WHATCOM COUNTY
WATER DISTRICT N0. 2

1615 Bayon Road
Bellingham, WA 98226

2023

WATER SYSTEM PLAN

System ID # 95700

BOARD OF COMMISSIONERS

Chuck Foster
Pete Rittmueller
Yaprak Goertz

Prepared By
Reichhardt & Ebe Engineering, Inc.
P.O. Box 978
Lynden, WA 98264
(360) 354-3687

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Whatcom County Water District #2
Water System Plan

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CHAPTER 1

CHAPTER 1

DESCRIPTION OF WATER SYSTEM

1.0 INTRODUCTION

This Chapter describes the existing Water System Facilities for Whatcom County Water District #2. The District is located in the Marietta area northwest of the City of Bellingham and adjacent to the Bellingham Airport. The location is shown on the Vicinity Map, Plate 1.

1.1 OWNERSHIP AND MANAGEMENT

Whatcom County Water District #2 is a municipal corporation created and operated under Title 57 of the Revised Code of Washington (RCW). The District is a Group A Community Water System (ID #95700). The District address is:

Whatcom County Water District #2
1615 Bayon Rd.
Bellingham, WA 98226
Phone: 360-733-5770 (24-hr Answering Machine)
Fax: 360-671-4912

A three member Board of Commissioners governs the Water District. The Board is responsible for making policy decisions for the District. The District Manager and Operator are appointed by the Board, and are responsible for managing the District operations. Key personnel include:

NAME	POSITION	HOME PHONE	OFFICE PHONE
Yaprak Goertz	Commissioner	(360)778-2786	(360)733-5770
Chuck Foster	Commissioner	(360)671-5394	(360)733-5770
Pete Rittmueller	Commissioner	(360)714-8690	(360) 733-5770
Lorrie Whitfield	Office Manager	(360)384-6184	(360)733-5770
Dave Olson	Operator	(360)733-7511	(360)739-5661

1.2 SYSTEM HISTORY AND BACKGROUND

1.2.1 History of Water System Development and Growth

The original system was constructed in 1945, utilizing treated water from the adjacent City of Bellingham. The 1997 Interlocal Agreement for purchase of water (Appendix I) allows the District to withdraw up to 1,100 gpm plus fire flow. There is no limit to the total amount of water taken, but under the current agreement the District cannot sell water outside of its boundaries as they existed on January 1, 1997, and the boundaries cannot be expanded without permission from the City. Water is provided from three interties with the City, and is provided at

sufficient pressure and quantity that storage and pressure boosting are not required by the District. This is verified by the hydraulic analysis in Appendix H.

Major expansions to the original distribution system were constructed in 1953, 1969, 1978, and 1993 from revenue bonds sold to generate funds necessary for construction. In 2014, in accordance with the Capital Improvement Plan adopted with the 2010 Water System Plan, undersized water mains on Olympic Way, Howard Avenue, Bancroft Avenue and Fort Bellingham Road were replaced. From time-to-time small extensions have been made to serve new customers. The District has grown from 64 connections in 1946 to 582 connections in 2020.

Part of the District is directly south of the Port of Bellingham Airport's main runway. As the runway expanded to accommodate larger aircraft, 47 nearby properties in the flight path were acquired by the Port for safety and noise abatement. The southwest part of the District along Marine Drive adjacent to the Nooksack River is located in a flood zone and has been inundated many times. The Whatcom Flood Control District has acquired 31 small properties prone to flooding and removed the structures from them. A few additional flood prone properties may be purchased in the future as they become available. Water mains in the vicinity of both the Port and Flood Control acquisitions are still functioning as they continue to serve other properties on either side and provide circulation to the water system.

The southeast portion of the District along Marine Drive is within the City of Bellingham Urban Growth Area, designated as Areas 1 and 4 on Plate 4. These areas include the majority of the Industrial and Urban Residential properties within the District. If annexed into the City, the District could continue to serve the annexed properties, or the City could take over that portion of the water system within the City Limits or possibly the entire District. The District does not anticipate that annexation will occur within the next ten years.

Under current County zoning approximately 90% of the buildable land in the District is developed.

1.2.2 Geography

The Shoreline Industrial area tends to be flat with some high bluffs, narrow backshores, slopes in excess of 15% adjacent to the Bay, and sandy beaches. There is some slope instability adjacent to the Bay. Wet areas have been identified between the Burlington Northern Railroad and Marine Drive on the Tilbury Cement property and the Marine Drive Industrial Park. Little Squalicum Creek flows through portions of the area. A high yield aquifer underlies much of this area.

The Airport/Marine Drive area consists of flat to rolling hills with slopes and bluffs adjacent to the shoreline ranging from 15 percent to upwards of 40 percent.

Numerous wetlands, as identified on the Whatcom County Critical Areas Maps, are located throughout the District, primarily in the western portions.

The Bennett Drive residential area is generally flat with some forest cover, which serves as a barrier between the residential area and the airport.

The Airport Gateway Operations area is fairly flat with sloping terrain toward the south. Most elevations in the area vary no more than 150 feet.

See topographic map, Plate 2.

1.2.3 Neighboring/Adjacent Purveyors

The only water purveyor adjacent to the District is the City of Bellingham, the District's supplier of water. The District's service area overlaps a portion of the City of Bellingham's Urban Growth Area. See Plates 3 and 4.

1.2.4 Ordinances/Bylaws

The District has adopted Resolutions and Policies pertaining to rates, services, etc. which are included in Appendix C.

1.3 INVENTORY OF EXISTING FACILITIES

1.3.1 Description of Facilities and Major Components

All water is supplied by the City of Bellingham via interties as described below in Section 1.3.3. The existing system facilities include a distribution system with approximately 15 miles of 4-inch to 8-inch water mains and appurtenances. The District relies on the City of Bellingham for storage and pressure. There are no District owned storage facilities or pumps. Master meters at the Bellingham interties are owned and maintained by the City and backflow devices are maintained by the District. All services are metered.

1.3.2 Number of Service Connections (Existing and Approved)

There are approximately 581 active services in 2020. The District was approved by the Washington State Department of Health (WSDOH) to support an unspecified number of connections in 2010. See Water Facilities Inventory, Appendix E.

1.3.3 Existing Interties

Water is purchased from the City of Bellingham at two intertie locations. The first intertie is an 8-inch diameter connection at Curtis Road to the City of Bellingham 10-inch diameter water main (which also serves the Lummi Indian Reservation). The pressure zone of this intertie is at elevation 276 feet. The second intertie is an 8-inch diameter connection at Marine Drive, east of Bennett Avenue. A third inactive intertie exists on Boxwood Avenue. All interties are metered and have approved backflow devices.

The only interties the District has are with the City of Bellingham. A copy of the interlocal water supply agreement between the District and the City of Bellingham can be found in Appendix I.

1.4 RELATED PLANS

1.4.1 Compatibility with Related Plans

The District's plan is not in conflict with plans for the City of Bellingham or Whatcom County's 2016 Comprehensive Plan. The City of Bellingham Urban Growth Boundaries include portions of the District, as shown on Plate 3. The District provides water service within its boundaries until such time as the city annexes and takes over the water utilities. Existing pipes outside of the UGA that meet minimum standards for fire protection and urban development will not serve as justification to allow for increased density or uses that are more intense than allowed under current zoning.

1.4.2 Coordinated Water System Plan

The Whatcom County Coordinated Water System Plan was developed under 70.116 RCW, and updated in 2000 and 2016. The District's system and service area boundaries are in conformance with the 2016 Coordinated Water System Plan.

1.4.3 County Response

This plan has been submitted to the Whatcom County Planning Department for consistency. A copy of the consistency statement is included in Appendix D. Requested changes are included.

1.4.4 Previous Water System Plan

The previous Water System Plan was approved by WSDOH on April 20, 2010.

1.5 EXISTING SERVICE AREA CHARACTERISTICS

1.5.1 Existing Service Area Map/Zoning and Land Use

The District's Service Area and Retail Service Area are shown on the Zoning/Land Use map, Plate 3. The District's Service Area, Retail Service Area and District Boundaries are identical. Areas within the Bellingham UGA are generally zoned for Industrial and higher density residential, while areas outside of the UGA are zoned for rural residential.

The area within the legal boundaries of the District is approximately 1,300 acres.

1.6 FUTURE SERVICE AREA

The District has the ability to expand its service area upon approval by the Board of Commissioners, the City of Bellingham and Whatcom County, providing such expansion is

consistent with Urban Growth regulations. However the District is not currently expanding and has no plans to expand beyond its existing service area.

1.7 SERVICE AREA AGREEMENTS

The District has overlapping service areas within the City of Bellingham UGA. The District will serve these areas until they are annexed by the City, or will continue to serve them after annexation if mutually agreed upon by both the City and District. The Interlocal Agreement with the City of Bellingham, located in Appendix I, provides the basis and conditions for water supply.

1.8 RETAIL SERVICE AREA

The Retail Service Area for the District is the same as the District Boundaries, shown on Plate 3.

1.9 SERVICE AREA POLICIES

1.9.1 Within City of Bellingham Urban Growth Area

1. A portion of the District lies within the City of Bellingham UGA and may be annexed into the City. The City has the right under RCW 35.13A to assume those portions of the District when annexed.
2. Improvements and/or upgrades to serve new development within the UGA shall be borne by the Developer.
3. Distribution system improvements within the UGA are required to provide fire flow consistent with Bellingham requirements.
4. The District shall have the first right of refusal with the City of Bellingham for ownership and maintenance of developer constructed water facilities in the UGA.
5. Existing fire flow meets the standards set forth in the Whatcom County Coordinated Water System Plan, but may not meet the stricter requirements of the City of Bellingham. New facilities and replacement of existing facilities will be sized to meet City of Bellingham fire flow requirements. The cost of such facilities will be borne by the Developer or Owner.
6. Transfer of ownership of District facilities and liabilities within areas annexed by the City of Bellingham shall be in accordance with the provisions of RCW 35.13A.
7. As a condition of annexation and assumption of existing District facilities, the Board of Commissioners and the City of Bellingham will negotiate an interlocal agreement, which will address the protection of the District's financial viability.

1.9.2 Outside City of Bellingham Urban Growth Area

1. Water service shall be provided at rural levels of service.
2. Water service shall be provided on a first-come first-served basis.

3. If or when the ownership and maintenance of the District's facilities are transferred to the City of Bellingham, service shall be provided in accordance with the policies of the City of Bellingham.

1.9.3 Wholesaling Water

The District does not provide water to other utilities on a wholesale basis.

1.9.4 Wheeling Water

The District's mains are not used to wheel water from the City of Bellingham or other purveyors. The District does supply water to a mobile home park, multi-family facility and a business park through master service meters. Wheeling water is prohibited unless approved by the City.

1.9.5 Annexation

It is the policy of the District that properties outside the District boundary must be annexed as a condition of service. Water District #2 was established to provide water for the service area boundaries shown on Plate 3. Projected usage within the service area boundaries will receive priority. However, if water availability exists, the Commissioners may decide to extend the service area boundaries. Expansion of the District's service area must be approved by the Boundary Review Board and any additional sale of water to new service areas requires approval by the City of Bellingham as outlined in the current contract, and must be in conformance with Urban Growth policies.

1.9.6 Design and Performance Standards

The District's development standards for new development are consistent with the City of Bellingham Development Guidelines and Improvement Standards. The minimum design and performance specifications for new extensions and related improvements are described in Chapter 7 – Standard Construction Specifications.

1.9.7 Urban Growth Area

For those areas in the District within the City of Bellingham Urban Growth Area, water will be provided at the level of service as zoned in the Urban Fringe Area Subarea Comprehensive Plan. Those responsible for new development and redevelopment of properties in these urban areas shall be expected to pay for the extensions or replacement of distribution and other facilities.

Where main extensions are required in the UGA, the District may require the Developer to perform the capital improvements under a City of Bellingham Public Facilities Construction Agreement. Use of the City of Bellingham Public Facilities Construction Agreement shall occur if and only if the actual extension is from a City owned main and will be deeded over to the City for maintenance and operation. Main extensions in this area may be extensions of the City of Bellingham mains or from existing parallel District mains.

1.9.8 Late-Comer Agreements

It is the policy of the District to contract with owners for the reimbursement of developer extension construction costs from connections charges received for properties subsequently utilizing District facilities developed by the developer extension method of procuring service. The District Reimbursement Policy is in accordance with RCW 57.22.

1.9.9 Oversizing

Oversized mains are typically those in excess of 8-inches in diameter in low density residential areas and 12-inches in diameter in high density residential, commercial or industrial zones. Any reimbursement for oversizing shall be determined by the Board prior to construction, and shall be established by Resolution. The District may refuse to participate in a project with oversizing payment if budgetary considerations or the prudent management of the District indicates such participation is not appropriate at the time. In such event, the Developer may proceed to construct its extension with the required oversizing, and shall be entitled to a reimbursement agreement with the District, payment to be conditioned upon future events justifying such District expenditure, e.g. developments utilizing such oversized facilities and providing General Facility Funds to the District. Oversizing for future growth will not be allowed in rural zones outside of the Bellingham UGA.

1.9.10 Cross-Connection Control Program

Where the possibility of contamination of the supply exists, water services shall be equipped with appropriate cross connection control devices in accordance with Chapter 246-290 WAC. The District's cross-connection program shall determine the need, size, kind, and location of the device. The District reserves the right to require backflow preventers prior to hook up for any service that may pose risk of contamination to the system. All costs associated with the installation, maintenance, and testing of backflow assemblies will be the responsibility of the customer. See Resolution #01-96 in Appendix G for further information on cross contamination policies.

1.9.11 Extension

Water is available per District policy to all residents and property owners within the District equally. It is the policy of the District to require developers and new customers to fund and construct the necessary improvements to extend service, including new water distribution mains, fire hydrants, meters, and other local facilities. The scope of improvements is determined by the District's Engineer and paid for by the Developer. The fees for engineering services, inspection during construction, and upgrading the District's as-built plans are charged to the Developer on a time and material basis. Improvements are be made in accordance to the *District Development Standards* in Appendix F and the current approved *Water System Plan.*

1.9.12 Rates and Charges

All users within the District are required to pay water service fees comprised of a base rate and a water use rate. Water use rates are assessed based upon consumption. Connection fees will be dependent upon size of service. Payment should be within thirty (30) days of billing, and thereafter late fees will be charged. After sixty (60) days the District reserves the right to shut off water service. A reconnection fee will be charged, but shall not exceed the standard connection fee. Connections for new services will not be made until connections fees have been paid in full, and the service has been installed to District Standards. Rates and charges are established by resolution. The current rates are shown in Appendix C.

1.9.13 Disruption of Service

All water system users will be notified prior to regularly scheduled inspection, maintenance, and repair activities that may disrupt services. Notification shall be posted on each customer's door 24 hours in advance of scheduled disruption of water service. A flier posted on the door, such as a door hanger, may be used to notify the customer of:

1. Water Service Shut Off
2. High Water Usage, or
3. Planned Disruption Of Service

The District will make every attempt to limit down time to off hours, such as evenings and weekends. Typical maintenance operations that may require shut down include flushing and disinfecting mains. Emergency repairs may need to be performed with very little notice. In such cases, notification will be done by telephone or in person with door hangers.

1.10 DUTY TO SERVE

1.10.1 Capacity

The Interlocal Agreement with the City of Bellingham to provide potable water to the District allows withdrawal of 1,100 gpm plus any required fire flow. This amount is adequate to provide service to all existing and future customers of the District through the 20 year planning period. The water demand projections are shown in Tables 2-9 and 2-10.

1.10.2 Consistency

Applications for service must be consistent with this Water System Plan, the Interlocal Agreement with the City of Bellingham, and District Development Regulations and Service Extension Policies. A Consistency Statement from Whatcom County is covered in Section 1.11 below.

1.10.3 Water Rights

A water rights self assessment is included in Appendix I. Water is provided under City of Bellingham water rights.

1.10.4 Timely and Reasonable

Upon receiving a request for new service, the District will, within 30 days initiate a meeting with the developer to outline the requirements and procedures.

1.11 CONSISTENCY FROM LOCAL PLANNING AND WRIA

This plan has been submitted to the Whatcom County Planning Department for consistency. A copy of the consistency statement is included in Appendix D.

NTS

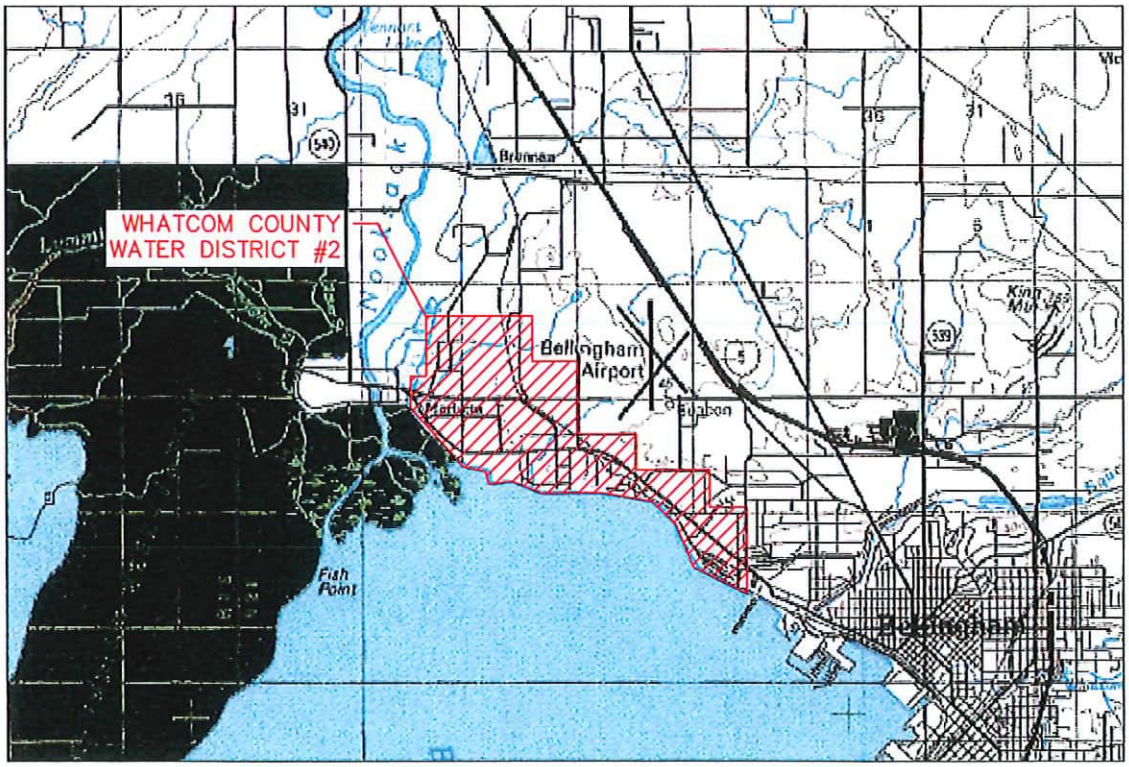

PLATE 1

Whatcom County Water District 2 Vicinity Maps

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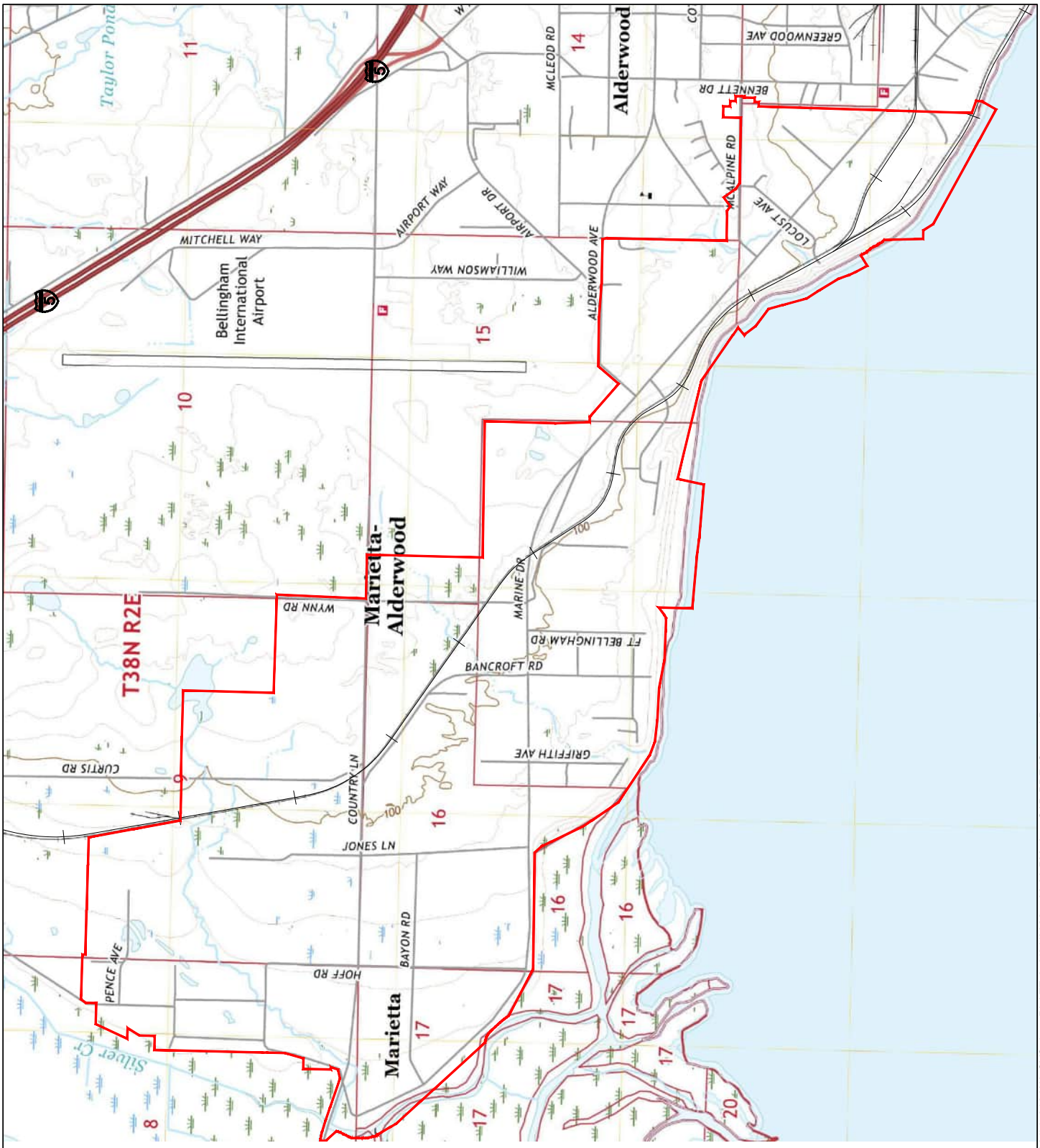

PLATE 2

WHATCOM COUNTY WATER DISTRICT 2 USGS QUAD MAP

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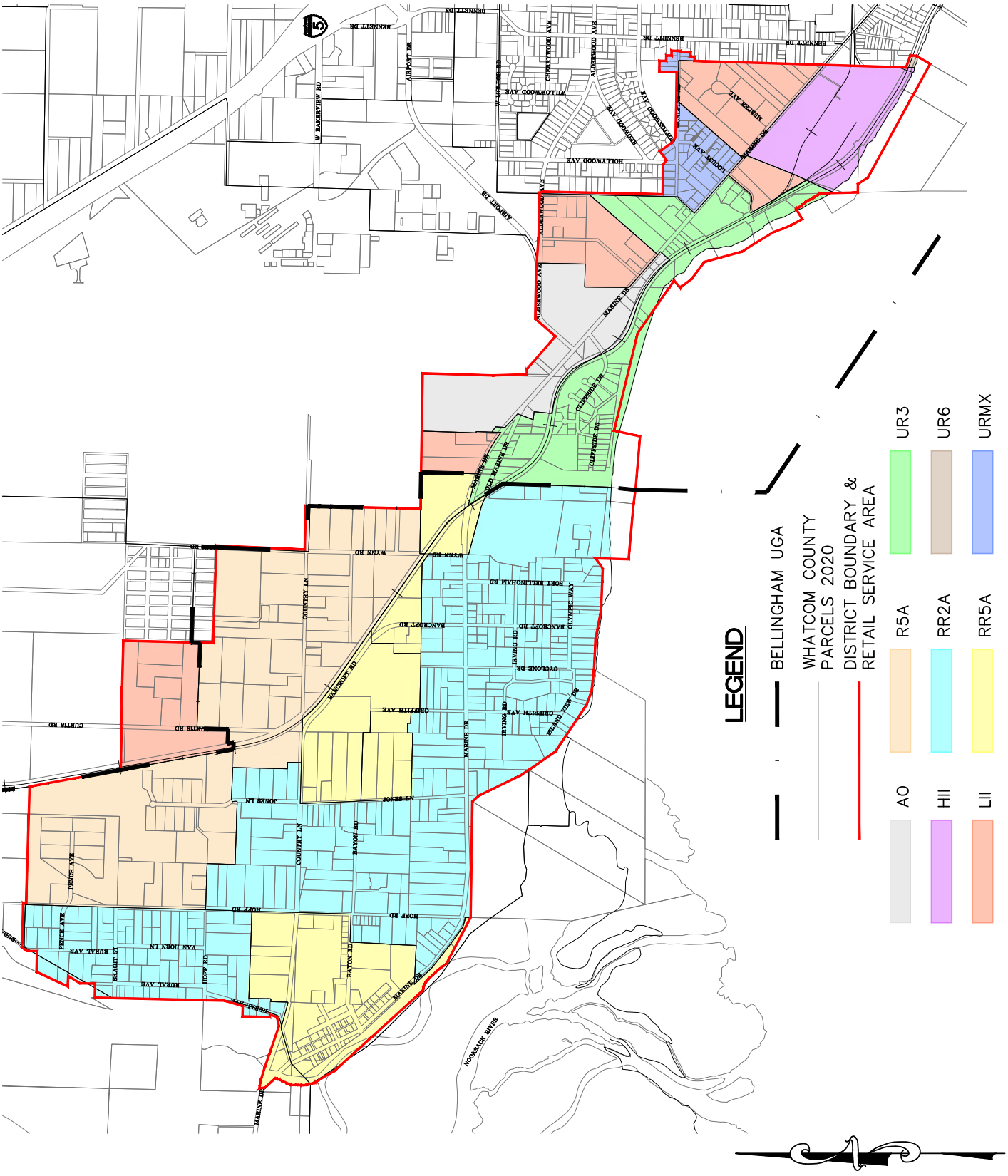

PLATE 3

WHATCOM COUNTY WATER DISTRICT 2 ZONING MAP

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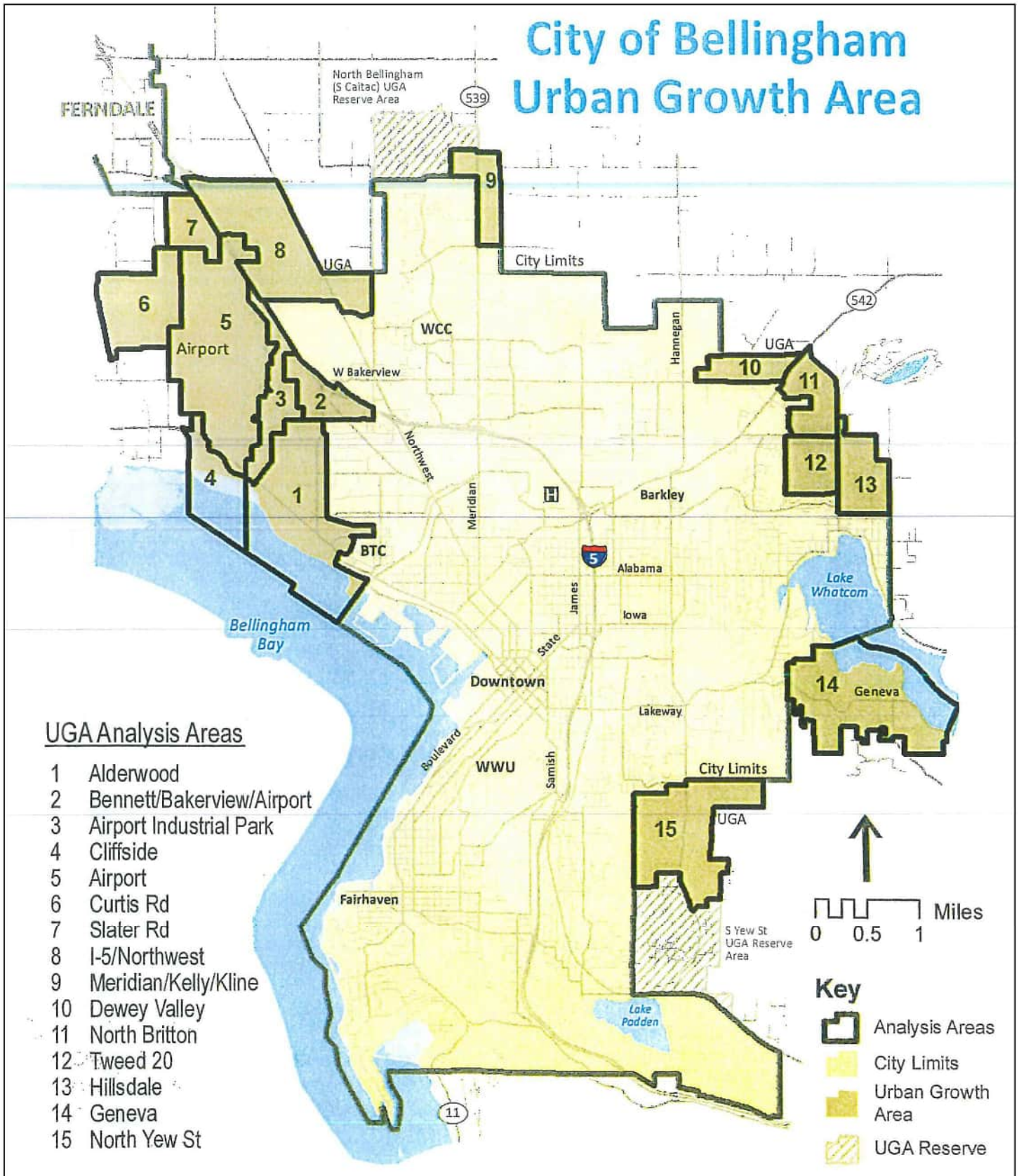


UGA Analysis Areas

1 Alderwood
2 Bennett/Bakerview/Airport
3 Airport Industrial Park
4 Cliffside
5 Airport
6 Curtis Rd
7 Slater Rd
8 I-5/Northwest
9 Meridian/Kelly/Kline
10 Dewey Valley
11 North Britton
12 Tweed 20
13 Hillsdale
14 Geneva
15 North Yew St

PLATE 4 BELLINGHAM URBAN GROWTH AREAS

GRAPHIC SCALE

800 0 400 800

(IN FEET)
1 inch = 800 ft.

LEGEND

- = 4" MAIN
- = 6" MAIN
- = 8" MAIN
- = 10" MAIN
- = 12" MAIN
- = 16" MAIN
- = DISTRICT BOUNDARY
- = BELLINGHAM UGA

INTERTIES

1. Marine Dr. Connection Point to City of Bellingham System
   - 6" Rockwell Turbo Meter w/ Strainer
   - 6" Single Check Valve
2. Boxwood Ave. Connection Point to City of Bellingham System
   - 6" Sensus Meter
   - 6" DCVA, Febco 805YD
   - 6" Cla-Val Pressure Reducing Valve (Connection Inactive)
3. Cutis Rd. Connection Point to City of Bellingham System
   - 6" Hersey FMCT Meter
   - 6" Single Check Valve

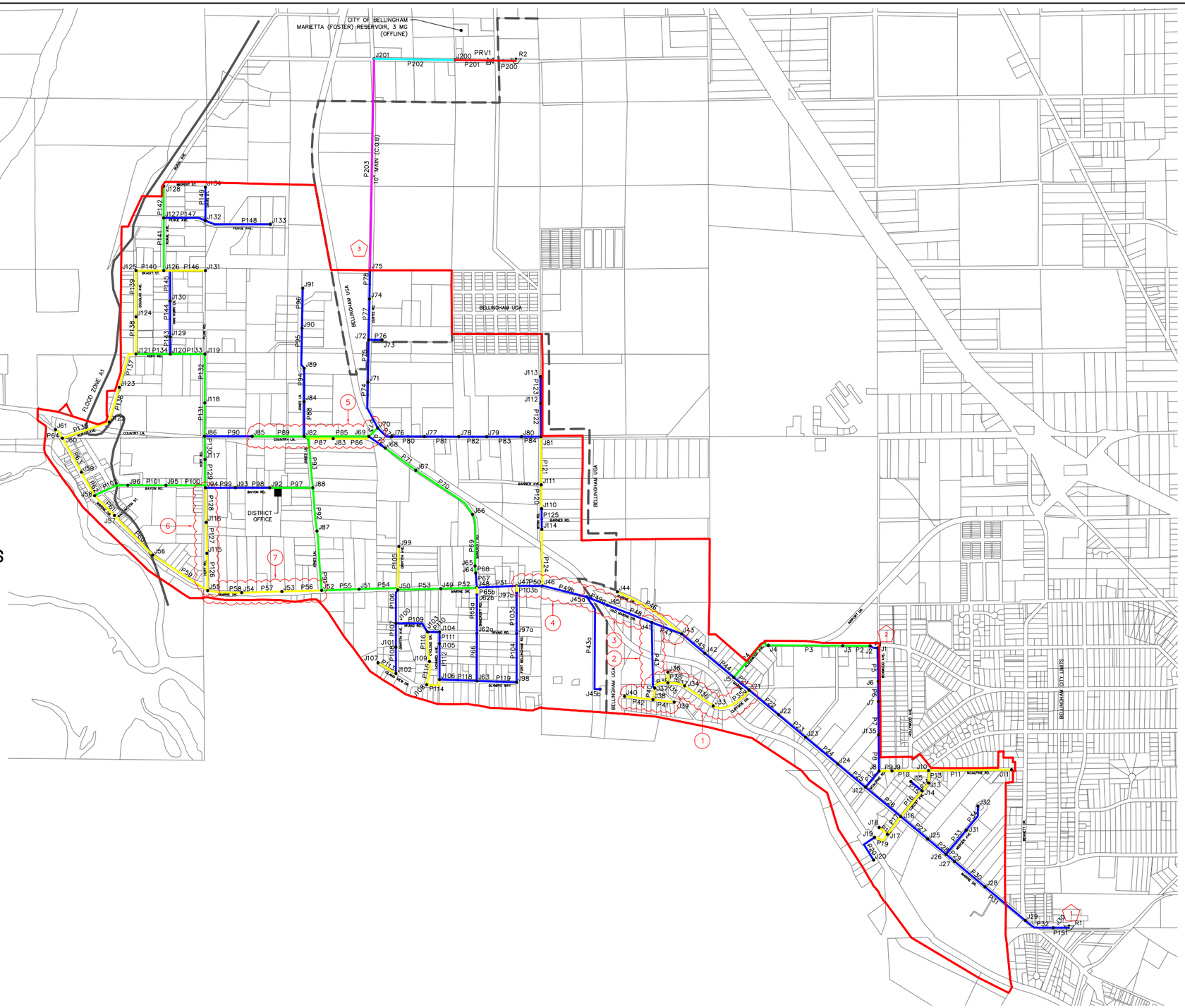
NOTES:

1. UPGRADE/CONSTRUCT ALL EXISTING/FUTURE WATER MAINS REQUIRED FOR FIRE FLOW WITHIN RESIDENTIAL ZONES TO A MINIMUM OF 8" DIAMETER.

2. UPGRADE/NEW WATER MAINS IN ALL ZONES OTHER THAN RESIDENTIAL ZONES SHALL BE SIZED TO PROVIDE FIRE FLOW CONSISTENT WITH THE REQUIREMENTS OF THE FIRE MARSHAL HAVING JURISDICTION. A HYDRAULIC ANALYSIS MAY BE REQUIRED.

RECOMMENDED IMPROVEMENTS

PLAN REFERENCE #	DESCRIPTION
	IMPROVEMENTS WITHIN BELLINGHAM UGA
1	Cliffside Area – Replace 2,850' of 4" with 8"
2	Cliffside Area – Replace 900' of 8" AC pipe
3	Old Marine Drive Phase 1 – Replace 1,300' of 8" AC pipe
	IMPROVEMENTS OUTSIDE BELLINGHAM UGA
4	Old Marine Drive Phase 2 – Replace 850' of 8" AC pipe
5	Country Lane – Replace 2,000' of 6" with 8"
6	Hoff – Replace 1,590' of 4" with 8"
7	Marine Drive, Jones to Hoff – Potential slide replacement 1,800' of 4" with 8"



DESIGNED BY CFR DRAWN BY IDH CHECKED BY	Reichhardt & Ebe ENGINEERING INC P.O. Box 978 | 423 Front Street Lynden, WA 98264 (360) 354-3687	NO.	DATE	DESCRIPTION	BY	WHATCOM COUNTY WATER DISTRICT NO. 2 1615 BAYON ROAD BELLINGHAM, WA 98225	2022 COMPREHENSIVE WATER SYSTEM PLAN

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CHAPTER 2

CHAPTER 2

BASIC PLANNING DATA AND WATER DEMAND FORECASTING

2.1 CURRENT POPULATION, SERVICE CONNECTIONS, WATER USE AND EQUIVALENT RESIDENTIAL UNITS

2.1.1 Current Population

The District had 582 service connections in 2020. Of those 547 were single-family residential connections, and 7 were multi-family residential connections serving 50 units for a total of 597 residential units. Estimating 2.5 persons per household, the current population of the District is approximately 1,500 persons.

2.1.2 Total Service Connections

A summary of the District's service connections is shown in Table 2-1. These are the total metered connections and include both active and inactive accounts. Multi-family accounts generally serve multiple residential units through one meter. Tables 2-3 through 2-6 show only active connections using water. Unoccupied properties have been excluded in order to accurately establish water use per ERU.

Table 2-1: Total District Connections

Connection Type	2017	2018	2019	2020
Single-Family	537	539	544	547
Multi-Family	7	7	7	7
Commercial	25	25	26	26
Smith Gardens	2	2	2	2
Total	**571**	**573**	**579**	**582**

2.1.3 Water Use Data Collection

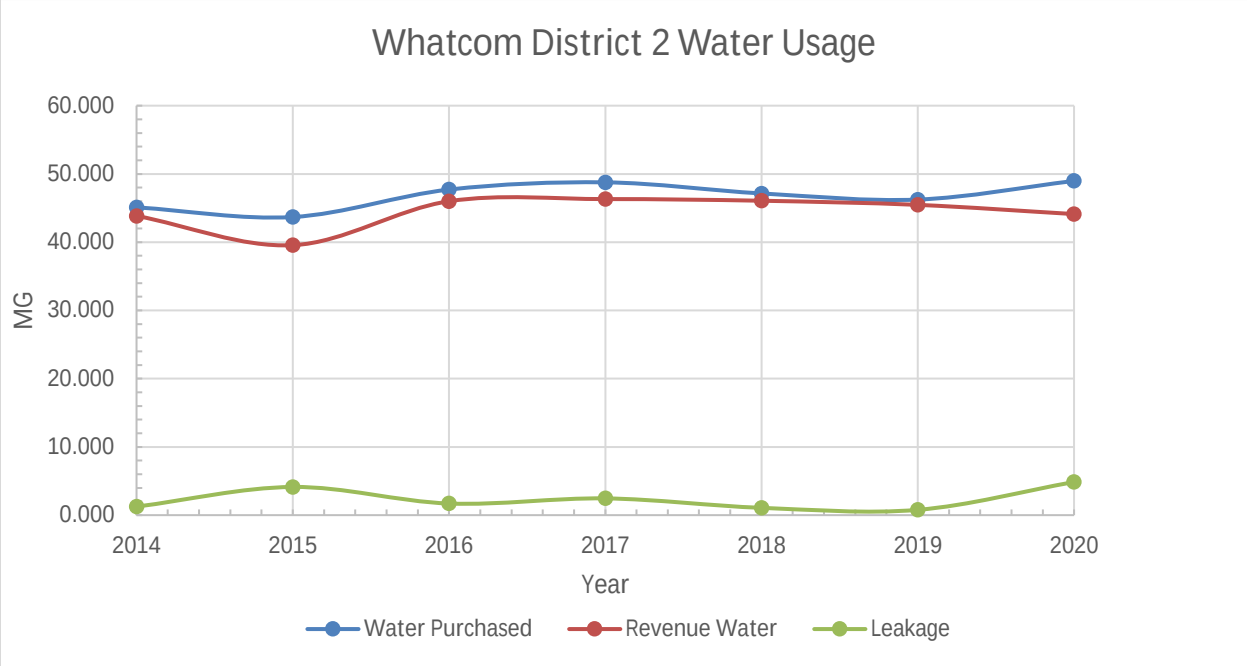
The District's water is purchased from the City of Bellingham. Water is provided through master meters at two separate locations; Marine Dr. and Curtis Rd. A third connection on Boxwood Ave. exists but is not currently used. The master meters furnishing water to the District are owned, operated and maintained by the City. Bellingham Meter calibration is the responsibility of the City. The master meters are read monthly, and the amount of water used is reported to the District. Meter readings by the City are not time coordinated with District customer meter readings, which can result in inaccurate estimates of monthly water loss. The District measures authorized consumption through bi-monthly readings of customer service meters.

Historical demands, as reflected in billing information from the City of Bellingham and District service meter readings are shown in Table 2-2.

Table 2-2: Water Use

Year	Water Purchased (MG)	Authorized Consumption (MG)	Distribution System Leakage (MG)	Distribution System Leakage (%)
2014	45.102	43.853	1.249	2.8
2015	43.685	39.556	4.129**	9.5**
2016	47.706	46.002	1.704	3.6
2017	48.766	46.312	2.454	5.0
2018	34.141*	46.069	NA	NA
2019	46.244	45.464	0.780	1.7
2020	48.973	44.116	4.857**	9.9**

*Inaccurate Bellingham Master Meter Information
**Includes system flushing



2018 Water Purchased was Estimated

In the above Table 2-2 Water Purchased is the total of all water purchased per calendar year from the City of Bellingham. This information is provided by the City. Authorized Consumption is the sum of all water sold and recorded on customer's service meters. Distribution System Leakage (DSL) is the difference between the City's records of water sold to the District and water billed to customers by the District. These figures are used for reporting Water Use Efficiency, and do not include Authorized Unmetered Consumption, which has not been tracked. The District flushes the distribution system on a five year schedule. In the years 2015 and 2020 system wide flushing occurred, but the amount of water used was not estimated or recorded. As a result those two years are not included in the analysis of DSL. Flushing can be done at any time of year, typically during low use periods. Flushing can also be delayed if there are water shortages.

2.1.4 Authorized Consumption and Distribution System Leakage

The District has had little authorized un-metered use in recent years. Water purchased from Bellingham is expensive and efforts are made to minimize water use that cannot be billed. Hydrants are flushed annually, but only using enough water to clean the barrels. System wide flushing is restricted to once every five years and is done during low use periods. Leaks have historically been confined to service saddles and AC pipe. No significant leaks have been reported in recent years. As a result the District reports the difference between water purchased and water sold (authorized consumption) as leakage (DSL). As can be seen in Table 2-2 leakage for the years 2015 and 2020 included hydrant flushing, and 2018 did not have accurate water purchased numbers. This leaves the years 2014, 2016, 2017 and 2019 with representative leakage numbers that can be used to estimate DSL. During those four years the leakage varied from 1.7% to 5%, averaging 3.3%. A leakage factor of 5% is used for estimating DSL without conservation in future years. A leakage factor of 3% is used with conservation.

2.1.5 Equivalent Residential Units (ERUs)

The Washington State Department of Health defines an ERU as "…a system-specific unit of measure used to express the amount of water consumed by a typical full-time single-family residence". The District has several different types of connections, each of which must be equated to a single family residence (ERU). Individual meter records for all users for the years 2017 through 2020 were analyzed. Vacancies and periods of non-use were removed in order to get an accurate value for water use in gallons per day per ERU and to determine the number of active ERUs. Table 2-3 summarizes this data for single family residential usage. In 2019 a few residential meters were not recorded for the last billing period, which is reflected in slightly lower gpd/ERU results. In 2020 during the COVID pandemic many residents were unemployed or worked at home, resulting in higher residential water use and lower commercial water use. Since there is a possibility that people will continue working at home the 2020 value of 155 GPD/ERU will be used for calculating equivalent ERUs for non-residential users (Tables 2-4 through 2-7). This figure is based only upon user water meter data, which does not include DSL or other non-metered authorized consumption.

Tables 2-3 through 2-7 show the conversion of water use for the various water user types to ERUs.

Table 2-3: Single Family Water Usage

Year	2017	2018	2019	2020
SF Water Used (mg)	28.527	30.717	28.128	29.889
Number of SF Services	537	539	544	547
Active SF Conn. (ERUs)	518	524	509	528
GPD/ Active ERU (ADD)	150.9	160.6	151.6	155.1
Total Active SF ERUs	518	524	509	528

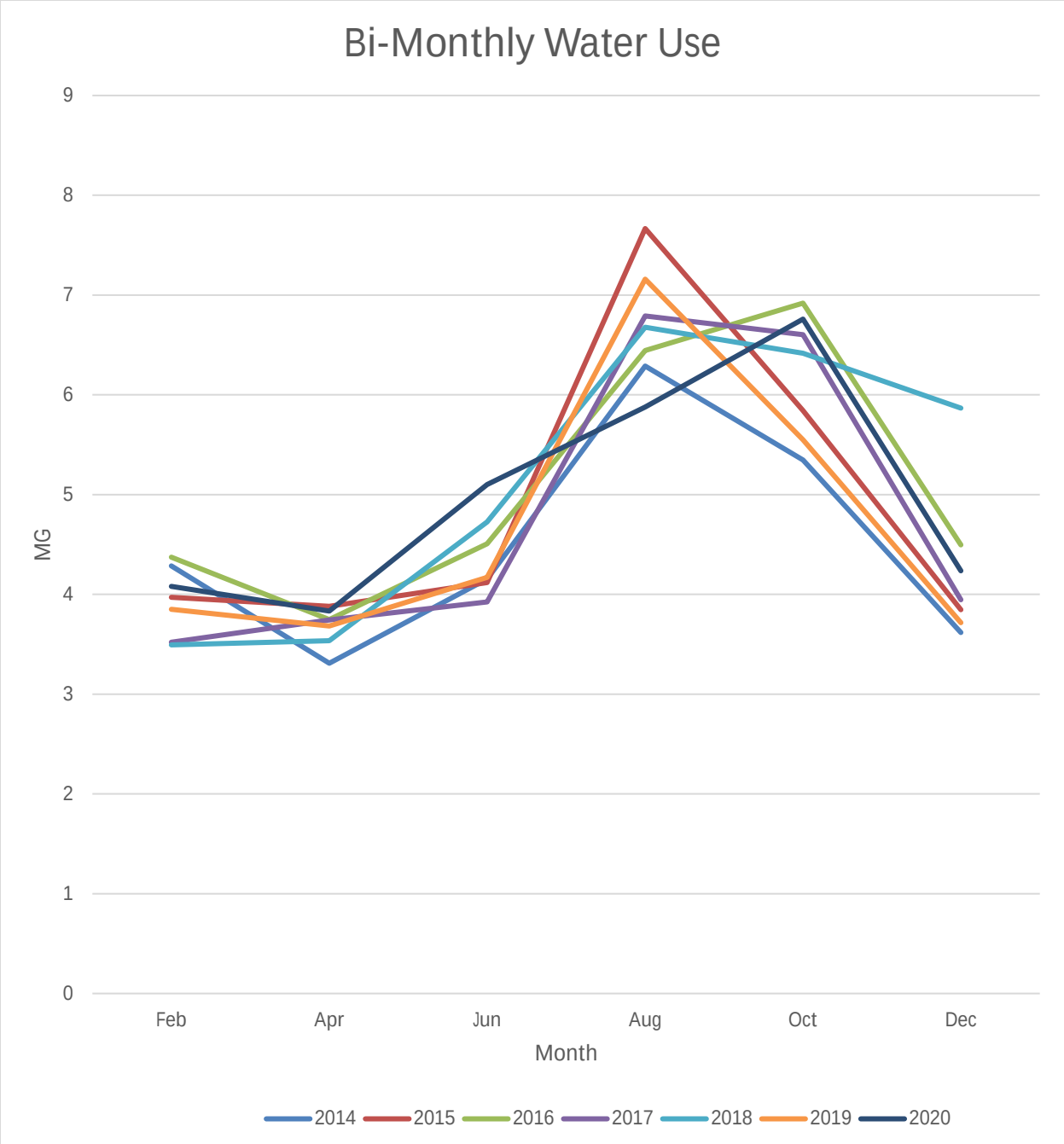


Table 2-4: Multi Family Water Usage

Year	2017	2018	2019	2020
MF Water Used (mg)	1.67	2.07	1.97	2.20
Number of MF Units	48	50	50	50
GPD/ MF Unit	95.1	113.5	107.7	120.0
ERUs/MF Unit	0.63	0.71	0.71	0.77
Total Equivalent MF ERUs	30.2	35.5	35.5	38.5

Table 2-5: Commercial Water Usage

Year	2017	2018	2019	2020
Comm. Water Used (mg)	2.75	3.44	3.58	2.25
Number of Active Comm. Units	18.5	16.0	17.5	16
GPD/ Comm. Unit	406.7	547.0	568.5	381.9
ERUs/Comm. Unit	2.70	3.1	3.2	2.3
Total Equivalent Commercial ERUs	50.0	52.7	55.4	37.0

Table 2-6: Smith Gardens Usage

Year	2017	2018	2019	2020
Water Used (mg)	9.46	9.75	9.38	10.03
Number of Active SG Units	2	2	2	2
Total Equivalent Smith Gardens ERUs	171	166	170	177

Table 2-7: Total Equivalent ERUs

Year	2017	2018	2019	2020
Single Family	518	524	509	528
Multi-family	30	36	36	39
Commercial	50	53	55	37
Smith Gardens	171	166	170	177
Total Equivalent ERUs	769	779	770	781

2.1.6 Water Demand

Average Day Demand:

Average Day Demand is the yearly amount of water from all sources divided by the number of days in the year. ADD based upon the years 2017 through 2020 ranged from approximately 150 gpd/ERU to 160 gpd/ERU (Table 2-2). This range could be due to several factors, including rates and weather. The higher figure of 160 gpd/ERU is used as the ADD without conservation. The lower figure of 150 gpd/ERU was nearly attained in 2017 and 2019 and is used as the ADD with conservation. DSL without conservation is estimated to be 5% of ADD and with conservation is estimated to be 3% of ADD. The above figures do not include flushing, which occurs on a flexible 5 year schedule. Flushing can be coordinated with the City to avoid high use periods. There is no limit to the amount of water the District can take from the City for flushing, but the high cost of water is a limiting factor.

Without Conservation

GPD/ERU	= 160 gpd
10% Safety Factor	= 16 gpd
Authorized Consumption	= 176 gpd
DSL allowance = 5% AC	= 9 gpd
Total	**185 gpd/ERU**

With Conservation

GPD/ERU	= 150 gpd
10% Safety Factor	= 15 gpd
Authorized Consumption	= 165 gpd
DSL allowance = 3% AC	= 5 gpd
Total	**170 gpd/ERU**

Maximum Day Demand:

The District does not have the ability to obtain daily use records which could be used to calculate Maximum Day Demand (MDD). The highest meter reading period from the 2017 through 2020 period was used as the Maximum Month Day Demand (MMDD), and a factor of 1.35 used to estimate the MDD. The maximum month billed by the City of Bellingham occurred in July of 2019 for 6,789,596 gal, which included DSL. There were 779 equivalent ERUs during that 31 day period, which equates to 281 gpd/ERU. DSL for 2017 was 8 gpd/ ERU. Deducting 8 gpd DSL, the MMDD based upon Authorized Consumption is 273 gpd/ERU. A 35% conversion factor recommended for systems with over 1,000 population, a 10% safety factor, and 8 gpd/ERU for DSL are combined to arrive at the MDD.

Without Conservation
MDD = 273 + (0.1 SF x 273) + (0.35 Conv. Fact. x 273) + 8 DSL = 404 gpd/ERU

With Conservation
gpd/ERU with conservation is 92% of gpd/ERU without conservation. (170/185 = 0.92)
MDD with conservation = 0.92 x 404 = 372 gpd/ERU

ADD and MDD SUMMARY

ADD Without Conservation	185 gpd/ERU
ADD With Conservation	170 gpd/ERU
MDD Without Conservation	404 gpd/ERU
MDD With Conservation	372 gpd/ERU

Peak Hour Demand:

Peak Hour Demand (PHD) is given by Equation 5-3 of the WSDOH Water System Design Manual as seen below:

PHD = ((MDD/1440) (C) (N) + F) + 18
Where:

PHD = Peak Hour 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

No. of ERUs (N)	C	F
15 – 50	3.0	0
51 – 100	2.5	25
101 – 250	2.0	75
251 - 500	1.8	125
> 500	1.6	225

The PHD formula is used in all water modeling computations for the distribution system capacity and for compliance with the City of Bellingham agreement for water.

2.2 PROJECTED LAND USE, FUTURE POPULATION, AND WATER DEMAND

2.2.1 Projected Land Use

The District is located between the cities of Ferndale to the north and Bellingham to the east. The northerly and westerly portions of the District are generally zoned as low density single family residential. These areas do not have sewer service and as a result are zoned for larger 2 to 5 acre minimum lot sizes. The area along the southeasterly part of the District is commercial and industrial with some multifamily zoning. Sewer is available in this area which allows higher density development. A large commercial garden nursery is also located in the southern portion of the District. The Bellingham Airport is located along the southern and eastern side of the District. Several years ago the Port of Bellingham acquired a group of residential properties south of their main runway for noise abatement. The Port recently indicated that they have no plans to acquire additional noise abatement related properties within the District. Properties along the Nooksack River in the southwest area of the District are located in a flood zone and many have been acquired and cleared by Whatcom Flood Control. There has been no recent flood control purchase activity and it is not anticipated that any significant number will be acquired in the near future.

Existing zoning within the District's boundaries consists of eight zoning classifications:

AO = Airport Operations
HII = Heavy Impact Industrial
LII = Light Impact Industrial
RR2A = Rural 1 Unit per 2 Acres
RR5A = Rural Residential 1 Unit per 5 Acres
R5A = Rural 1 Unit per 5 Acre
UR3 = Urban Residential 3 Units per Acre
URMX = Urban Residential Mixed Use

See Plate 3, Chapter 1, Zoning Map.

The Whatcom County Tax Parcel Viewer was used to locate vacant properties within the District. There are approximately 40 residentially zoned parcels without homes. Several of these parcels could be split into smaller lots, but some may have wetlands or other features that prevent development. The areas zoned for Light Impact Industrial include approximately 10 undeveloped properties. The former Cement Plant property located in the southeast corner of the District is zoned Heavy Impact Industrial, but is served with water directly by the City of Bellingham.

The Final EIS for the Whatcom County 2016 Comprehensive Plan and Development Regulations Update and Urban Growth Areas Review, November 2015, Appendix E, contains a table of water purveyors, listing current (2013) and future (2036) population and dwelling units. See Appendix D. Water District No. 2 is listed as having 689 dwelling units within its boundaries in 2013. However the District only served 578 dwelling units as of 2020. The projection from 2013 to 2036 shows 18 new dwelling units. This amounts to slightly over 1 new dwelling unit per year. The District has grown at the rate of approximately 3 new dwelling units per year over the last four years. With the scarcity of buildable residential properties it is anticipated that residential growth will essentially conform to the County's projections.

A portion of the District is within the City of Bellingham Urban Growth Area as shown on Plate 3, Chapter 1. There has been little action by the City to annex this area, and the District does not anticipate that annexation will occur within the next 10 years. However if the City does proceed with annexation they may choose to continue using the District as water purveyor. Taking a major portion of the District's customers would cause a financial hardship on the District, and as a result the City could be required to take over the entire District.

2.2.2 Projected Water Use

There are approximately 650 existing parcels within the legal boundaries of the Water District. Of those approximately 35 have been acquired by the Port of Bellingham and the Whatcom flood Control District. Those lots cannot be built upon because they are either in the flood zone of the Nooksack River or in the Bellingham Airport noise abatement area.

An estimate of the District's Growth in ERUs is presented in Table 2-8. ERUs are based upon Table 2-7 for the year 2020, with the exception of Commercial, which is based on the year 2019. Commercial use was unusually low in 2020, probably because of the COVID pandemic. Residential growth is based upon the Whatcom County growth projections described in Section 2.2.1. Residential growth includes both single and multi-family ERUs. Additional Multi-family development is not expected, due to zoning and land availability. Commercial use may see additional growth, but Appendix E of the Whatcom County Urban Growth Review shows no increase in employment through the year 2036. Smith Gardens is not expected to expand in their present location because of zoning and lot coverage issues.

Table 2-8: Projected Number of ERUs

	ERUs				
Year	Single-Family	Multi-Family	Commercial	Smith Gardens	Total
2022	530	39	58	177	804
2023	531	39	58	177	805
2024	532	39	58	177	806
2025	533	39	59	177	808
2026	534	39	59	177	809
2027	535	39	59	177	810
2028	536	39	59	177	811
2029	537	39	59	177	812
2030	538	39	60	177	814
2031	539	39	60	177	815
2032	540	39	60	177	816
2033	541	39	60	177	817
2043	548	39	60	177	827

2.2.3 Water Demand Forecasting

Projected water demand for the next 10 and twenty years is calculated with and without conservation. The calculated ADD, MDD, and PHD from Section 2.1.6 and ERU projections from Table 2-8 were used to calculate future water demands for the entire system.

Without Conservation

Average Day Demand (ADD) = 185 gpd/ERU
Maximum Day Demand (MDD) = 404 gpd/ERU

Table 2-9: Projected Water Demand without Conservation

Year	ERUs	ADD	MDD	PHD	Q_a
		(mgd)	(mgd)	(gpm)	(ac-ft/yr)
2022	804	0.1487	0.3248	442	167
2023	805	0.1489	0.3252	442	167
2024	806	0.1491	0.3256	443	167
2025	808	0.1495	0.3264	444	167
2026	809	0.1497	0.3268	444	168
2027	810	0.1499	0.3272	445	168
2028	811	0.1500	0.3276	445	168
2029	812	0.1502	0.3280	446	168
2030	814	0.1506	0.3289	447	169
2031	815	0.1508	0.3293	447	169
2032	816	0.1510	0.3297	447	169
2033	817	0.1511	0.3301	448	169
2043	829	0.1534	0.3349	453	172

Q_a is the total amount of water needed for the year based on ADD

With Conservation

Average Day Demand (ADD) = 170 gpd/ERU
Maximum Day Demand (MDD) = 372 gpd/ERU

Table 2-10: Projected Water Demand with Conservation

Year	ERUs	ADD (mgd)	MDD (mgd)	PHD (gpm)	Qa (ac-ft/yr)
2022	804	0.1367	0.2991	408	153
2023	805	0.1369	0.2995	409	153
2024	806	0.1370	0.2998	409	153
2025	808	0.1374	0.3006	410	154
2026	809	0.1375	0.3009	411	154
2027	810	0.1377	0.3013	411	154
2028	811	0.1379	0.3017	411	154
2029	812	0.1380	0.3021	412	155
2030	814	0.1384	0.3028	413	155
2031	815	0.1386	0.3032	413	155
2032	816	0.1387	0.3036	413	155
2033	817	0.1389	0.3039	414	156
2043	829	0.1409	0.3084	419	158

Q_a is the total amount of water needed for the year based on ADD

2.2.4 Fire Flow Requirements

This section deals with the District's policies regarding fire flow for future facilities and for upgrades to existing facilities. Historically the District has required developers to provide fire hydrants and water mains capable of providing fire flow. Although the County does not require fire flow in most rural residential zones, they do require fire suppression facilities for larger homes regardless of zoning. Therefore, the District requires new water mains to be designed and constructed to meet minimum County and DOH requirements and recommendations for fire suppression. This normally consists of a gravity storage system with adequately sized water mains and fire hydrants. The Interlocal Agreement with the City allows the District 1,100 gpm plus available fire flow. There is no limit to the volume or quantity of water. Therefore, fire flow is limited by the ability of the distribution system to provide it. A hydraulic analysis for fire flow was performed and is located in Appendix H.

Table 2-11 shows the minimum and recommended fire flow requirements per the CWSP for zones within the District.

Table 2-11: Fire Flow Requirements

Zoning	Minimum Fire Flow Requirements	Recommended Fire Flow Requirements
LII, AO	1,000 gpm for 2 hours	2,000 gpm for 2 hours
URMX	750 gpm for 1 hour	1,500 gpm for 1 hour
UR3	500 gpm for 1 hour	750 gpm for 1 hour
RR2A, RR5A, R5A	No flow required	500 gpm for 1 hour

Although none of the District Service Area is contiguous with Bellingham City Limits, the Southeast area is located within the Bellingham Urban Growth Area. Bellingham Fire Flow requirements are different from those of Whatcom County. If the City annexes all or portions of the District, the fire flow requirements for those annexed areas will change and will be dealt with at that time. Water main upgrades and new construction in all zones in the UGA other than rural residential zones will be sized to provide fire flow consistent with the requirements of the Fire Marshal having jurisdiction.

CHAPTER 3

CHAPTER 3
SYSTEM ANALYSIS

3.1 SYSTEM DESIGN STANDARDS

The design periods for this study are 10 and 20 years.

Growth projections for the 10 year design period are used to determine when improvements must be made to accommodate that growth. 20 year growth projections are used to assure that scheduled improvements will accommodate future growth.

The design criteria used for development of this plan are based on historical records and recommended design standards of the Washington State Department of Health.

Projects are based upon and designed for the 20-year projections. 10-year projections are used to determine when deficiencies occur or when improvements are required.

3.1.1 Average and Maximum Day Demands

Average Day Demand (ADD) is used to project future demands. The ADD for each ERU is presented in Chapter 2. ADD without conservation is 185 gpd per ERU and with conservation is 170 gpm per ERU.

Maximum Day Demand (MDD) is the water demand for the peak day of the year. The MDD without conservation is 404 gpd per ERU and with conservation is 372 gpm per ERU.

ADD and MDD with and without conservation, as computed in Chapter 2, Section 2.1.6, are used for existing and future analysis of the system.

3.1.2 Peak Hour Demand

Peak Hour Demand (PHD) is the maximum one-hour demand during the peak day of the year. It is used to size transmission mains and distribution piping. The PHD as computed from the PHD equation in Chapter 2, Section 2.1.6, is used for existing and future analysis of the system. Since the water is taken directly from Bellingham's system and the District does not have storage facilities, Peak Hour Demand is be provided by the City, limited to the Contract Amount of 1,100 gpm plus fire flow. Projected peak use through the 20 year planning period (without conservation) is 452 gpm (Table 2-9).

3.1.3 Storage Requirements

The City of Bellingham provides storage for the District from its reservoirs. The City's Water System Plan considers the storage requirements of the District. Bellingham includes the District's water requirements in their water system plan.

3.1.4 Minimum System Pressures

The distribution system should provide dependable service. This requires proper line sizing and interconnections to provide adequate water pressure and fire protection. Water pressure in the mains should be maintained at a minimum of 30 psi under normal conditions and 20 psi during fire flow conditions. Pressures above 80 psi should be reduced by premises pressure reducing valves.

3.1.5 Other System Policies

In general, water mains should be looped where feasible. For sizing new mains or upgrading existing mains the grid distribution mains in residential areas should be at least 8 inches in diameter, and 12 inches in commercial and industrial zones. Valves in the distribution system should be placed at intersections and spaced not to exceed 800 feet in residential districts, and 500 feet in commercial, industrial, and multi-family districts.

3.2 WATER QUALITY ANALYSIS

The District's water system complies with the provisions of the Safe Drinking Water Act (SDWA) and WAS 246-290. The raw water source is Lake Whatcom and although water quality is excellent and has not been subject to a serious health threat, the watershed is open to development, logging, and recreational use, and therefore the potential for contamination exists. Sources of pollution include urban runoff, occasional combined sewer overflows from Sudden Valley, sediments eroded from logged or cleared areas, and deposit associated with recreational uses such as boating. Since the lake is relatively large and has good circulation, it has been able to tolerate the various uses of its watershed with minimal decline in water quality.

The treated water source is the City of Bellingham treatment plant and distribution system. The finished water turbidity range is 0.04 to 0.07 NTU, which is much less the 0.5 NTU required by the Surface Water Treatment Rule. The disinfection facilities are currently operated to provide a residual chlorine concentration on 0.6 mg/L.

3.3 SYSTEM DESCRIPTION AND ANALYSIS

3.3.1 Source

The raw water originates primarily as rainfall and snowmelt in the mountains and foothill of the Cascade Maintain Range. The raw water source is the Lake Whatcom drainage basins.

Lake Whatcom serves as a raw water reservoir for the City of Bellingham water treatment plant. Treatment

The water is treated by the City of Bellingham, and the Interlocal Agreement specifically states that the water sold to the District will be treated. Bellingham water meets the requirements of the Safe Drinking Water Act. The District does not provide any additional treatment of the water.

3.3.2 Storage

A. General Description

The City of Bellingham provides storage for the District from its reservoirs. The City's water system plan includes storage required by the District. The Bellingham Water System Plan defines the storage parameters and provides the hydraulic grade line for modeling purposes.

3.3.3 Distribution System

B. General Description

The existing system facilities include a distribution system with approximately 15 miles of 4-inch to 8-inch water main and appurtenances. There is one pressure zone with a normal hydraulic grade line of 271 feet. The general condition of the distribution facilities varies. PVC and DI pipes are generally in good condition. A few areas of older AC Pipe are in poor condition and are scheduled for replacement as part of the Capital Improvement Plan. Remaining AC Pipe does not show signs of deterioration and is not scheduled for replacement in the next ten years. System leaks are typically associated with services and failure of asbestos cement water mains. System pressures are monitored and reported by the system operators as part of the scheduled operation and maintenance program. Changes to the distribution system are recorded on as-built prints of the system that are maintained by the operators. Valves are located at intersections of distribution mains to allow system isolation. Fire hydrants are located throughout the District. Although most areas outside the Bellingham UGA do not require fire hydrants, the hydraulic model shows that most of the existing ones can provide at least 500 gpm. For new and replacement water mains the City of Bellingham Fire Department will determine hydrant spacing within the UGA, and the Whatcom County Fire Marshall will recommend future hydrant spacing outside the UGA.

C. Analysis

A hydraulic model of the existing system was created by updating the previously calibrated model from the 2011 Water System Plan, using the *WaterCAD* computer program by Haestad Methods. Two different scenarios were created to simulate the current and future development conditions for the District. Future conditions are labeled as 2030 projections and include pipelines listed in the Capital Improvement Program. Since the District is largely built-out and as no additional pipelines are anticipated to be built after the current planning period, the 2030 conditions are expected to hold well into the future.

A steady state analysis of each scenario was run. Each scenario was attributed with its own demand alternatives that are representative of the corresponding development conditions and hydraulic grade line. In addition to a steady state analysis, a fire flow analysis was also run for current and future conditions. During the fire flow analysis each node is analyzed individually. The model simulates the specified fire demand at each node while maintaining a minimum system pressure of 20 psi.

The model of the existing system was updated using information from water system as-built drawings provided by the District. As water lines are replaced or upgraded, the model is updated using as-built drawings to keep it representative of the system.
The hydraulic modeling revealed several deficiencies, as noted in Table 3-1.

Table 3-1 Distribution System Deficiencies (2020)

Location	Node Number	Zone	Fire Flow Required gpm	In City UGA	Deficiency
Cliffside Area	All	UR3	500	Yes	Velocity
Griffith	J99	RR-2A	None	No	Velocity*
Skagit	J131	RR-2A	None	No	Velocity*
Marine Drive	J44	UR3	500	Yes	Pressure
Locust	All	LII/ URMX	1,000/750	Yes	Velocity

*Not deficient as fire flow is not required, but cannot maintain 500 gpm fire flow without exceeding velocity requirement

Cliffside Area: Improvements are planned within the 10 year planning period.
Griffith and Skagit: Fire flow is not required. No improvements are planned within the 10 year planning period.
Marine Drive: Only one service is on this line. It is not considered feasible to upgrade it.
Locust: This area is within the Bellingham UGA. Upgrades are not planned by the District but may be done by property owners at their expense or by the City of Bellingham after annexation occurs. A ULID would be considered by the District.

3.4 SUMMARY OF SYSTEM DEFICIENCIES

3.4.1 Source

The District's source, water purchased by contract from Bellingham, is adequate for the 20 year scenario. Projected year 2040 PHD is 452 gpm of the 1,100 gpm contract amount. The contract also provides unlimited fire flow, which can be in excess of the contract amount. There are no deficiencies.

3.4.2 Storage

The City of Bellingham provides storage for the District from the City reservoirs. There are no deficiencies.

3.4.3 Distribution System

The hydraulic modeling of the distribution system revealed no deficiencies at peak hourly demand, currently and in 10 years. A fire flow hydraulic analysis revealed deficiencies in several areas from either low pressure or high velocity. The fire analysis was run at 500 gpm plus MDD in all residential (non-commercial/industrial) zones. Fire protection is not required in Whatcom County in rural residential zones, but since fire hydrants are located on most of the Districts water mains the minimum County flow requirement was modeled for informational purposes. Fire flow in LII and URMX zones was modelled at 1,000 gpm and 750 gpm as appropriate for those zones.

3.5 SELECTION AND JUSTIFICATION OF PROPOSED IMPROVEMENT PROJECTS

Improvements needed to address the system deficiencies are described above and lised in the Capital Improvements Plan; see Chapter 8. The primary improvements outside of the Bellingham UGA consist of upgrades of aging and undersized mains. These improvements will increase system reliability and provide additional fire flow. Upgrades in the Bellingham UGA for fire flow will not be initiated or financed by the District. If increased fire flow is required for any specific property or properties, upgrades to the District facilities must be provided at the property owner(s) expense and must meet City of Bellingham requirements.

3.6 ASSET MANAGEMENT

The District's System Assets are limited to pipelines and service meters. There are no tanks, pumps, specialty valves or other such facilities.

Asset Management consists of an inventory and analysis of pipelines and meters. An assessment of the systems distribution system by the maintenance staff indicated that although many of the system pipes are older asbestos cement pipes, they are in satisfactory condition and most should last through the next ten-year planning period and possibly through the twenty-year planning period. Several sections of the distribution system have been designated for replacement within the 10-year planning period. The designated replacement pipelines are either in poor condition or undersized. The deficient mains are listed in Table 3-1 above and in Chapter 8 as Capital Improvements. The undersized mains scheduled for replacement are those that will be upsized for reliability and capacity. An asset management program consisting of an inventory and analysis of the pipelines and service meters is included in Appendix E.

CHAPTER **4**

CHAPTER 4

WATER USE EFFICIENCY PROGRAM AND WATER RIGHTS

4.1 WATER USE EFFICIENCY PROGRAM

Whatcom County Water District #2 has developed and is implementing a Water Use Efficiency Program that promotes efficient water use and enhances the adequacy of the current sources to meet existing and future needs. The Water Use Efficiency Plan is included in Appendix J.

4.1.1 Water Use Efficiency Goals

A demand side goal of reducing individual water use to a system wide average of 170 gpd/ERU over the next 10 years, and a supply side goal of reducing leakage to under 10% have been adopted by the District. The Plan was reviewed as part of the process in developing the Water System Plan. Goals were publicly reviewed and were adopted by the District.

4.1.2 Water Use Efficiency Measures

Water Use Efficiency Measures adopted by the District include:

a. Conservation Rate Structure
b. Voluntary Odd-Even Watering Schedule
c. Use of Radio Read Meters to help with Customer Leak Detection
d. Student Education Program
e. Rain Barrel Program

4.2 SOURCE OF SUPPLY ANALYSIS

4.2.1 Water Rights

Whatcom County Water District #2 has an agreement with the City of Bellingham in which the City provides up to a maximum of 1,100 gpm of potable water plus fire flow. There is no maximum annual quantity of water specified. All water provided by the City is included within the City water rights. A Water Rights Self Assessment form is included in Appendix I.

4.3 WATER SUPPLY AND DEMAND CHARACTERISTICS

4.3.1 Water Supply

Water from the City of Bellingham comes from Lake Whatcom and is then filtered and disinfected. The District obtains the water from Bellingham two different locations; one location

at Marine Drive and one location at Curtis Rd. The District has a third connection with the City of Bellingham at Boxwood Ave. that is not currently active but can be used in case of emergencies. The District's water is treated by the City of Bellingham. Bellingham must meet the requirements of the Safe Drinking Water Act. The District does not anticipate treating the water provided by Bellingham.

4.3.2 Demand Characteristics

The District's customers are primarily single-family residences, with a few commercial, industrial, and multi-family customers as well. Demand varies throughout the day on a diurnal pattern, and varies by season, with higher demand in the later summer months when residential lawns and gardens require water. Two of the connections are considered to be irrigation and are primarily used in the summer months. One large commercial nursey is provided with water and uses approximately 20% of the water sold by the District.

4.4 INTERTIES

The District shares boundary lines with two other entities – the City of Bellingham, and the Lummi Reservation. There are no water service area conflicts with the Lummi Reservation, but the City of Bellingham Urban Growth Area includes part of the District.

CHAPTER 5

SOURCE WATER PROTECTION

5.1 SOURCE WATER PROTECTION

Whatcom County Water District #2 receives all of its water from the City of Bellingham. The source of Bellingham's water is Lake Whatcom. Bellingham's watershed control plan was developed as the "Bellingham Source Protection Plan." Although the District has no control over the plan, new development in the District must comply with Whatcom County and City of Bellingham development standards. These are designed to improve and enhance water quality of the Lake. Bellingham treats the water through filtration and disinfection. Finished water meets or exceeds the requirements of the Safe Drinking Water Act.

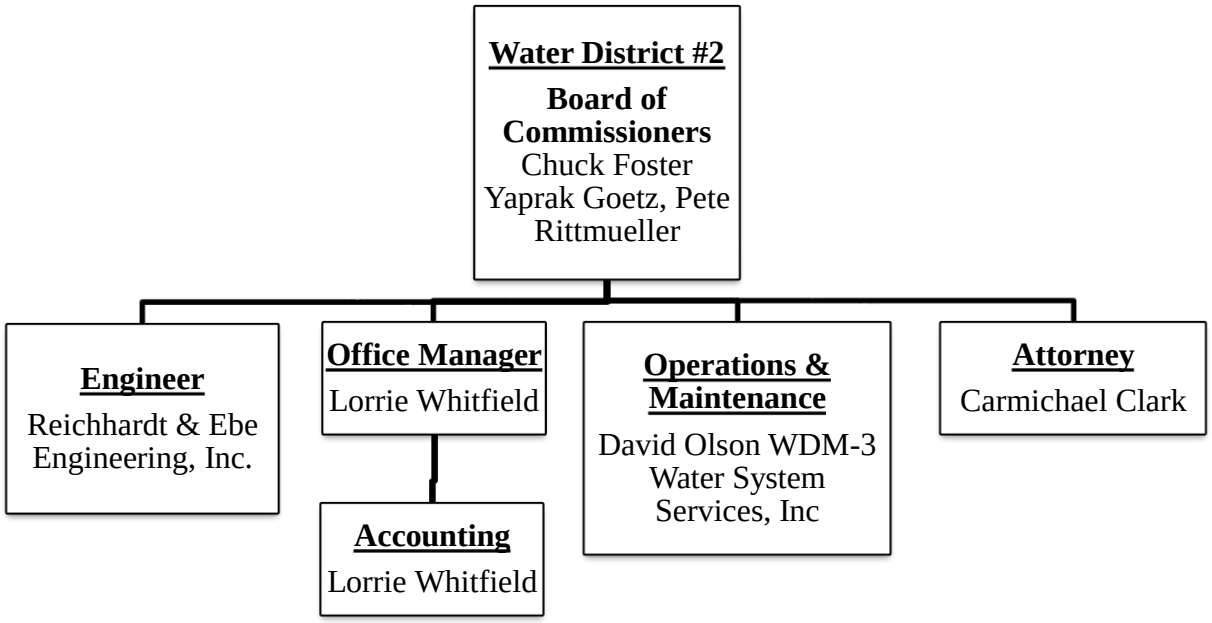
CHAPTER 6

CHAPTER 6

OPERATION AND MAINTENANCE PROGRAM

6.1 WATER SYSTEM MANAGEMENT AND PERSONNEL

A three-member Board of Commissioners governs the Water District. The Board is responsible for making policy decisions for the District. The Office Manager and Operation and Maintenance Manager are appointed by the Board and are responsible for managing the District business, finances and operation.



6.2 OPERATOR CERTIFICATION

Group A water systems are required to have a certified operator (RCW 70.119.030). The District contracts with David Olson and Water System Services, Inc. for Operation and Maintenance of all District facilities. Water System Services personnel are fully certified water system operators.

6.3 SYSTEM OPERATIONS AND CONTROL

6.3.1 Identification of Major System Components

A map showing the components of the existing system is provided in Chapter 1. Major components include:

- Active interties with the City of Bellingham located on Marine Dr. and on Curtis Rd.
- Inactive intertie with the City of Bellingham located on Boxwood Ave.
- Transmission and distribution piping.

6.3.2 Routine System Operation

The operator is responsible for routinely checking the system and monitoring various components to ensure that the system is functioning as designed. All activities are recorded by the operator in a bound 8-1/2"x11" notebook. Below is the normal routine operation schedule:

1. Weekly – Inspect the distribution system including checking the entire system for hydrant damage, leaks, missing valve marking lids, and erosion damage.
2. Monthly – Read and analyze source meter consumption as an indicator of leaks.
3. Bimonthly – Read individual service meters and record readings. Inspect the meters and boxes for damage at the time of reading. Compare the flow volume data recorded by the City of Bellingham to the total flow volume observed at the individual service meter to determine water losses in the system.
4. Five Year Interval – Distribution System Flushing. This is done during low demand periods when adequate water is available. Operators keep track of the amount of flushing water used in order to estimate the annual water use and leakage for the Water Use Efficiency Report.

Storage

The District does not have or require storage reservoirs. All storage is provided by the City of Bellingham.

Pumps

The District does not utilize pumping facilities. Adequate pressure is provided by the City of Bellingham.

6.3.3 Preventative Maintenance Program

Inspection of the system shall be performed as a part of the routine operations.

Water system users are notified prior to regularly scheduled inspection, maintenance, and repair activities that may disrupt services. Notification to the media is made three (3) working days prior to major disruptions affecting traffic or water service for more than one day. Notices are posted on doors 24 hours in advance of loss of water supply. During flushing operations customers are warned that water may be temporarily discolored A list of property owners contacted prior to service disruption shall be recorded in the logbook.

The District will make every attempt to limit down time to off-peak hours. Typical maintenance operations that may require shut down are flushing and disinfecting mains after leak repair.

Emergency repairs, such as main breaks may need to be performed with very little notice. In such cases, notifications will be done by telephone, in person or with door hangers.

Maintenance Program:

1. Main line that dead-ends at a blowoff assembly shall be flushed once a year. Looped distribution lines shall be flushed on a five-year schedule. Water main flushing shall be performed in accordance with the most recent version of the *WSDOT Standard Specifications for Road, Bridge, and Municipal Construction*.
2. All hydrants and valves shall be inspected and tested periodically for proper operation. The valves shall be exercised in conjunction with the main flushing operations.
3. General maintenance of District facilities should be performed as needed. Access to hydrants, blowoffs, valves, and meter boxes shall be kept clear of all obstructions. Spraying for emerging weeds and brush should be performed twice annually, once in May and later in the growing season. Vault drains shall be inspected and cleaned annually.

6.3.4 Equipment, Supplies and Chemical Listing

Basic equipment and supplies for normal operating shall be stocked in the District shop building. The City of Bellingham supply warehouse, open 24 hours per day, shall be used for resupply and emergency as needed.

6.4 EMERGENCY RESPONSE PLAN

The District's Emergency Response Plan is located in Appendix E.

6.4.1 Emergency Call-up List

The District maintains two levels of call-out lists. The Water System Services crew members are rotated through a routine call out list on a weekly basis to provide the normal emergency response needs. The Duty Person is assigned a take home service truck to shorten response time.

The entire District staff is included in the Emergency Call process for natural and man-made disasters.

Water Quality Problems – Experienced waterworks operators can usually handle water quality problems. An example might be a bad test result for bacteria where disinfection quickly corrects the problem and where follow-up sampling confirms that the problem has been corrected. A report covering the nature and extent of the problem shall be prepared by the Operator and submitted to the Manager.

Water Quality Emergencies – A water quality emergency is defined as requiring outside expertise and assistance to assess and respond to the problem. Examples might include a bad test result for fecal coliform, nitrates, pesticides, VOC's, or other contamination of the distribution system or source. The Operator shall be notified immediately upon discovery of a water quality emergency.

In the event of a water quality emergency, the water system users should be notified immediately. Public notification should be performed according to WAC 246-290-330. Notices shall be clear and concise, giving a simple explanation of the emergency. Health risks should also be stated. A list of steps the users should take should be included in the notification. Notices shall be hand delivered. If it is not certain the notice has been received (through verbal confirmation), multiple notices shall be delivered until contact is made. Some emergencies may warrant radio or television broadcast. In the event of a water quality emergency resulting from a Bellingham water treatment failure that requires a boil water notice, the District will use the Public Notification procedures and steps listed above to distribute the Bellingham boil notice and notify all customers.

In the event of a water quality problem that results in illness, both the WCHHSD (360-778-6000) and the Communicable Disease Hotline (360-738-2503) should be notified immediately by phone.

Regardless, the Whatcom County Health and Human Services Department (WCHHSD) and the Washington State Department of Health shall be notified of the water quality emergency. The following is a list of local and regional DOH contacts.

DEPARTMENT	**PHONE #**
Whatcom County Health Department	(360) 778-6000
Washington State Department of Health	(253) 395-6750 Office (877) 481-4901 Emergency

Physical/Mechanical Failures – Every attempt must be made to get the system back on line as quickly as possible without compromising the quality of the repairs. The Manager and Commissioners shall be notified of all such failures. Records shall be kept of all repair work.

Often partial service can be restored until permanent repairs are made, such as isolating broken parts of the main. However, water users shall be made aware of temporary repairs and how they will be affected. Conservation shall be emphasized during these times.
In the event of an emergency repair, the Board of Commissioners upon resolution may waive the requirements for contracting work and materials. If District personnel cannot make repairs, the properly qualified contractor should be contacted immediately. Contractors that are familiar with the system are:

Samish Environmental
1191 Birch Bay Drive
Lynden, WA 98264
360-510-7403

All Phase Excavating
1920 Main St, Suite 15
Ferndale, WA 98248
360-815-1514

Honcoop Gravel
8911 Guide Meridian
Lynden, WA 98264
360-354-4763

Stremler Gravel
201 Birch Bay – Lynden Rd
Lynden, WA 98264
360-354-8504

6.4.2 Notification Procedures

In the event of an emergency, the Manager and Commissioners shall be notified within 24 hours of the event. An emergency telephone number shall be posted on the door of the District office, where customers can reach the Operator on-call during non-working hours. An emergency telephone number shall also be recorded on the District's answering machine.

6.4.3 Vulnerability Analysis

Water system vulnerability is defined as the degree facilities are adversely affected under different disaster conditions. Vulnerability has two aspects - that of serious consequences to the system and that of exposure of a specific facility to failure.

The distribution system is the most vulnerable facility of the District. Disaster conditions include earthquakes, flooding, or sabotage. A failure of the distribution system could cause a loss of service, loss of fire protection, low service pressure, and damage to property. District personnel can perform normal repair of the distribution system. In the event of failure, a contractor or the City of Bellingham can perform repair work.

6.4.4 Contingency Operations Plan

The District is closely related to the City of Bellingham as its sole supplier of water, and relies on the City and its 2018 Comprehensive Emergency Management Plan in case of major system failure.

6.5 SAFETY PROCEDURES

Unsafe work areas are to be reported and marked off until such time that corrective measures can be taken. All reports and action should be documented and kept on file. In designated dangerous areas, safe work practices are implemented to reduce risk of injury.

All work shall be performed in accordance with OSHA and WISHA regulations. All warning labels on chemical containers should be read and understood before using.

6.6 CROSS-CONNECTION CONTROL PROGRAM

Where the possibility of contamination of the supply exists, water services shall be equipped with appropriate cross connection control devices in accordance with Chapter 246-290 WAC. The District's cross-connection control program shall determine the need, size, kind, and location of the device.

The District reserves the right to require backflow preventers prior to hook up for any service that may pose risk of contamination to the system.

All cost associated with the installation, maintenance, and testing of backflow assemblies will be the responsibility of the customer. Backflow assemblies must be inspected and tested by a

certified Backflow Assembly Tester (BAT). Inspections are required at the initial installation, in addition to a yearly inspection and test. The BAT shall submit certification for proper operation of the valve to the City of Bellingham, the WSDOH, and the District. The system operator shall maintain the test results in a file. Water service to the customer will be terminated in accordance with WSDOH regulation if the maintenance procedure is not followed.

6.7 CUSTOMER COMPLAINT RESPONSE PROGRAM

All user complaints will be forwarded to the Operator. The Operator will investigate the complaint within one (1) business day. The Operator should attempt to make a site visit as soon as possible. All complaints will be documented in a record log and action will be taken such as water quality testing and repairs. When receiving the complaint the Operator should at a minimum request the following information:

1. What is the location of the service?
2. When did you first notice the problem?
3. Has there been any work performed on your own water lines recently?
4. Has anyone been ill, and if so was a physician contacted?
5. Has the ill person been out of town recently?
6. Has a water quality sample been taken?

After a field investigation of the problem and necessary action is taken, the operator shall contact the person who has filed the complaint to notify them that the problem has been resolved. The Operator's actions shall be documented on the District "Daily Work Order Form". The complaint record should be available for inspection during sanitary surveys.

6.8 RECORDKEEPING AND REPORTING

6.8.1 Records

A chronological record (log) of all inspections, repairs, and maintenance shall be kept by the water operator. A report shall be made to the Board of Commissioner annually, or as requested. The Office Manager shall be responsible for maintaining all financial records. All records shall bear the signature of the operator of the water system or a representative of the Board.

The District shall ensure that the following records of operation and water quality analyses are kept on file:

1. Record of bacteriological analysis shall be kept for five years.
2. Records of chemical analysis shall be kept for as long as the system is in operation.
3. Other records of operation and analysis required by the Department of Health shall be kept for three years.
4. Record of action taken by the system to correct violations of primary drinking water regulations and copies of public notifications shall be kept for three years after that last action with respect to the particular violation involved.

5. Copies of any written reports, summaries, or communications, relating to comprehensive system evaluations (CSE) conducted by system personnel, by a consultant or by any local, state, or federal agency, shall be kept for ten years after completion of the CSE.
6. Daily water use readings from the City of Bellingham totaling meters shall be kept for 5 years.

6.8.2 Reporting

The Board shall insure that reports required by the Department of Health are submitted when requested, including tests, measurements, and analytic reports.

The Operator shall keep separate files for water quality information, operation, inspections, maintenance, and repairs. The District shall ensure the submittal of an updated WFI to the Department of Health every three years or as requested.

The District shall ensure the submittal of an updated WFI to the Department of Health within thirty days of any change in name, number of connections, ownership, or responsibility for management of the water system.

6.8.3 Bacteriological

The District shall ensure that the Department of Health is notified of the presence of:

1. Coliform in a sample within ten days of notification by the laboratory; and
2. Fecal coliform or E. Coli in a sample, by the end of the business day in which the Association is notified by the laboratory or as soon as possible. When a coliform MCL violation occurs, the District shall ensure that the following notifications are made:
    a. Notification of the Department of Health before the end of the next business day when a coliform MCL is determined; and
    b. Notification of the water system users in accordance with WAC 246-291-360.

6.8.4 Consumer Confidence Report

The District shall issue a Consumer Confidence Report to all members once a year in compliance with the Federal Safe Drinking Water Act amendment, (Federal regulation 40 CFR Part 141 Subpart O).

6.9 SANITARY SURVEY

A Sanitary Survey was performed on February 2, 2023 by Laura McLaughlin, (DOH). There were no significant deficiencies or significant findings. Observations and Recommendations included a statement to “Monitor chlorine residuals through time and work with the City to keep them consistently above 0.2 PPM.”

If residuals drop below 0.2 PPM the City of Bellingham Public Works Department is notified immediately.

CHAPTER 7

CHAPTER 7

DISTRIBUTION FACILITIES DESIGN AND CONSTRUCTION STANDARDS

7.1 INTRODUCTION

Water District #2 has adopted design and construction standards for their water system. This chapter describes those standards and the District's methods of assuring conformance. WAC 246-290-125 exempts the District from submittal requirements to the State Department of Health for review and approval of Project Reports per WAC 246-290-110 and construction documents per WAC 246-290-120 for new distribution mains and other distribution-related projects as defined in WAC 246-290-010 under certain conditions:

- The purveyor has a current Water System Plan (WSP) approved by Washington State Department of Health (DOH) that includes construction specifications and standards for distribution mains and an analysis of the hydraulic capacity of the basic transmission and distribution main configuration for the water system.
- The water system maintains a completed "Construction Completion Report for Distribution Main Projects" DOH 331-147 on file for each such project.

This Water System Plan complies with the requirements for exemption for the following project types including those listed in the Capital Improvement Section of this Water System Plan:

- Distribution Mains
- Transmission Mains

7.2 PROJECT REVIEW PROCEDURES

The District requires approved construction plans, specifications, and under certain conditions, a project report per WAC 246-290-110 for projects when water system additions, modifications or improvements are made to the District's system. Improvements will fall into two categories:

1. Capital Improvement Projects (CIP) proposed by the District in accordance with an approved Water System Plan. Typically, the District retains the services of a Design Engineer to prepare the design. All projects other than distribution and transmission main projects require DOH approval and go through the process defined in WAC 245-290-110 and 120. Transmission and Distribution Main projects go through the exemption process defined in WAC 246-290-125.

2. Private Developer Projects. Private Developers (applicant) normally retain an outside engineering firm to design and manage their project. All projects other than distribution and transmission main projects require DOH approval and go through the process defined in

WAC 245-290-110 and 120. Transmission and Distribution Main projects go through the exemption process defined in WAC 246-290-125. The District Engineer reviews all private projects for conformance with the District Standards and Policies from initial planning through construction and approval.

7.3 POLICIES AND REQUIREMENTS FOR OUTSIDE PARTIES

It is District policy to require developers and new customers to fund necessary improvements caused by impact of additional services. Prior to submittal of plans for new water mains or other improvements, the Applicant must complete a Developer Extension Agreement (DEA) that defines the process of planning, engineering, and construction of the proposed facilities. After acceptance of the DEA, the Applicant submits planning documents to the District for approval. The District Engineer reviews the Applicant's design for compliance with the Districts Water System Plan, Policies and Procedures. When DOH approval is required, the Applicant is responsible for the entire DOH submittal and approval process, including fees. Applicant is also responsible for all permits from Whatcom County and other utilities and agencies affected by the proposed project. Construction monitoring can be provided under the direction of the Applicant's Engineer or the District's Engineer. Disinfection and testing of completed projects are to be done under District supervision.

7.4 DESIGN AND CONSTRUCTION STANDARDS

7.4.1 Design And Construction Standards For Water Mains

The distribution system must be designed to provide dependable service. This requires proper line sizing and interconnections to provide adequate water pressure and fire protection. Water pressure on the mains must be maintained at a minimum of 30 psi under normal conditions. Pressures above 80 psi should be eliminated whenever possible. Water mains should be looped where feasible. The grid distribution mains in residential areas should be a minimum of 8 inch diameter where required for fire flow. In areas where fire flow is not required, pipe size may be reduced, depending upon a hydraulic analysis. All pipe must be PVC C-900 or ductile iron. Properly sized and pressure rated HDPE may be allowed for transmission mains. Valves should be placed at intersections and water main branches and at intervals not to exceed 900 feet in the distribution system. Fire hydrants should be placed no further than 900 feet apart. Hydrant tees shall be placed at least every 900 feet apart in phased fire flow plans. Low flow fire hydrants shall have the caps color coded red when effects of fire flow are unknown, when flow is less than 500 gpm, or when fire flow would reduce system pressure below 20 psi. Hydrant locations must be approved by the Whatcom County Fire Marshal and local Fire Districts. Any hydrant branch exceeding 100 feet in length should be 8 inch diameter. Road crossings require a casing. Connections into existing water mains require a live tap.

The District has adopted Construction Specifications and Details, which are presented in Appendix F.

7.5 CONSTRUCTION CERTIFICATION AND FOLLOW-UP PROCEDURES

All distribution system construction is to be monitored and observed by the District or its representatives or a professional engineer retained by the developer. Pressure testing, flushing, disinfection, and bacteriological testing is done under the direction of the District's engineer. After receipt and approval of certified as-built drawings from the Developer's Engineer or surveyor, licensed in the State of Washington. The District's engineer or Developers Engineer shall certify the results of the pressure test and disinfection performed under his or her direction. All records and certifications shall be retained by the District and made available to the DOH upon request.

CHAPTER 8

CHAPTER 8

IMPROVEMENT PROGRAM

8.1 INTRODUCTION

The purpose of this Chapter of the Water System Plan is to plan for upgrading the District's water system to eliminate current deficiencies and provide reliability. This chapter lists the existing deficiencies, projects and improvements anticipated in the next ten years. There are no known health or water quality issues requiring upgrades. The District's needs are primarily focused on reliability and useful remaining life of the distribution system.

8.2 PRIORITIZING IMPROVEMENTS

8.2.1 Identification of System Improvements

System improvements are limited to the distribution system only, as the system does not have any storage or pumping facilities.

8.2.2 Assessment of Alternatives

All identified improvements consist of replacing undersized pipes and those in poor condition. Many of them are located within the Bellingham UGA. Under one alternative the District could wait to improve piping within the UGA until it is decided whether the District or the City will own and operate the water system within the UGA after annexation. In that case the District would need to plan primarily for pipeline and service line maintenance. Under another alternative the District could replace the most vulnerable piping located within the UGA by utilizing long-term loans. Under this alternative, per annexation procedures, the City would be required to assume the loan indebtedness of those portions of the distribution system they annexed.

8.2.3 Selection of Alternatives

Although many of the existing water mains are older asbestos cement pipes, they are in satisfactory condition and appear to have many years of satisfactory service left.

Within the City of Bellingham UGA

In all areas except those supplied by 4-inch and 6-inch dead end lines in zones that require fire flow, the system is capable of supplying the Whatcom County minimum required fire flow. The system may be unable to provide the City of Bellingham required fire flows for several of the areas within the UGA as it is currently zoned. The District plans to upgrade only water mains in the UGA that are failing or in poor condition. Water mains in the UGA that are in satisfactory

condition but do not meet City fire flow requirements will not be replaced by the District. Upgrades required by commercial property owners for fire protection will be the responsibility of the property owners and will be constructed to meet City codes.

Outside of the City of Bellingham UGA

The existing distribution system outside of the City of Bellingham UGA has many aging asbestos cement mains. Although these pipes can be susceptible to breaks and leaks, they appear to be in satisfactory condition, with many years of service left in them. The District's maintenance staff has selected mains that they feel will need replacement within the next ten years. These selected mains are generally those that are in poor condition or will improve flow and reliability in the system. Although fire flow is not required in the rural zones it is recommended the mains be replaced with a minimum 8-inch diameter pipe. Mains needing replacement are listed in Table 8-1, Recommended Capital Improvements.

Water mains that are in poor shape and tend to have high maintenance costs are recommended to be replaced. Water mains that are in satisfactory shape but currently undersized for fire flow are recommended to remain in place during the next ten-year period.

8.3 CAPITAL IMPROVEMENT SCHEDULE

Table 8-1 lists improvements through the year 2030. Improvements are not listed in any order of priority and can be constructed as needed or as funds become available. Improvements are shown on the Water System Plan map in Chapter 1.

Table 8-1: Recommended Capital Improvements

Plan Reference #	Description	Financed By	Date	Estimated Cost
	Improvements within Bellingham UGA Area			
1	Cliffside Area - replace 2,850 LF 4" with 8"	Loan	2025	$595,000
2	Cliffside Area - replace 900 LF 8" AC pipe	Loan	2025	$145,000
3	Old Marine Drive Phase 1 - replace 1,300 LF 8" AC pipe	Loan	2027	$252,000
	Improvements Outside Bellingham UGA Area			
4	Old Marine Drive, Phase 2 – replace 850 LF 8" AC pipe	Loan	2027	$160,000
5	Country Lane – Replace 2000 LF 6" AC with 8"	Loan	2029	$390,000
6	Hoff - replace 1,590 LF 4" with 8" DI	Loan	2030	$296,000
7	Marine Drive, Jones to Hoff. Potential slide replacement 1,800 LF - 4" AC to 8"	Loan	Unknown	$335,000

CHAPTER 9

CHAPTER 9

FINANCIAL PROGRAM

9.1 PAST FINANCIAL STATUS

The District's Balance Sheet for 2022 is shown on Table 9.1. It shows General Funds in the amount of $128,373 and a Reserve Fund in the amount of $843,572. Reserves are broken down into three categories. The Operating Cash Reserve is covered in the General Fund. The Reserve Funds include Emergency Reserve, which is the cost of the most vulnerable facility and Replacement Reserve. The Emergency Reserve is sized to replace a portion of Marine Drive that is considered to be the most vulnerable facility. The estimated cost for that project is $335,000. The remainder of the Reserve Fund is set aside to cover Replacement Reserves and other projects that may come up from time to time.

Table 9.2 shows actual income and expense for the years 2021 and 2022. It should be noted that a large radio read meter project was completed in those two years. The maintenance expense in 2021 in particular was larger than normal because of that project. Capital improvements are shown separately in future years at the bottom of Table 9.2 in order to separate them from routine operating and expense accounts.

9.2 IMPROVEMENT PROGRAM FINANCING

Capital Improvements identified in Chapter 8 are categorized into two types, within the Bellingham UGA and outside of the UGA. Projects within the Bellingham UGA are likely to be annexed within the next 10 to 20 years and are planned to be financed with long-term loans. The District prefers to minimize use of use cash reserves for projects in UGA areas they could lose if they are annexed. Replacement reserves are better suited for use in financing projects that will remain within the District.

Capital Improvements located within the Bellingham Urban Growth Area are anticipated to be financed through long term loans, such as the USDA's 40 year term program. As the UGA is annexed by Bellingham, assuming that the City takes over the water system within the annexed area, the City will be required to assume the outstanding indebtedness, per annexation requirements. Other financing options include the Public Works Trust Fund, State Revolving Fund and General Obligation Bonds.

Table 9-2 is based upon income and expense records for 2021 and 2022. Cost of water purchased from Bellingham is expected to increase annually, and water rates are projected to increase proportionally. Expenses are shown increasing gradually with inflation. Reserve balance grows annually until the reserves are used to fund Capital Improvements located outside of the Bellingham UGA. Projected annual increases in net income keep the Reserve fund above the estimated cost for the most vulnerable facility.

The District is largely built out under current zoning, which limits the potential for larger system improvements. Future projects will consist primarily of upgrades to existing facilities, replacing undersized and failing pipelines. The Capital Improvement Projects listed in Chapter 8 are the known projects in that category. Remaining pipelines in the system are considered to be in satisfactory condition and are not expected to need replacement within the next ten-year planning period.

Table 9-1 Balance Sheet

8:58 AM
01/20/23
Cash Basis

Whatcom County Water Dist. #2
Balance Sheet
As of December 31, 2022

	Dec 31, 22
ASSETS	
Current Assets	
Checking/Savings	
1.5 Petty Cash	250.00
802 General Funds	
1.1 General Fund	88,447.24
Electronic Payment Receipts	35,914.59
General Fund (Invested)	4,011.03
Total 802 General Funds	128,372.86
80220 Reserves	
1.3 Reserve Invested	343,469.57
1.4 Reserve Cash	102.88
1.6 Emergency Fund	500,000.00
Total 80220 Reserves	843,572.45
Total Checking/Savings	972,195.31
Accounts Receivable	
Accounts Receivable	-2,030.09
Total Accounts Receivable	-2,030.09
Total Current Assets	970,165.22
TOTAL ASSETS	**970,165.22**
LIABILITIES & EQUITY	
Liabilities	
Current Liabilities	
Other Current Liabilities	
DWSRF Loan 802.11	294,944.30
Total Other Current Liabilities	294,944.30
Total Current Liabilities	294,944.30
Total Liabilities	294,944.30
Equity	
Opening Balance Equity	289,484.92
Retained Earnings	459,726.50
Net Income	-73,990.50
Total Equity	675,220.92
TOTAL LIABILITIES & EQUITY	**970,165.22**

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Table 9-2 Operational Budget

	2021 actual	*2022 actual*	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2043
Ordinary Income/Expense														
Base Rate	*221,186*	*252,659*	270,850	278,976	287,345	295,965	304,844	313,989	323,409	333,111	343,105	353,398	364,000	454,116
Water Sales	*297,711*	*309,786*	322,177	335,065	348,467	362,406	376,902	391,978	407,657	423,964	440,922	458,559	476,901	605,298
Total Water Sales and Base Rate	*518,897*	*562,445*	593,027	614,040	635,812	658,371	681,746	705,968	731,066	757,075	784,027	811,957	840,901	1,059,414
Other Income	*66,874*	*28,588*	29,446	30,329	31,239	32,176	33,141	34,136	35,160	36,214	37,301	38,420	39,572	49,370
Total Income	*585,771*	*591,033*	622,473	644,369	667,051	690,547	714,887	740,103	766,226	793,289	821,328	850,377	880,474	1,108,784
Cost of Goods Sold														
Purchased Water	*348,609*	*380,048*	365,000	372,300	379,746	387,341	395,088	402,989	411,049	419,270	427,656	436,209	444,933	492,916
Gross Profit	*237,162*	*210,985*	257,473	272,069	287,305	303,206	319,800	337,114	355,177	374,019	393,672	414,168	435,541	615,868
Expense														
Adminstrative/Overhead	*39,685*	*39,150*	39,933	40,732	41,546	42,377	43,225	44,089	44,971	45,870	46,788	47,724	48,678	53,450
Payroll Expenses	*52,007*	*53,957*	55,036	56,137	57,260	58,405	59,573	60,764	61,980	63,219	64,484	65,773	67,089	73,666
Maintenance and Repairs	*152,093*	*64,824*	66,120	67,443	68,792	70,168	71,571	73,002	74,462	75,952	77,471	79,020	80,600	88,503
Professional Fees	*65,236*	*48,421*	49,389	42,400	43,248	44,113	44,995	45,895	46,813	47,749	48,704	49,678	50,672	55,640
Utilities	*4,552*	*4,802*	4,898	4,996	5,096	5,198	5,302	5,408	5,516	5,626	5,739	5,854	5,971	6,556
SRF Loan Repayment	*27,453*	*27,112*	26,771	26,432	26,091	25,751	25,411	25,070	24,730	24,390	24,049	23,709	23,369	
Radio Read Project	*134,625*	*46,711*												
Total Expense	*475,651*	*284,977*	242,148	238,139	242,033	246,011	250,077	254,229	258,472	262,807	267,234	271,758	276,379	277,815
Net Income	*-238,489*	*-73,992*	15,325	33,930	45,272	57,195	69,723	82,885	96,705	111,212	126,438	142,410	159,162	338,053
Capital Improvements within UGA														
USDA Loan Income					740,000		252,000							
USDA Construction Expense														
Cliffside					740,000									
Old Marine Drive Phase 1							252,000							
USDA Loan Repayment						32,000	32,000	42,800	42,800	42,800	42,800	42800	42,800	42,800
Net Income less Loan Repayment						25,195	37,723	40,085	53,905	68,412	83,638	99,610	116,362	295,253
Capital Improvements Outside of UGA														
Construction Expense from Reserves														
Old Marine Drive Phase 2							160,000							
Country Lane										390,000				
Hoff Road												296,000		
Marine Drive														335000
Reserve Balance	*955,252*	*843,572*	858,897	892,827	938,099	963,293	841,017	881,101	935,006	613,418	697,056	500,665	617,027	460,918

9.3 RATE STRUCTURE ANALYSIS

Water meters are read and billed bi-monthly. The District purchases water from the City of Bellingham at a rate of 1.5 times the "Inside City" retail rate. Bellingham's inside city rate includes City operating and maintenance costs. The District then takes Bellingham's Outside City rate, adds their own Operating and Maintenance costs, and passes it on to consumers. The District bi-monthly charge for 2022 is $5.17 per 100 cubic feet plus a base rate of $65.00 per living unit. The rate is adjusted annually as required to keep up with the cost of water purchased. A copy of the rate and fee schedule is in Appendix C. The relatively high cost of water is anticipated to encourage conservation.

9.4 FINANCIAL VIABILITY TEST

Table 9.2 shows the District's projected revenue and expenses through 2032. The 2022 numbers are actual, and the numbers for future years include the associated new rates and connection fees. Cost of capital improvements are included, as well as current cash balance, operating reserve, and emergency reserve.

Income from water sales for 2022 is $562,445. With 781 active ERUs the water cost amounts to an average of $721 per year per ERU. The Median Household Income (MHI) in Whatcom County is $65,420 in 2020, per the 2020 census. The recommended maximum Cost/ERU per the DOH Financial Viability Manual is 1.5% of the MHI. 1.5% of $65,420 = $981/ERU. The District's proposed rate structure of $721/ERU passes the Financial Viability Test.

CHAPTER 10
MISCELLANEOUS DOCUMENTS

10.1 MEETING WITH CONSUMERS AND PUBLIC

Prior to adoption of this water system plan, in accordance with WAC 246-290-100, several actions by the elected governing body (Commissioners) which involve public notification, public meetings, and communications with customers, adjacent utilities and public agencies are required.

- Water Use Efficiency. WAC 246-290-830 requires that the elected governing body (EGB) evaluate and reestablish water use efficiency goals as part of updating a water system plan. Goals must be set in a public forum that provides public participation. A notice of a public hearing covering the proposed Water Use Efficiency Goals was mailed to all customers and posted on the District's website and the DOH website. A public meeting was held on March 20, 2023. There were three persons representing Smith Gardens present to discuss the goals. After discussion the Commissioners adopted the goals as presented. A copy of the minutes of the public hearing and goal approval is included in Appendix B. The updated Water Use Efficiency Program is included in Appendix J.

- Meeting of Consumers. WAC 246-290-100 (8)(a) requires an informational meeting of consumers to present the Draft Water System Plan. A notice of a public hearing and informational meeting covering the Draft Water System Plan was mailed to all customers, posted on the District's website and the DOH website. The public meeting was held on March 20, 2023. A brief overview of the Plan was presented by Dave Olson. Public attending were representatives from Smith Gardens with questions and discussions on how Smith Gardens would be affected by the plan. Questions were addressed and answered by the commissioners. Copies of the public notification, minutes of the public meeting, public comments with Commissioner responses, and approval of the Water System Plan by the Commissioners are included in Appendix B.

- Plan Transmittal to Adjacent Utilities and Local Governments. The Draft Water System Plan was posted on the District's website. In compliance with WAC 246-290-100(4)(k)(ii) a notification was sent to the following local governments with jurisdiction, and to adjacent water utilities: Whatcom County, City of Bellingham, Lummi Indian Tribe. The notice is included in italics below:

  Water System Plan Update

  The Whatcom County Water District #2 Draft Water System Plan Update is available for review and comment. The Plan can be accessed from the following link:

  _____

  It may also be found on the Home Page of the District's website: *www.wcwd2.com*

  A copy of the plan is available for inspection at the District's office at: 1615 Bayon Road Bellingham, WA 98225

Written comments or questions may be submitted until March 18, 2023 to the District's office at the above location or emailed to: wcwd2@qwestoffice.net.

No written comments were received .

- Whatcom County. WAC 246-290-108 requires a consistency review by local governments with jurisdiction over the service area. A copy of the completed form by the Whatcom County Planning and Development Services is included in Appendix D. All conditions by the department were addressed:

10.2 WATER SYSTEM PLAN APPROVAL

The Water District 2 Commissioners approved the Water System plan on March 18, 2024. A copy of the minutes approving the Water System Plan are included in Appendix B.

10.3 AGREEMENTS, INTERTIE

The District operates under a Memorandum of Agreement with the City of Bellingham. This is described in previous chapters and a copy is included in Appendix I. The intertie agreement with the City of Bellingham is included in Appendix I.

10.4 SATELLITE MANAGEMENT PROGRAM

The District does not participate in a Satellite Management Program.

APPENDIX **A**

Appendix A

This Appendix includes comments and correspondence from the Department of Health and the Department of Ecology relative to the Water System Plan.

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
NORTHWEST DRINKING WATER REGIONAL OPERATIONS
PO BOX MS:47822 OLYMPIA, WA 98504-7800

August 21, 2023

LORRIE WHITFIELD, BUSINESS
MANAGER
WHATCOM COUNTY WATER DISTRICT 2
WCWD2@QUESTOFFICE.NET

Subject: Whatcom County Water District 2, ID# 95700
Whatcom County
Water System Plan
Submittal #23-0508

Dear Lorrie Whitfield:

Thank you for your patience in our response to the draft Water System Plan filed in our office on May 23, 2023. Due to staffing and workload considerations, we have found ourselves unable to meet the 90-day period in which to finalize the DOH review letter. This letter constitutes the notice of the 90-day extension identified in SHB2446.

If you have any questions regarding our review process, please contact me at krista.chavez@doh.wa.gov or at (564) 669-0757.

Sincerely,

SUBMITTED TO DOH BOX ACCT ON MARCH 22, 2023

Krista Chavez
Regional Planner
NW Drinking Water Operations

Ecc: Carl Reichhardt, PE, Reichhardt & Ebe Engineering, Inc.
Whatcom County Health Department
Laura McLaughlin, DOH

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
NORTHWEST DRINKING WATER REGIONAL OPERATIONS
PO BOX 47800 MS:47822 OLYMPIA, WA 98504-7800

October 4, 2023

LORRIE WHITFIELD, BUSINESS MANAGER
WHATCOM COUNTY WATER DISTRICT 2
WCWD2@QUESTOFFICE.NET

Subject: Whatcom County WD 2, ID #95700
Whatcom County
Water System Plan – 2023
Submittal **#23-0508**

Dear Lorrie Whitfield:

Thank you for submitting the Water System Planning document (WSP) for Whatcom County Water District 2 (the District), which was received in this office on May 23, 2023. We have reviewed the plan and offer the following comments. These comments must be adequately addressed prior to approval of the WSP.

Note that all pages referenced in our comments refer to the PDF pages.

Chapter 1: Description of the Water System

1. Please provide your appeals process for conditions of service.
2. How does the City of Bellingham (the City) calculate the maximum allowed 1100 GPM flow in the interlocal agreement? For example, is it based on actual minute-by-minute data? Is it based on the average flow over the peak hour, similar to PHD? Do they use MMAD and equation 3-1 to estimate PHD? Or do they measure flow? If the City calculates maximum allowed flow differently than DOH calculates PHD, what are the current City-calculated maximum flows?
3. What will the district do if the residual is lower than the required 0.2 mg/L in distribution? Does the District regularly work with Bellingham on chlorine residual? If Bellingham were not able to provide a 0.2 ppm residual, Water District #2 would be required to install chlorine.

Chapter 2: Basic Planning Data

4. Why doesn't the water usage analysis include 2021 and 2022 data? This was an important time for many community water systems. People started working from home and water usage changed for some systems starting in 2020. Were there any noticeable changes in demand after 2020 for the District? Please describe them. Be aware that because the demand analysis is based on older data and planning only goes out to 2030, the District's approved planning period would end in 2030. If the District would like to extend the planning period to 2033, include more recent demand data and plan the CIP and Budget out to 2033.
5. Has the District determined the point they would not be financially viable due to the City's annexations? Is the City "required" to take over the District should this happen, including the

loan debt? Where does the requirement come from? Does this align with the City's planning document? Similarly, if the City annexes the entire UGA, who will pay for the main replacement?

6. Table 2-7 shows total ERUs served by Water District #2 at 781. Why does Table 2-9's projected water demands start off with 803 ERUs, so much higher than 781?

Chapter 3: System Analysis

7. Please include your asset management program. Chapter 8 CIP notes that loans will be required to finance the replacement of pipeline, with an estimated date of 2025. Please be aware an asset management program is a requirement to obtain funding through the ODW State Revolving Fund (SRF). What is the District doing in regards to implementing asset management in your water utility? Your program should include a list of water system assets, age of assets, expected life of the assets, replacement cost of assets, level of service, and criticality.
8. Was the hydraulic model calibrated and verified? When and how? If not, are you confident that this model accurately reflects the water system? Describe your rationale. The hydraulic model should be re-calibrated at each water system plan approval to verify that the model still accurately reflects the distribution system.
9. What year's demand data was used to run the model in the results presented in Table 3-1 (page 33)? The table appears to describe FF + MDD boundary conditions. Was this for 2020, 2040, or another year? What are the results for the end of the planning period (2030 or 2033).
10. In the 2020 PHD model results presented in Appendix H (page 181), there appears to be many nodes with pressures over 80 psi, up as high as 113 psi. High pressures can cause damage to pipes and fittings or even appliances. Are these pressures correct? If not, calibrate the model so that it more accurately reflects he distribution system. If they are correct, is the District planning to address these higher pressures?
11. We did not see model results in Appendix H (page 181) from 2030 PHD, 2040 MDD +FF, or 2040 PHD boundary conditions. Please direct us to these results in your document or include these results and present any nodes that did not meet minimum required pressures. If these results show any deficiencies (pressures less than 30 psi for 2030 PHD), make sure to address them in your CIP and budget.

Chapter 4: Water Use Efficiency Program and Water Resource Analysis

12. Appendix B appears to be empty. Please provide the goal setting public adoption documentation for your 6-year goal setting.
13. The 2019-2022 3-year average DSL is >10% and requires a Water Loss Control Action Plan (WLCAP) per WAC 246-290-820. Please provide this plan. It is referenced on page 35, but the WUE plan in Appendix J focuses mostly on demand reduction. Please provide more detail on how the district will measure, track and reduce leakage. The plan should be supported by the District's budget with specific line items. Consider including Table 8-1 in the WLCAP.
14. How will you coordinate meter readings with the city to improve estimates for monthly water loss?
15. Land use and zoning projections only go out to 2036. Please provide a 20 projection per WAC 246-290-100(4)(b)(iii).
16. Please describe your design standards for meters, read frequency, calibration frequency, meter maintenance and replacement schedule.

Chapter 5: Source Water Protection
No comments

Chapter 6: Operation and Maintenance Program

17. Emergency Plan:
    - The DOH Regional Office number on page 107 should be 253-395-6750.
    - Please add the DOH After Hours Emergency number – 1-877-481-4901.
    - Double check your contact numbers in Section 6. There appear to be some mistakes. DOH's phone number should be 253-395-6750 on page 41.
    - Please describe the boil water advisory plan if the City's treatment plant were to fail.
18. Please include the more recent 2023 sanitary survey with your plan and address the recommendations and observations.
19. Please develop a Disinfection By-Product Monitoring Plan. We've included a template to inform your plan. It's important to select a DBP sample location that is conservative and representative of the distribution system. It's also important to sample from the same location each sampling period.

Chapter 7: Distribution Facilities Design and Construction Standards

20. Please address the following comments to your standard specification to increase clarity and reduce risk to the District:
    a) Page 171: Valves that house vacuum/air release valves should drain to daylight when possible. Consider adding this to your standard spec.
    b) The downward facing vent on the air/vac release must be screened with 24 mesh screen. Please add this specification to figure 8 (page 173).
    c) All vaults (meters, valve, etc.) should be located to prevent flooding, and if possible with appropriate drainage installed. Flooded vaults pose risks to distribution. Consider adding a note to vault details about minimizing risk of flooding.
    - Please specify the required pressure to be used with WSDOT Specification 7-09.3(23) (note 14).
    - For clarity, consider changing the language on page 155, Note A to include "professional engineer licensed in the State of Washington." "Professional engineer" may not mean licensed in Washington to all readers.
    d) Please clarify the difference between figure 5's blowoff hydrant (page 167) and figure 7's blowoff hydrant (page 170).

Chapter 8: Improvement Program

21. Thank you for including a list of planned main replacement projects on page 50 (table 8-1). Please provide more specific dates for the earlier projects in the list. We noticed that the first two projects are planned for 2025 and will be funded by loans. Does the District know if these projects qualify for the loan program they are applying for? If the District plans to apply for SRF Construction loans, note that the application period is typically in October and November each year. This could push the schedule back a year.
22. Review our website for upcoming Lead Service Line Inventory Requirements: https://doh.wa.gov/community-and-environment/drinking-water/contaminants/lead/lead-and-copper-rule-revisions. Note that Lead Service Line Inventories are due in October 2024. This is a helpful Lead Service Line Frequently Asked Questions document: https://doh.wa.gov/sites/default/files/2023-02/331-712_0.pdf. This is a link to our State Revolving Fund that has a Lead Service Line Loan program: https://doh.wa.gov/community-

and-environment/drinking-water/water-system-assistance/drinking-water-state-revolving-fund-dwsrf. If the District's Lead Service Line Inventory will require investment, add the necessary activities to the CIP and the budget.

Chapter 9: Financial Program

23. Please provide at least 2-3 years of income and expense data.

Chapter 10: Miscellaneous Documents

24. Please provide signed documentation of the final plan approval by your governing body.
25. Please provide a signed Local Government Consistency Form.
26. Please include an updated Water Facilities Inventory (WFI) form.

Please address comments provided by the Department of Ecology, if any.

We hope that you have found these comments to be clear, constructive and helpful in the development of your final draft WSP. We ask that you submit the revised WSP on or before January 2, 2024. In order to expedite the review of your revised submittal, please include a cover letter summarizing how each of the above comments was addressed in the revised WSP and where each response is located (i.e., page numbers, Appendices, etc.)

Regulations establishing a schedule of fees for review of planning, engineering, and construction documents have been adopted (WAC 246-290-990). The total cost is $3,705.00. An itemized invoice for the review of this project has been sent to the DOH primary contact on file for your water system. Please note that this fee covers our current review and one more submittal for this project. If additional submittals are required, then an invoice for additional fees will be included with our final approval letter. Please remit complete payment in the form of a check or money order within thirty days of the date of this letter by following the instructions on the invoice.

Thank you again for submitting your revised Water System Plan for our review. If you have any comments or questions concerning our review, please contact our office.

Sincerely,

Krista Chavez
Regional Planner
564-669-0757

Laura McLaughlin, P.E
Regional Engineer
564-669-0753

Enclosure

ecc: Carl Reichhardt, PE, Reichhardt & Ebe Engineering, Inc
Dave Olson, Operator
Patrick Hull, Whatcom County Health Department
Hayli Hruza, Whatcom County Health Department
Crystal Nuño, DOH

STATE OF WASHINGTON
Department of Health
OFFICE OF DRINKING WATER
Project And Plan Review

INVOICE

WHATCOM COUNTY WATER DIST #2
WHATCOM COUNTY WATER DIST #2
1615 BAYON RD
BELLINGHAM, WA 98225

WS ID: 95700
Invoice No: 53793
Invoice Date: 10/04/2023
Due Date: 11/03/2023

WS NAME: WHATCOM COUNTY WATER DIST #2

PROJECT AND PLAN REVIEW SUBMITAL#: 23-0508

DESCRIPTION	QTY	COST	AMOUNT
Water System Plan	1	x $3705.00	$3705.00
		Total Amount Due	**$3705.00**

Comments: Submittal # 23-0508 Invoiced with Review

1. ***Pay online*** with a credit card, debit card, or electronic check (ACH) using the Environmental Health Payment System at https://secureaccess.wa.gov/.
2. For billing questions, please contact Northwest Drinking Water Regional Operations at (253) 395-6750 or via email DW.NWRO.WSProjects@doh.wa.gov.
3. This invoice is issued in accordance with WAC 246-290-990(3)(c)(iii).
4. For persons with disabilities, this document is available on request in other formats. To submit a request, please call 711 Washington Relay Service.
5. If paying by check:
   Make checks payable to Department of Health, Federal ID #91-1444603.

Please return the bottom portion of this invoice with your check.

Invoice Number: 53793
Invoice Amount: $3705.00
Owner Number: 006564
WS Name: WHATCOM COUNTY WATER DIST #2

Invoice Date: 10/04/2023
Invoice Due Date: 11/03/2023
Region: NW
WS ID: 95700

Reference: PROJECT AND PLAN REVIEW FEES

Please remit to:
ACCOUNTS RECEIVABLE
DOH PROJECT AND PLAN REVIEW FEES
PO BOX 1099
OLYMPIA, WA 98507-1099

7DWA10597240100 PP0009570OX11032300370500

District response to comments by DOH Northwest Drinking Water Operations dated October 4, 2023.

The comments by the Department are listed in order below, with the response in italics directly below each comment.

Chapter 1: Description of the Water System

1. Please provide your appeals process for conditions of service.

The District does not have a formal appeals process. Any applicant that wants to appeal a policy, decision or action by the Commissioners is free to attend a regularly scheduled meeting to present their appeal.

2. How does the City of Bellingham (the City) calculate the maximum allowed 1100 GPM flow in the interlocal agreement? For example, is it based on actual minute-by-minute data? Is it based on the average flow over the peak hour, similar to PHD? Do they use MMAD and equation 3-1 to estimate PHD? Or do they measure flow? If the City calculates maximum allowed flow differently than DOH calculates PHD, what are the current City-calculated maximum flows?

The City does not monitor maximum flow to the District as they do not have the ability to measure instantaneous flow at their meters. Fire flow is not restricted.

3. What will the district do if the residual is lower than the required 0.2 mg/L in distribution? Does the District regularly work with Bellingham on chlorine residual? If Bellingham were not able to provide a 0.2 ppm residual, Water District #2 would be required to install chlorine.

The District works closely with the City to maintain the required chlorine residual in the water supplied to the District. The water provided to the District comes directly from the City's immediately adjacent distribution system. If chlorine residual is below 0.2 ppm in water supplied to the District, it is also below 0.2 ppm in the City. The City is responsible for remedying the situation in order to remain in compliance within their own system. When chlorine residual drops below 0.2 ppm in water provided to the District, the City is notified. The City is normally aware of low residuals in their own system and is usually already working to increase the residual as required.

Chapter 2: Basic Planning Data

4. Why doesn't the water usage analysis include 2021 and 2022 data? This was

an important time for many community water systems. People started working from home and water usage changed for some systems starting in 2020. Were there any noticeable changes in demand after 2020 for the District? Please describe them. Be aware that because the demand analysis is based on older data and planning only goes out to 2030, the District's approved planning period would end in 2030. If the District would like to extend the planning period to 2033, include more recent demand data and plan the CIP and Budget out to 2033.

The WSP was developed in 2021 before complete data for that year was available. Delays were encountered in submitting the plan before 2023 due to the need to discuss issues with the City regarding service area boundaries and urban growth areas.

Water use (Authorized Consumption – AC) for the years 2021 and 2022 was examined and it appears that the use is consistent with pre-covid water use. The pre-covid AC in 2016 through 2018 was approximately 46 mg. The AC rose slightly during the covid years,2019 and 2020 presumably because more people were staying home. Since then, AC has dropped back to pre-covid numbers. The District is mostly built out, with very few additions or changes in the past few years except for

the variability of water use by commercial properties. The majority of the District is outside of the Bellingham UGA and is a low-density zone residential area, nearly all built out per the zoning code. As a result the AC forecast in the Plan is not anticipated to change, unless another pandemic or unforeseen event occurs.

Projected water use in Section 2.2.2 has been updated to the year 2043. The capital improvement plan and projections shown in Table 9-2 have also been expanded to the year 2043.

5. Has the District determined the point they would not be financially viable due to the City's annexations? Is the City "required" to take over the District should this happen, including the loan debt? Where does the requirement come from? Does this align with tire City's planning document? Similarly, if the City annexes the entire UGA, who will pay for the main replacement?

Annexation is a complex process, beyond the scope of a Water System Plan. It is governed by the Revised Code of Washington, and many hearings, studies, reviews by the Boundary Review Board and negotiations covering a multitude of issues including utilities are required. As the process evolves, issues of assumption of utilities will be resolved, along with financial viability. RCW 35.13 is a good reference for answering the questions posed above. It is clear under the RCWs that the City must take over all indebtedness within the annexed area. For that reason, the district plans to finance any substantial improvements with loans that would be assumed by the City after annexation.

At this time, with so many issues and variables, the District feels it is premature to try to develop plans involving future annexation by the City.

The District's position is that if the City takes over any portion of the District's water system the City will be responsible for all upgrades or improvements to bring the system up to City standards. However, improvements made by the District within the City's UGA prior to annexation will be constructed in conformance with City standards.

6. Table 2-7 shows total ERUs served by Water District #2 at 781. Why does Table 2-9's projected water demands start off with 803 ERUs, so much higher than 781?

Note that the increase in ERUs in Table 2-9 is predominantly Commercial. The Cement Plant property located on Marine Drive at the southeast corner of the District is now and always has been served by the City of Bellingham. Some of the area along Marine Drive may be re-developed as commercial property and request service from the District. To be conservative the commercial ERUs were increased in Table 2-9 to account for this possibility.

Chapter 3: System Analysis

7. Please include your asset management program. Chapter 8 CIP notes that loans will be required to finance the replacement of pipelines, with an estimated date of 2025. Please be aware an asset management program is a requirement to obtain funding through the ODW State Revolving Fund (SRF). What is the District doing in regard to implementing asset management in your water utility? Your program should include a list of water system assets, age of assets, expected life of the assets, replacement cost of assets, level of service, and criticality.

The District does not own, operate, or maintain pumps, storage or source facilities. The physical assets consist of the distribution pipes and service meters. The meters were replaced in 2021 with radio read meters. The maintenance staff monitors pipelines for breaks and leaks and has submitted a list of pipelines that they feel will need replacement within the next ten years. These are included in the Capital Improvement Plan. An Asset Management Plan that conforms to WAC 246 290-100(4)(e)iii, "Inventory and analysis of water system facilities", is included in Appendix E.

8. Was the hydraulic model calibrated and verified? When and how? If not, are you confident that this model accurately reflects the water system? Describe your rationale. The hydraulic model should be re-calibrated at each water system plan approval to verify that the model still accurately reflects the distribution system.

The hydraulic model was developed several years ago by R&E by utilizing extensive flow testing and calibration, which verified the model's accuracy. The results are included in previous Water System Plans. Since that time there have been very few changes to the distribution system. Pipeline improvements

in the Fort Bellingham area, discussed in Section 1.2.1, were done to address fire flow deficiencies. These improvements have been accounted for in the current hydraulic model. The model has been field checked from time to time by hydrant pressure tests. The District and their Engineer feel that the existing model is up to date, accurate and there is no need for re-calibration at this time. If the City changes its delivery system by moving points of connection, changing pressure zones or makes other changes, such as assumption of portions of the District's system, the hydraulic model may need to be re-constructed and calibrated.

9. What year's demand data was used to run the model in the results presented in Table 3-1 (page 33)? The table appears to describe FF + MDD boundary conditions. Was this for 2020, 2040, or another year? What are the results for the end of the planning period (2030 or 2033).

The results in Table 3-1 are based upon current conditions which have not changed for several years. The table heading in the Plan has changed to reflect this. Section 3.4 Summary of System Deficiencies, Subsection 3.4.3 Distribution System has been expanded to include a description of each of the deficiencies noted in Table 3-1, including how each of them is to be handled in the future.

10. In the 2020 PHD model results presented in Appendix H (page 181), there appears to be many nodes with pressures over 80 psi, up as high as 113 psi. High pressure can cause damage to pipes and fittings or even appliances. Are these pressures correct? If not, calibrate the model so that it more accurately reflects the distribution system. If they are correct, is the District planning to address these higher pressures?

The pressures shown in the model are correct and were recently verified. The highest pressures are located in the flood plain area adjacent to the Nooksack River. The Whatcom Flood Control District is acquiring property in this area and abandoning homes that have been frequently flooded. However, the water mains in this area will remain in service as they are required for circulation and service to adjacent homes at higher elevations.

The District is aware that system pressure in excess of 80 psi exists in several of the lower areas being served. The pressure in the system is controlled by the City of Bellingham at the connection points. The District does not wish to install pressure regulating valves on their mains as it could affect existing fire suppression systems. The District's practice is to have property owners install individual pressure regulating valves on their services if needed. New services must comply with the Whatcom County Building Codes regarding water pressure.

11. We did not see model results in Appendix H (page 181) from 2030 PHD, 2040 MDD +FF, or 2040 PHD boundary conditions. Please direct us to these results in your document or include these results and present any nodes that did not meet minimum required pressures. If these results show any deficiencies (pressures less than 30 psi for 2030 PHD), make sure to address them in your CIP and budget.

The model results for PHD 2030 have been added to Appendix H. Pressure remains above 30 psi under PHD conditions at all nodes. Modeling for 2030 includes all planned changes for the future. 2040 was not modeled as changes to the system between 2030 and 2040 are considered to be insignificant. The District is largely built out per County Zoning and no additional growth that would require major additions to the water system is foreseen.

Chapter 4: Water Use Efficiency Program and Water Resource Analysis

12. Appendix B appears to be empty. Please provide the goal setting public adoption documentation for your 6-year goal setting.

The Goal Setting Documentation has been added to Appendix B

13. The 2019-2022 3-year average DSL is >10% and requires a Water Loss Control Action Plan (WLCAP) per WAC 246-290-820. Please provide this plan. It is referenced on page 35, but the WUE plan in Appendix J focuses mostly on demand reduction. Please provide more detail on how the district will measure, track and reduce leakage. The plan should be supported by the District's budget with specific line items. Consider including Table 8-1 in the WLCAP.

The District's historical water loss from leakage is below 10%. In the year 2022 a break in a water main (which is scheduled in the CIP for replacement) was discovered. The water from the break travelled underground into a catch basin, which made it difficult to locate in a timely manner. Water from that break was recorded as leakage, since the District included all non-revenue water as leakage. The District does not feel that a WLCAP is necessary because actual leakage, not including breaks, is below 10%. It is recommended in the Plan that the District estimate and record all authorized non-revenue water such as hydrant and system flushing, fire department use and bulk use by contractors and others in order to better estimate actual leakage. Recent installation of radio read service meters and the ability to obtain timely water purchase records from the City will allow the District to monitor water use closely.

14. How will you coordinate meter readings with the city to improve estimates for monthly water loss?

The District is now able to obtain direct meter readings of the Bellingham Master Meters rather than relying on billing information for determining water use. The District can call the City to obtain mater meter readings on the same day as service meters are read. The call number is included in the list of contacts in Chapter 6.

15. Land use and zoning projections only go out to 2036. Please provide a 20 projection per WAC 246-290-100(4)(b)(iii).

The Whatcom County land use projections currently go to 2036. Because the District is nearly built out and very little growth is forecast due to zoning restrictions, the growth rate to 2036 was projected at the same rate out to the year 2043.

16. Please describe your design standards for meters, read frequency, calibration frequency, meter maintenance and replacement schedule.

As Stated in Section 1.3.1 the City of Bellingham owns and maintains the meters at the interties that provide water to the District. District service meters are new radio read meters. The District does not have a formal schedule for calibrating the service meters. Meters are serviced, repaired and replaced on an individual basis as necessary. The radio read capabilities allow the District to monitor meters closely.

Chapter 6: Operation and Maintenance Program

17. Emergency Plan:
    - o The DOH Regional Office number on page 107 should be 253-395-6750.
    - o Please add the DOH After Hours Emergency number 1-877-481-4901.
    - o Double check your contact numbers in Section 6. There appear to be some mistakes.
    - o DOH's phone number should be 253-395-6750 on page 41.

Telephone Numbers have been updated.

- Please describe the boil water advisory plan if the City's treatment plant were to fail.

A boil water plan has been added to Section 10 of the Emergency Response Plan in Appendix E.

18. Please include the more recent 2023 sanitary survey with your plan and address the recommendations and observations.

The 2023 Sanitary Survey has been added to Appendix E and is addressed in Chapter 6.

19. Please develop a Disinfection By-Product Monitoring Plan. We've included a template to inform your plan. It's important to select a DBP sample location that is conservative and representative of the distribution system. It's also important to sample from the same location each sampling period.

A DBP Monitoring Plan is included in Appendix E.

Chapter 7: Distribution Facilities Design and Construction Standards

20. Please address the following comments to your standard specification to increase clarity and reduce risk to the District:
    a) Page 171: Valves that house vacuum/air release valves should drain to daylight when possible. Consider adding this to your standard spec.
    b) The downward facing vent on the air/vac release must be screened with 24 mesh screen. Please add this specification to figure 8 (page 173).

A note has been added to Figure 8 requiring a screened vent.

c) All vaults (meters, valve, etc.) should be located to prevent flooding, and if possible with appropriate drainage installed. Flooded vaults pose

risks to distribution. Consider adding a note to vault details about minimizing risk of flooding.

A note has been added to Figure 8 requiring positive drainage. In addition, Valve Section 7-12.2 of the Standard Specifications has been modified to include positive drainage to vaults.

d) Please specify the required pressure to be used with WSDOT Specification 7-09.3(23) (note 14).

WSDOT Specification 7-09.3(23), which has been adopted by the District in its Standard Specifications, is very specific in requiring "150 psi in excess of that in which they will operate or in no case shall the test pressure be less than 225 psi".

e) For clarity, consider changing the language on page 155, Note A to include "professional engineer licensed in the State of Washington." "Professional engineer" may not mean licensed in Washington to all readers.

Chapter 7, Section 7.2 has been revised to clarify that professional engineers must be licensed in the State of Washington in accordance with state law.

f) Please clarify the difference between figure 5's blowoff hydrant (page 167) and figure 7's blowoff hydrant (page 170).

Figures 5 and 7 are identical. Figure 7 has been removed.

Chapter 8; Improvement Program

21. Thank you for including a list of planned main replacement projects on page 50 (table 8-1). Please provide more specific dates for the earlier projects in the list. We noticed that the first two projects are planned for 2025 and will be funded by loans. Does the District know if these projects qualify for the loan program they are applying for? If the District plans to apply for SRF Construction loans, note that the application period is typically in October and November each year. This could push the schedule back a year.

The Capital Improvements listed in Table 8-1 are not prioritized. The dates are tentative and may change, depending upon availability of funds and project need. The District has many options for funding. These include Public Works Trust Fund Loans, USDA bonds, ULID and General Obligation bonds, and DWSRF loans. Part of project planning and development includes finding and selecting the most advantageous lending source to apply to for funding. Note that Table 9-2 shows funding from USDA. Although this is not a definite funding selection, the USDA program has a 40-year term that may benefit the District for projects within the Bellingham UGA. Also note that the District may have enough in reserves to fund the proposed projects outside of the UGA without loans. Some of these could move up in priority, as local funds are currently available.

22. Review our website for upcoming Lead Service Line Inventory Requirements:

https://doh.wa.gov/community-and-environment/drinking-water/contaminants/lead/lead-and-copper-rule-revisions. Note that Lead Service Line Inventories are due in October 2024. This is a helpful Lead Service Line Frequently Asked Questions document: 0.pdf. This is a link to our State Revolving Fund that has a Lead Service Line Loan program: https://doh.wa.gov/community-and-environmental/drinking-water-system-assistance/drinking-water-state-revolving-fund-dwarf. If the District's Lead Service Line Inventory will require investment, add the necessary activities to the CIP and the budget.

The District's staff and maintenance personnel have not encountered lead service lines and do not believe there are any in the distribution system. However, the District is aware of the requirement for the Lead Service Line Inventory and will comply with the requirement before the deadline in October 2024. Since there is no evidence at the present that there are lead service lines the District does not believe there will be capital costs pertaining to replacement of lead service lines.

Chapter 9: Financial Program

23. Please provide at least 2-3 years of income and expense data.

Table 9-2 includes actual income and expense data for the years 2021 and 2022.

Chapter 10: Miscellaneous Documents

24. Please provide signed documentation of the final plan approval by your governing body.
25. Please provide a signed Local Government Consistency Form.
26. Please include an updated Water Facilities Inventory (WFI) form.

These documents have been added to Chapter 10. The WFI is in Appendix E.

APPENDIX **B**

Appendix B

This Appendix includes notice of public meetings, public comments and correspondence relative to the Water System Plan. This includes the Water Use Efficiency Goal setting process.

20 March 2023

Regular Meeting

The Regular Meeting of the Board of Commissioners for Whatcom County Water District #2 was held on 20 March 2023, at 10:00 a.m. Commissioners present were Pete Rittmueller and Commissioner Ms. Yaprak Goertz. Commissioner Chuck Foster was excused. Also present was Dave Olson, Operations Manager, Lorrie Whitfield, Office Manager.
Our guests were Terry Smith, Wendy Malick and Pete Rim, representing Smith Gardens.

The Chairperson introduced the next portion of the meeting as the Water System Plan Informational Meeting.

Dave presented our guests with a brief overview of our new Water System Plan after which Pete Rim asked many questions on how any changes would affect Smith Garden, both positively and negatively.
The Board Chairperson called the Public Water Use Efficiency Form in session at 11:30 a.m.
See attached minutes.
The forum was closed at 11:55 a.m.

The Board Chairperson began the regular meeting.

Minutes for the 20 February 2023 meeting were approved as presented.

General Fund & General Fund Invested balance as of 28 February 2023 is $ 120,874.39.
Total Reserve balance as of 28 February 2023 is $846,056.46.
Financial statements are attached to these minutes.

March 2023 Claims totaled $ 36,628.69.
March 2023 Payroll totaled $ 3,525.20.

Past Due accounts were reviewed with customer shut offs on 22 March 2023.

Three leak adjustments were presented to the Board for approval.

Motion: Pete The Board hereby approves the February 2023 minutes, March 2023 Claims and Payroll and the leak adjustments as presented.
2nd Yaprak Passed unanimously.

The Policy Book review is still in progress.

The Board reviewed the quote provided by Overheard Door to replace the broken springs on the garage door.
Motion Pete The Board hereby approves the Overhead Door quote to replace the broken springs on the garage door.
2nd Yaprak Passed unanimously.

Dave has met with the City of Bellingham to see if annexation into the district was going to happen soon and any of the current boundary lines need to be adjusted. The City has no set time line for annexation within the foreseeable future and feel the boundaries are fine as they currently are, and any adjustments can be made in the future.

As the City is not looking to annex for a minimum of 10 years, we need to address the fragile line on Cliffside Drive, which is listed as the top priority in the water system plan. The question now becomes do we plan to start in 2024 and how do we fund the project, use District funds or seek funding elsewhere.

The next regular meeting will be 17 April 2023.

There being no further business the meeting was adjourned at 12:45 p.m.

Pete Rittmueller

Chuck Foster

Yaprak Goertz

20 March 2023

Public Forum on Water Use Efficiency

The Public Forum meeting of the Board of Commissioners for Whatcom County Water District #2 was held on 20 March 2023, at 11:30 a.m. Commissioners present were Pete Rittmueller and Commissioner Ms. Yaprak Goertz, Commissioner Chuck Foster was excused. Also present was Dave Olson, Operations Manager, Lorrie Whitfield, Office Manager.

Our guests were: Terry Smith, Wendy Malick and Pete Rim, representing Smith Gardens.

Written comments were due by March 18, 2023.
No written comments were received.

There was a brief discussion on how the district currently encourages customers to conserve water through water usage rates along with the new radio read meters that have leak detection capabilities. Plus, Odd/Even watering in the warm weather.

The district goals are to reduce system wide Average Day Demand per customer to 170 gallons per day on the demand side and keep leakage to under 5% on the supply side. These goals are to be achieved by use of rates and continued use of customer assistance, leak detection, outdoor watering on Odd/Even days and customer use of rain barrels and Student Education Programs through the Whatcom Water Alliance.

Motion: Pete The Board of Commissioner's hereby adopt the above goals to be included in the new 2023 Water System Plan.
2nd Yaprak Passed Unanimously

There being no further business the public forum was adjourned at 11:55 a.m.

P Ritt
Pete Rittmueller

Chuck Foster

Yaprak Goertz

Whatcom County Water District #2

1615 Bayon Rd.
Bellingham, WA 98225

Phone: 360-733-5770 Fax: 360-671-4912
Email: wcwd2@qwestoffice.net

March 1, 2023

To: Customers of Water District 2

Re: Water District 2 Comprehensive Drinking Water System Plan Update and Water Use Efficiency Goals.

Notice is hereby given that Water District 2 will hold an informational meeting on the Water System Plan draft consistent with WAC 246-290-100, followed by a public forum to evaluate, and reestablish water use efficiency goals consistent with WAC 246-290-830. The informational meeting will be held at the District office during the regularly scheduled monthly commissioner meeting beginning at 10 am on March 20, 2023 at the address above.

There will be opportunity for public comment regarding the Water System Plan draft and proposed Water Use Efficiency Goals during the meeting.

Written comments must arrive at the District office no later than 5 pm on March 18th and may be submitted by mail to the above address or by email to wcwd2@qwestoffice.net

A link to the Water System Plan draft including Water Use Efficiency information found in Chapter 4 can be found on the District Website home page at www.wcwd2.com beginning March 6th, 2023.

Sincerely

Water District 2

Board of Commissioners

APPENDIX C

Appendix C

This Appendix includes District Policies and Resolutions

Rules and Regulations
Resolutions
Rates and Fees

Rules and Regulation
of
Whatcom County Water District Number 2

The following rules and regulation are hereby established for the control of Whatcom County Water District Number 2.

SECTION 1. The word "Secretary" where ever used in these regulations shall be held and construed to mean the Secretary of the Board of Water Commissioners of Whatcom County Water District Number 2. The wards "Water Board" shall be held and construed to mean the Board of Water Commissioners of Whatcom County Water District Number 2; and the word "Person" where ever used in these regulations shall be held to mean and include natural person of either sex, associations, co-partnerships and corporations whether acting by themselves or by a servant, agent or employee; the single number shall be held to include the plural and the masculine pronoun to include the feminine. The words "Water District" shall be held and contoured to mean Whatcom County Water District Number 2.

SECTION 2. The rates for water supplied to users in Whatcom County Water District Number 2 shall be for each month or fractional part thereof as follows:

800 cubic feet or less----------$2.50
Exceeding 800 cu.ft. per 100 cu.ft.------$ .08
Provided that the rate for all water used
in excess of 10,000 cu.ft. shall be per
100 cubic feet----------$ .04

The minimum charge of $2.50 as above set forth shall apply to each separate service or "user" whether residing on the same premises or otherwise.

SECTION 3. Any person desiring to have premises connected with the water supply system of the Water District shall make application at the office of the Secretary on the printed forms furnished for that purpose. Every such application shall be made by the owner of the property to be benefited or by his authorized agent; and applicant must state fully and truly all the purposes for which the water may be required, and must agree to conform to the rules and regulations established from time to time as the condition for the use of water; and must further agree, as a condition precedent in the premises, that the Water District shall have the right at any time, without notice, to shut off the water supply for repairs, extensions, non-payment or rates or for any other reason, and that the Water District shall no be responsible for any damage caused by the breaking, bursting or collapsing of any boilers, pipes or fixtures or by the stoppage

or interruption of the water supply, or any damage whatever resulting directly or indirectly for the shutting off of water.

SECTION 4. No person supplied with water from the District Water Mains shall be entitled to use it for any purpose other than those stated in the application or to supply in any way other persons or families.

SECTION 5. When a permit has been obtained for the installation of water, the Secretary shall cause the premise described in the application, if same but upon a street upon which there is a District Water Main, to be connected with the District's Water Main by a service pipe extended at right angles from the main to the property line and including a stop cock placed within the line of the street curb, which connection shall thereafter be maintained by and kept within the exclusive control of the Water District.

In case of application for water service on premises not abutting upon a street upon which there is a District Water Main, and upon payment in advance by the application for such service of the average cost as determined by the Water Board from time to time, the district will lay its connection from the main toward the premises for a distance equal to the distance from the main to the curb line, said distance in no case to exceed forty (40) feet, and permit connection therewith by means of a union and pipes laid at the expenses and maintained by the owner of the service, or at the discretion of the Water Board and upon payment to the actual cost thereof, extend the service to the premises of the applicant along and beneath any public street or avenue of the city, but not otherwise. No premises shall be allowed to have more than one service connection except the connection for fire purposes as hereinafter defined. Every separate premises supplied by District Water must have its own separate service connection with the District Main, and the premises so supplied will not be allowed to supply water to any other premises (except temporarily) where there are not mains in the street, unless said property is adjacent and owned by the person who owns the service connection.

SECTION 6. All persons connecting to District service, or laying their own private pipes, shall be required to use only standard galvanized iron pipe or other pipe of equal durability or serviceability, up to and including two (2) inches in size, and all pipes shall be laid not less than two (2) feet below the surface of the ground, except than in ungraded streets where the grade is already established, said service and pipes shall be laid at least two (2) below the said established grade. The Water Board will maintain private services from the main in street which are being graded or regraded and will have such access on private property as shall be necessary to maintain such pipes during the work, and shall as practicable upon the completion of

such work relay said pipes in street. Except for above cause, owners shall maintain their private pipes from the end of the District service to and into their property, or in case the Water Board finds it necessary to maintain the same the owner shall relinquish all rights to said pipes. When necessary the Water Board many slope services in on property to conform to the slope occasioned by the grading of the street and charge expense to owner of service.

SECTION 7. The fees for the installation for water service shall be the average cost of labor and material, as determined by the Water Board from time to time, and such average cost shall be paid by the person applying for service before the work of connecting the property with the main is begun. This provision shall also apply where exchange in size of service are made at the request of the property owner. No service smaller than 3/4 of an inch shall be installed. No water will be supplied outside the territory o the Water District except for service within the limits of the City of Bellingham, Washington and also to certain property abutting the district's territory and owned by the Groverment of the United States. In such instances the installation charge shall be as above set forth provided that the applicant in such cases shall also pay in advance an amount equal to the assessment charge on similar property within the district plus the cost of a water meter, such meter to become the property of the district immediately upon installation.

SECTION 8. Before water will be turned on to the premises connected with the district's mains, the connection between the district's pipes at the property line and the service pipes on the premises must be made with the union and approved by the Secretary.

SECTION 9. To be omitted.

SECTION 10. It shall be unlawful for any person whose premises are supplied with water, either at fixed rates or through meter, to install additional fixtures on said premises; or to apply the water to purposes other than for those for which the original application was made; or to furnish water to additional families or premises, or fixtures, unless he shall first make application in writing so to do upon a printed form furnished for that purpose, and in the same manner as an original application for the installation of water service.

SECTION 11. When additional fixtures on premises are connected without the application prescribed in the preceding section, such fixtures or premises shall be charged at double the rate for the time they are in use, and the service may be shut off by the Superintendent and a charge of two (2) dollars made for shutting off and turning on such service. In case water shall be turned off as provided in the section, the same shall not be turned on

again until all rates and charges against such premises have been paid in full.

SECTION 12. When new buildings are to be erected on the site of the old ones and it is desired to increase the size of or change the location of the old service connection, or when a service connection to any premises is abandoned or no longer used, the Superintendent may cut out or remove such service connection; after which, should a service connection be required for said premises, a new service shall be placed only upon owner's making an application and paying for a new tap in the regular manner. When the service connection of any premises does not come from a main in front of said premises, the Superintendent shall, when a main is laid in front of said premises, after notifying the owner or tenant thereof, transfer the service connection to the new main without charge, and at the same time cut out the old service connection.

SECTION 13. Whenever the owner or occupant of any premises connected with the city's water supply system desired to discontinue the use of water for any special purpose or through any fixtures mentioned in the original application, he shall cause such fixtures to be removed; and the branch pipe of service supplying the same to be plugged, and shall notify the Superintendent in writing before any reduction of rates will be made.

SECTION 14. Should it be desired to discontinue the use of water supplied to any premises, written notice must be filed with the Superintendent on or before the 6th of the month, which notice shall be on the printed forms provided by the Superintendent for that purpose, and payment in full for all arrearages must first be made. The water will then be turned off and turned on again on application without charge; but no remission of rates will be made for a period of less than one (1) calendar month or without the notice prescribed in this section.

SECTION 15. All water rates will be charged against the property to which it is furnished and against the owner thereof; and if for any cause any sums owing therefor become delinquent the water shall be shut off; and in no case shall it be turned on to the same property until all delinquences shall have been paid in full. No change of ownership or occupation shall affect the application of this section.

SECTION 16. Should the owner or occupant of the premises turn on the water or suffer or cause it to be turned on, after it has been shut off at the curb cock by the Superintendent it may be turned off at the main by the Superintendent, and an additional charge of five ($5.00) dollars made for the expense of turning it off and on.

SECTION 17. All accounts for water shall be kept in the name of the owner of the property and not in the name of the tenant; and the owner only or his legally authorized agent shall be held responsible for water rates; provided, that persons holding property under written lease may be supplied on their own account where it is more convenient than to keep the account in the name of the owner.

SECTION 18. No plumber or other person will be allowed to make connection with the city mains or make connection with any conduit, pipe, or other fixture connecting therewith, or to connect pipes when they have been disconnected, or to turn water off on any premises without the permission of the Superintendent.

SECTION 19. None but competent plumbers shall be allowed to do any work in connecting with the city service pipes or mains; and all plumbers shall make in writing a true and accurate return of the work done within twenty-four (24) hours after completion and before water may be turned on, which returns shall describe the position of the service pipes, stop cocks and other fixtures outside of buildings and refer to street and lot corners and shall be on forms furnished by the Superintendent.

SECTION 20. Plumbers failing to perform their work according to the established rules and regulations, or executing it unskillfully, or to the damage of the city water works system may be debarred by the Water Board from making any connection with the city's service pipes.

SECTION 21. Officers and employees of the city Water Department shall have free access at proper hours of the day to all parts of buildings in which water may be delivered from the city mains for the purpose of inspecting the condition of the pipes and fixtures, and the manner in which the water is used, and any owner or occupant of any premises supplied with city water who shall fail, neglect or refuse to give free access to such premises for the purposes herein specified shall be charge a penalty of two ($2.00) dollars and the service may be immediately shut off.

SECTION 22. It shall be unlawful for any person to waste water, or allow it to be wasted by imperfect or leaking stops, valves, pipes, closets faucets or other fixtures, or to use closets without self closing valves, or to allow any pipes or faucets to run open to prevent the service from freezing, or for any other reason, or to use the water for purposes other than those named in the application upon which rates for water are based, or for any other purpose than that for which his application provides, or to use it in violation of any provision of this ordinance.

SECTION 23. If any person shall violate any provision of the preceding section, the Superintendent may, in his discretion and

without notice, place a meter on such service where premises are supplied at fixed rates, and may charge for the water at meter rates; provided, that the charge shall not be less than the fixed rate; and unless such person shall make the proper repairs and stop the waste, and water shall be shut off and not be turned on again until all delinquent and unpaid charges have been paid, and proper repairs made, and until there has been paid a charge of two ($2.00) dollars for shutting off and turning on such water service.

SECTION 24. Any owner, manager or architect intending to use water in the course of construction of any building, shall report to the Superintendent such intention on forms provided for that purpose. Water for building purposes shall be furnished only upon application of the owner or authorized agent, and will be charged for at meter rates; and all delinquent and unpaid charges therefor shall become a lien upon the premises supplied, and shall be collected in the same manner as other delinquent and unpaid charges.

SECTION 25. Water fixtures will be assessed for each and every purpose available, and for each family or establishment within the enclosure or when separated only by a door, gateway or other means of easy access.

SECTION 26. Pipes for fire protection purposes must be fitted up with such fixtures only as are needed for fire protection, and entirely disconnected from those used for other purposes. Whenever practicable the hose shall be kept attached to the fixtures, suspended conveniently for use in case of fire.

In no case shall any use of any water be permitted through any fire service, nor through any pipes, tanks or other fixtures connected therewith however, that connections and apparatus used for fire protection may be tested at any time under the following conditions, viz; Written notice shall be given to the Superintendent that such test is desired when date and hour shall be assigned the application for connecting tests, all of which tests must be made in the presence of the Superintendent or his authorized agent. For violation of this section a penalty of five ($5.00) dollars will be imposed, and the supply of water discontinued from the premises for all purposes until all charges and penalty have been paid.

SECTION 27. The following acts are prohibited:

(a) To open, close, turn or interfere with, or attempt to, connect with any fire hydrant, stop valve or stop cock, belonging to the city Water Dept., unless authorized by the Superintendent in writing; provided, this rule shall not apply to members of the city Fire Department while acting in such capacity.

(b) To disturb or damage any pipe, machinery, tools or other

property of the City Water Dept.

(c) To throw refuse of any substance into any city reservoir, or to throw any deleterious matter in or upon any part of the city's water shed or water supply system, or into Lake Whatcom, or to bathe in any part of Lake Whatcom or any reservoir.

(d) To deface or injure any building or other structure or improvement of the City Water Department.

(e) To place any foreign thing upon the grounds belonging to the city Water Dept., or upon such portion of grounds and streets as may be under its control.

(f) To disturb or injure any fountains, lawn, grass plot, flowers, vines, bushes or trees belonging to or under the control of the city Water Dept.

(g) To use black iron pipe or fittings to connect any premises or building with the city Water Dept. pipes.

SECTION 28. Permits for sidewalk sprinkling, private hydrants,irrigation and hose connections will be granted only to persons supplied through meter or paying a fixed rate of not less than one and 25/100 ($1.25) dollars per month.

SECTION 29. Sidewalk sprinkling must be confined within the limits of the front of the premises of which payment has been paid.

SECTION 30. (As amended by Ord. #5137, passed July 28, 1930) The use of water for sprinkling for irrigation of lawns, gardens, flower beds, plants, trees, shrubs or parking strips is hereby prohibited except during the hours and the manner under conditions hereinafter provided.

SECTION 31. The Water Board is hereby authorized and empowered to divide the city into irrigation districts within which districts water may be used at the times in this ordinance authorized for sprinkling or irrigating lawns, gardens, flower beds, plants, trees, shrubs, or parking strips, or for hosing windows, woodwork, porches, steps or walks in such districts. Whenever districts are established notice thereof shall be given insuch manner as the Water Board may order, and thereafter it shall be unlawful for any person to use water at any other time or in any other manner then as prescribed in such notice.

SECTION 32. (As amended by ord #5137, passed July 28, 1930) Water used for any purposes mentioned in Sections 30 and 31 of Ordinance No. 3444, from any service not connected with a meter, must be delivered throught a hose to which shall be attached a single nozzle or an automatic sprinkler, with not more than one sprinkler head. No hose of greater diameter than three-fours 3/4 of an inch shall be used for delivering water for any of such

purposes and only one nozzle, the orifice of which is not greater than one-fourth (1/4) of an inch in diameter, shall be used. The use of water for sprinkling or irrigation will be permitted only on a lot not more than sixty by one hundred twenty-five (60x125) feet, or its equivalent area used as a lawn or garden and occupied by a building used as a dwelling, and no more than one line of hose shall be in operation at any one time. On or after the first day of January 1931, any water user, not connected with a meter, who uses water for irrigation purposes in excess of the area of sixty by one hundred and twenty-five (60 x 125) feet, hereinbefore provided, shall pay the sum of two dollars and fifty cents ($2.50) additional per season for sprinkling or irrigating such excess area. Provided, however, that each water user who uses a automatic sprinkler or an automatic sprinkler devise, with a sprinkler head orifice of more than one fourth (1/4) of an inch in diameter, or with more than one sprinkler head, or who uses more than one line of hose, shall be required to install, at his own expense, a water meter, and pay water meter rates for all water used.

Water may be used daily, as herinbefore provided, between the hours of 5:00 a.m. and 8:00 a.m. and 6:00 p.m. and 9:00 p.m., provided, however, that the Water Board may, whenever in its judgment the public safety, health or equitable distribution of water requires, direct the Superintendent to change or alter the time above stated, or to discontinue the use of water for the above purposes, or to prohibit the use of any automatic sprinkler or sprinkler systems.

For violation of any provisions of this section, a penalty of two dollars ($2.00) shall be imposed and taxed against the person supplied with the service used for such purposes and the water shall be shut off until the same has been paid. Provided however, that the Water Board may grant permits for cemeteries, driveway and streets, and such other municipal purposes as may be deemed advisable, subject to such terms and condition as the Water Board may provide, which permits must cease and terminate whenever water is used in a manner other than as specified in such permits.

SECTION 33. No nozzle or other sprinkling device shall be so placed as to throw water on any person passing along the street or sidewalk.

SECTION 34. No person shall use any water for irrigation or sprinkling during the progress of any fire in the city, and all irrigation and sprinkling shall be immediately stopped when an alarm of fire is sounded in any part of the city, and shall not be begun again until the fire has been extinguished. For any violation of this section a penalty of ten dollars ($10.00) for each offense shall be imposed and taxed against the person and premises supplied, and the water turned off until such penalty has been fully paid.

SECTION 35. (As amended by Ord. #4783, passed Nov. 28, 1927) That from and after the first day of January 1928, for the purpose of fixing the water rates in the City of Bellingham and for the collection of fixed rates, the City of Bellingham shall be divided into three districts, to be known as the EAST DISTRICT, the WEST DISTRICT and the SOUTH DISTRICT, respectively; said districts to comprise the following described territory:

EAST DISTRICT shall include and comprise all that portion of the City of Bellingham lying east and south of the center line of Cornwall Avenue and north of the former boundary line between the former cities of Fairhaven and Whatcom.

WEST DISTRICT shall include and comprise all that portion of the City of Bellingham lying west and north of the center line of Cornwall Avenue and north of the former boundary line between the former cities of Fairhaven and Whatcom, including all of Broadway Park Plat.

SOUTH DISTRICT shall include and comprise all the territory constifuting the former city of Fairhaven and south of the boundary line between the former cities of Whatcom and Fairhaven.

All fixed rates shall be due and payable as follows:

In the EAST DISTRICT, on or before the last day of January for January and February; on or before the last day of March for March and April; on or before the last day of May for May and June; on or before the last day of July for July and August; on or before the last day September; for September and October; on or before the last day of November for November and December.

In the SOUTH DISTRICT, on or before the last day of January for January and February; on or before the last day of March for March and April, on or before the last day of May for May and June; on or before the last day of July for July and August;on or before the last day of September for September and October; on or before the last day of November for November and December.

In the WEST DISTRICT, onor before the last day of February for February and March; on or before the last day of April for April and May; on or before the last day of June for June and July; on or before the last day of August for August and September; on or before the last day of October for October and November; on or before the last day of December for December and January.

Said rates and charges herein provided for shall be in full force and effect from and after January 1, 1928.

If the rates and charges are not paid at the time and in the manner prescribed it shall be the duty of the Superintendent to shut off the water with out notice, and it shall not be turned on again until all arrearages and charges are paid, together with a penalty of twenty-five ($.25) cents which shall be charged on all fixed and meter rates when the same are not paid, on or before the delinquent date, which delinquent date shall be as follows; to-wit:

For fixed rates in the EAST DISTRICT, the last day of January and the last day of each alternate month thereafter.

For fixed rates in the WEST DISTRICT, the last day of February and the last day of each alternate month thereafter.

For fixed rates in the SOUTH DISTRICT, the last day of January and the last day of each alternate month thereafter.

All meter rates shall become delinquent from and after the last day of the month succeeding the month in which the water is furnished.

Nothing herein shall be construed to prevent any customer from depositing with the City:

(a) If a fixed rate, the amount to become due for a period of not less than six (6) months;

(b) If meter rate, the estimated amount to become due for a period of not less than six (6) months.

SECTION 36. All meters shall be and remain the property of the city and may be installed or removed by the Superintendent in conformity to rules and regulations in this ordiance provided in the event of a meter getting out of order and failing to register properly, the consumer shall be charged at the average daily consumption as shown by the meter during the last three months the same was in good condition. In all cases where meters are lost, injured or broken by carelessness or negligency of owners or occupants of premises, they shall be replaced or repaired under the direction of the Superintendent and the cost charged against the owner or occupant of premises, and in case of non-payment the water shall be shut off, and will not be turned on until such charge and the charges for turning on the water are paid.

SECTION 37. (As amended by Ord. #5310, passed June 13,1932, effective on the first day of August 1932.)

The monthly rates for use of water other than measured by meters, shall be known as "FIXED RATES" and shall be a follows;

A minimum rate of $.50 shall be charged wherever there is a connection with city service, and the addition thereto, the following rates shall be imposed;

For each bath tub.....$.25
For each toilet.....$.25
Wherever a steam heating plant is situated upon the premise.....$.50

SECTION 38. (As amended by Ord. #4783, passed Nov. 28, 1927)

Water for all purposes where supplied through pumping plants, and for the following purposes under all conditions, shall be served by meter and charged for a meter rates.

Bakeries	Coffee Houses	Hotels
Barber shops	Dry goods stores	Hospitals
Printing Offices	Restaurants	Schools
Boarding Houses	Drug Stores	Hydraulic elevators
Bath Houses	Dairies	Laundries
Stables,Public	Blacksmith shops	Dying and Cleaning
Lunch Counters	Soda Fountains	Barns, Transfer

Gas Works	Lawn Fountains	Stationary urinals
Bottling Works	Green Houses	Office Bldgs.
Theaters	Candy Factories	Gardens for market
Oyster stands	Water meters	Club Rooms
Govt. Bldgs.	Photograph studios	Water plants

Water used for all other purposes or kinds of business not hereinabove enumerated, shall be furnished and charged at meter rates or at special fixed rates which shall be determined by the Water Board; and where meters are not installed, fixed rates shall be charged.

SECTION 39. (As amended by Ord. #5394, effective Feb.20, 1934.)
That the rates for water in the City of Bellingham supplied through meters, except as hereinbefore provided, (for a month or fractional part thereof), shall be as follows:
For the first 400 cubic feet or fraction thereof .....$.75
Exceeding 400 cubic feet, up to and including 30,000 cubic feet for each 100 cubic feet so in excess.....$.07
Exceeding 30,000 cubic feet, up to and including 70,000 cubic feet for each 100 cubic feet so in excess.....$.04
Exceeding 70,000 cubic ft. for each 100 cubic ft. so in excess$.03
Provided, that in cases where any one plant on a single service uses two million cubic feet per month, or over, the rate for all water so furnished in excess of 100,000 cubic feet may be for each 100 cubic feet so in excess.....$.02
Water used for all other purposes not hereinbefore enumerated shall be furnished and charged for either at meter rates or at a special rate, which rate or rates shall be fixed by the City Council as hereinbefore provided, and provided further, that where two or more separated buildings are supplied by the same meter, the minimum shall be $.75 permonth for each building.
Where meters are installed for a temporary supply only, a minimum charge of three dollars ($3.00) shall be charged.

SECTION 40. In computing meter rates and water rents as herein provided, results ending in one and two cents shall be counted "0"; and results ending in three, four, six or seven cents shall be counted "5"; and results ending in eight and nine cents shall be counted "10".

SECTION 41. In all cases wherein by these rules and discretion is vested in the Superintendent, such discretion shall be subject to the control of the Water Board.

SECTION 42. It shall be the duty of the employees of the Police and Fire Departments of the City of Bellingham to give vigilant aid to the City Water Department in the enforcement of its rules and regulations, and to this end they shall report all violations thereof which come to their knowledge, to the office of the Water Superintendent.

SECTION 43. Each and every violation of infraction of any of the rules and regulations established by this ordinance, in addition to any special penalties attached thereto, shall constitute a separate offense; and any person found guilty of such violation of infraction, shall upon conviction, be fined in any sum not exceeding One Hundred ($100.00) Dollars.

SECTION 44. All ordinances and parts of ordinances in conflict herewith are hereby repealed.

Passed by the City Council of the City of Bellingham, this 3rd day of May 1920.

Resolution 87-#2
29 December 1987

Any corner lot formed by a new road, Water District #2 will supply the water main for the First (1st) 150 feet along the newly formed road, as long as it comes off an existing Water District #2 water main.

Robert A. Peterson

Joseph P. Roberts

John Coulthurst

Signed copy in minutes book.

Resolution 89-#2
23 May 1989

Any request for alterations to our existing system must be presented in writing and the applicant will apear at a Regular Board Meeting to discuss the request. If such alterations are approved, any and all costs incurred shall be born by the applicant. Then all work shall be performed by Whatcom County Water District #2.

Robert A. Peterson

Joseph P. Roberts

John Coulthurst

RESOLUTION #93-02

A RESOLUTION OF THE BOARD OF COMMISSIONERS OF WHATCOM COUNTY WATER DISTRICT #2, WHATCOM COUNTY, WASHINGTON, AUTHORIZING THE ADOPTION OF A SMALL WORKS CONTRACTORS' ROSTER.

WHEREAS, the Water District has been advised that RCW 57.08.050 has been amended to provide for telephone bid from a small works contractors' roster; and

WHEREAS, the statute provides that on projects which the estimated cost is less than $50,000 the project may be awarded, based on written or telephone, of bids to a contractor on the small works roster; and

WHEREAS, RCW 57.08.050, as further amended, provides that the Commissioners may set up uniform procedures to prequalify the contractors for the roster.

NOW, THEREFORE, BE IT RESOLVED by the Board of Commissioners of Whatcom County Water District #2, Whatcom County , Washington as follows:

1. The District shall adopt a small works roster which shall be maintained in the District office. The small works roster shall include all responsible contractors who have requested to be on the list. The manager shall set up procedures to notify all contractors on the small works roster of projects the estimated cost of which is less than $50,000 and to obtain written and/or telephone bids.

2. The Commissioners shall select on the basis of lowest telephone or written bid, qualified contractors to perform projects for the District where the project cost is under $50,000.

3. The manager shall set up uniform procedures to prequalify contractors for inclusion on the list and advise the contractors in the District of the small works roster.

4. The small works roster shall be revised every six (6) months.

ADOPTED by the Board of Commissioners of Whatcom County Water District #2, at a regular meeting thereof held the 27th day of July 1993.

Robert A. Peterson

Joseph P. Roberts

Robert S. Krebs

ADDENDUM TO RESOLUTION #01-96

Dated March 26, 1996

Backflow prevention requirements within the Whatcom County Water District #2 for water service hookups.

Single Family Residence -- Whatcom Water District #2 discretion

Single Family residence -- (with irrigation/sprinkler system)- Minimum double check valve

Multiple Family Residence -- Whatcom County Water District #2 discretion

Commercial Building -- (Low or no health hazard) -- Whatcom Water District #2 discretion

Commercial Building -- (with irrigation/sprinkler system) -- Double Check Valve

Commercial Building -- (Potential Health Hazard) - Reduced Pressure Backflow Device

Persons to contact for review of requirements or to answer any questions: Phone: 733-5770 Hours 8:00 a.m. to 3:00 p.m.

RESOLUTION #96-03

A resolution of the board of commissioners
of Whatcom County Water District #2,
Whatcom County, Washington

BE IT RESOLVED by the board of Commissioners of Whatcom County Water District #2, Whatcom County, Washington as follows:

Section A. General Facilities Charge. Any application for water service shall be subject to a general facilities charge, the prevailing rate at the time of installation, per equivalent living unit to be connected to the District's water system in addition to any connection, permit or inspection fees otherwise applicable.

Section B. Equivalent living unit calculations. the number of equivalent living units per service or project, as applicable, shall be as follows:

1. Single family dwellings: For each single family dwelling, one unit.

2. Multiple Family residence: For each residential unit, one unit such as Apartments and Condos.

3. Mobile Home Park or Trailer Court: For each space in a mobile home park or trailer court or other premises where water service is available to a space which is used or may be used for living purposes, on a full or part-time basis, one unit.

4. Camping Mobile Home Park or Camping Trailer Park (not intended for general year around use i.e. camping type) For each space in a mobile home park or trailer court or other premises where water service is available to a space which is used or may be used for living purposes, on a part-time basis, one-half unit.

5. Campgrounds (with water service only to individual sites): for each space in a campground used for camping on a full or part-time basis, one third unit.

6. Campgrounds (without water service to individual sites): For each space in a campground used for camping on a full or part-time bases, one quarter unit.

7. Motel or Hotel: For each two rooms for fraction thereof, one unit.

8. A Restaurant: For each six seats or fraction thereof, one unit.

9. Bar or Cocktail Lounge: For each ten seats or fraction thereof, one unit.

10. Retail Store, Office or Factory: For each ten full-time employees or fraction thereof, one unit.

Section D. Connection after General Facilities Charge Payment. Whenever a General Facilities Charge is paid, connection to actual usage on the property to the water system should occur within three hundred sixty five (365) days. If connection is not made within three hundred sixty five (365) days, the difference between the amount of the General Facilities Charge in effect at the time of such payment and the time of connection to actual usage on the property to the water system shall be paid.
Section E. BE IT FURTHER RESOLVED that any resolutions or parts of resolution in conflict herewith are hereby repealed insofar as they conflict with the provisions of the resolution.

Section F. If any section, subsection, sentence, clause or phrase of the Resolution is for any reason held to be invalid or unconstitutional, such decision shall not affect the validity of the remaining portions of this Resolution. The council hereby declares that it would have passed this code and each section, subsection, sentence, clause and phrase thereof, irrespective of the fact that any one or more section, subsection, sentences, clauses or phrases has been declared invalid or unconstitutional, and if, for any reason, this Resolution should be declared invalid or unconstitutional, then the original Resolution or Resolutions shall be in full force and effect.

Section G. This Resolution shall be in full force and effect on Date: 24 Sept 1996.

PASSED by the Board of Commissioners of Whatcom County Water District #2, Whatcom County, Washington, at a regular meeting held the 24th day of Sept. 1996.

Greg Christensen Robert S. Krebs Joseph P. Roberts

THIS IS TO CERTIFY that the above is a true and correct copy of Resolution #96-03 of Whatcom County Water District #2, Whatcom County, Washington, adopted at the regular meeting of the Board of Commissioners on 24Sept 96.

SECRETARY

Resolution #02-96
Water Line/Main Extensions

A main extension is required whenever property within Whatcom County Water District #2 is developed and that property does not abut a water main, or when an existing abutting water main is not adequate to provide the required water pressure or flow rate.

The person desiring a main extension shall petition the Commissioners of Whatcom County Water District #2 requesting permission to extend the water system.

The Commissioners shall review the request and if the requested extension is determined to be desirable, shall provide the petitioner with the design requirements for the extension. If the requested main extension is determined to be an undesirable extension to the water system, the petition shall be denied.

All main extensions shall extend thru the property to the opposite property line (completely). Exceptions will be from commissioners only!

The petitioner's plans shall be in accordance with engineering and District standards. The completed plans shall have a valid professional engineers seal and endorsement. The plans shall be reviewed by the Districts Engineer before any approval shall be given.

All cost, including engineering review shall be borne by the petitioner.

Once approval is given, the petitioner shall contract with a contractor to install the main extension. The contractor shall be licensed to perform the construction.

Upon completion of a main extension, the petitioner shall provide the District an accurate reproducible mylar drawing of the main extension and appurtenances as actually installed, in plan and profile.

Upon completion, all extensions and appurtenances shall become the property of Whatcom County Water District #2.

No main extension will be accepted until satisfactory "as built" drawings are provided.

Greg Christensen Robert S. Krebs Joseph P. Roberts

Resolution # 99-02

25 May 1999

We, the Board of Commissioners for Whatcom County Water District #2, due hereby resolve to make the following changes to our Rules and Regulations.

From this date forward **All meters installed within Whatcom Co. Water District #2, whether new service or meter replacement will be a Touch Read meter.

Greg Christensen

Ernest Struthers

Maxine Visser

Resolution # 2001 - 03

18 Oct. 2001

We, the Board of Commissioners for Whatcom County Water District #2, due hereby adopt the state RCW's for collection of all water connection charges and rates and charges for water supplied by the district and other charges deemed appropriate.

RCW 57.08.080 Rates and charges.

The commissioners shall enforce collection of the water connections charges and rate and charges for water supplied against property owners connecting with the system and/or receiving such water, such charges being deemed charges the property served, by addition for penalties of not more than ten percent thereof in case of failure to pay the charges at times fixed by resolution. The commissioners may provide by resolution that where either water connection charges or rates and charges for water supplied are delinquent for any specified period of time, the district shall certify the delinquencies to the treasurer of the county in which the real property is located, and the charges and any penalties added thereto and interest thereon at the rate of not more than eight percent per year shall be a lien against the property upon which the service was received, subject only to the lien for general taxes.

RCW 57.08.090 Rates and charges - Foreclosure for delinquency - Costs -Fees - Cut off of service.

The district may, at any time after the connection charges or rates and charges for water supplied and penalties are delinquent for a period of sixty days, bring suit in foreclosure by civil action in the superior court of the county in which the real property is located. The court may allow, in addition to the costs and disbursements provided by statute, such an attorney's fee as it adjudges reasonable. The action shall be in rem, and may be brought in the name of the district against an individual, or against all of those who are delinquent in one action, and the laws and rules of the court shall control as in other civil actions.

In addition to the right to foreclose provided in this section, the district may also cut off all or part of the service after charges for water supplied are delinquent for a period of sixty days.

This resolution will be deemed retroactive to all liens currently in place.

Greg Christensen

Ernest Struthers

Maxine Visser

Resolution: 2003 – 01
Pipestem Development Within WCWD#2

A 'Pipestem Development' is described as a parcel of land for an individual residence or multiple residences that does not directly 'front' either a public street or 'right-of-way'. It is connected via a finger of property from the street or R/W to the main body of the property. Its physical characteristics lend it to be compared to a [tobacco] pipe.

Whatcom County Water District #2 (WDWD#2) recognizes this method of development as a potential complexity for the purveying of potable water to this property and possible future growth properties, adjacent and beyond.

Prior to the issuance of the 'Water Availability' form:

> The Commissioners shall have the plans presented to them [by the developer, owner of the property or their representative] at a regular monthly Commissioner's meeting, and examine all impacts to the property and future development within the immediate area. In addition, they shall examine the proposal in light of water flow, hydrant spacing, accessibility to meters and any applicable law or regulation.
>
> It shall be the Commissioner's responsibility to require (if needed) mitigating requirements to sustain the Water District's ability to provide for current and future growth. This may include, but not be limited to: 'water main extension(s)', water main size increase (for existing mains leading to the site) fire hydrant(s), 'blow-offs', valves or any approved water main delivery system designed to current WCWD#2 requirements. This construction shall be within an approved 'right-of way' or 'easement', allowing the Water District full access to the system. The District's engineer, at the applicant's expense, must approve the plans.
>
> The construction cost of the system or improvements shall be borne by the applicant in most cases, however, at the discretion of the Commission, the District may enter into a 'cost-sharing' agreement.

The Commissioners also have the right to approve any development [as related to 'water availability'] without additional requirements, if so decided.

It shall be the obligation of the Commissioners to reply to the applicant in a timely manner.

Approval shall not imply that similar conditions must be imposed [or not imposed] upon any future or past developments.

Addendum to Resolution # 2001-03

25 March 2003

We, the Board of Commissioners for Whatcom County Water District #2, due hereby place the following addendum to existing Resolution # 2001 - 03.
At the time of lien removal the property owner will be assessed all costs for placement and removal of said lien.

Water will not be reinstated until all fees are paid in full.

Greg Christensen

Charles Foster

Maxine Visser

Whatcom County Water District #2
Resolution 2008 – 03

A resolution establishing a requirement to install a meter on any main connection that extends outside the Right of Way.

Whereas, Whatcom County Water District #2 will requires a meter on all private and public water connections to it's water system, effective January 1, 2008.

Whereas, Whatcom County Water District #2 will install a meter on all new water line and service connections. The additional cost of the meter, if larger than the standard 5/8" Sensus, will be the responsibility of the developer or owner of the property.

Whereas, all services that will require a meter shall include, but not be limited to: fire lines (including hydrants on private property), fire suppression sprinkler systems, agricultural and other watering systems, and any other connection that continues out of the Right of Way.

Whereas, this shall not include fire hydrants within the Right of Way.

Whereas, this shall become part of the Water System Developer's Standards handbook.

Whereas, these regulations shall become effective upon signing.

Whereas, the Commission may, upon internal discussion, modify these conditions, on a 'case by case' basis.

Signed after it's passage this 25 day of Feb, 2008.

Commissioner Commissioner Commissioner

Maxine Visser

WHATCOM COUNTY WATER DISTRICT #2

RESOLUTION NO. 2008-04

ESTABLISHING VOLUNTARY SUMMER OUTDOOR WATER CONSERVATION MEASURES

WHEREAS, Whatcom County Water District #2 (hereinafter "WD#2") is a local government providing potable water service, and

WHEREAS, water is a valuable and limited resource that should be used wisely and efficiently to accomplish the greatest possible public benefit, and

WHEREAS, the Washington State Department of Health (WSDOH) has adopted a Water Use Efficiency Rule contained in Washington Administrative Code (WAC) Chapters 246-290-800 through -840, requiring each State municipal water supplier to use water more efficiently, and

WHEREAS, water conservation provides a cost-effective management strategy to reduce demand, defer the need for new water rights and moderate costs of capital facilities, and

WHEREAS, water consumption during the summer months greatly exceeds winter water consumption, placing stress on water supply systems, and

WHEREAS, irrigation during the summer constitutes the largest portion of the increased summer water consumption, and

WHEREAS, research has shown that irrigation practices can be adjusted to effectively maintain plantings while reducing overall consumption ("Grass only needs an inch of water a week, including rainfall, and established gardens usually require less" and "the best watering practices for your lawn are to water infrequently but deeply." [Puget Sound] *Partnership for Water Conservation* internet website http://www.partners4water.org/conservationtips_yard.html), and

WHEREAS, public education and outreach help promote water conservation and encourage consumers to adopt specific water saving measures, and

WHEREAS, partnering with other water systems is viewed as a cost-effective way to develop and promote public education strategies while sharing technical information and expertise, and

WHEREAS, the WD#2 has a mutual understanding to be part of the Whatcom Water Alliance and work collaboratively with other local water municipal purveyors in Whatcom County to explore various alternatives for water conservation, and

WCWD2 2022 Rate & Fee Schedule
Resolution 2021 – 2

Rate 1 Domestic Single Family Residence — **One water meter per living unit**

$65.00 Bi-Monthly Base Rate per living unit.

$ 5.17 for each 100 cu. ft. used.

Rate 2 Multiple Living Units — One water meter per property/facility

- Apartments — One water meter serving multiple living units
- Trailer Parks — One water meter serving multiple living units
- Condominiums — One water meter serving entire complex

$65.00 Bi-Monthly Base Rate per living unit

$ 5.17 per 100 cu. ft. all usage.

Rate 3 Non-Residential and Mixed Use

- Non-Residential and Commercial — One meter serving entire facility
- Residential & Commercial, Mixed Use — One meter serving entire facility.

BASE RATES

5/8" Meter: $65.00 Bi-Monthly	2" Meter: $92.00 Bi-Monthly
3/4"Meter: $66.00 Bi-Monthly	3" Meter: $103.00 Bi-Monthly
1" Meter: $76.00 Bi-Monthly	4" Meter: $125.00 Bi-Monthly
1 ½" Meter: $81.00 Bi-Monthly	6" Meter: $164.00 Bi-Monthly

"PLUS"

$65.00 Bi-Monthly Base Rate **per living unit or Commercial Building**

$ 5.17 per 100 cu. ft. all usage.

Rate 4 Other

- Irrigation — Fire Sprinkler/Suppression Systems

$87.00 Bi-Monthly Base Rate per connection

$ 5.17 per 100 cu. ft. all usage.

FEES

The purpose of Fees and/or Assessments is to offset the direct or indirect impact of activities that are primarily for the benefit of or required by an individual or group, which do not otherwise benefit the District as a whole.

- Water Service Application Fee - $100.00 non-refundable.
- Water Line Extension Application Fee - $500.00 non-refundable.
- Water Availability Application Fee - $100.00 per year per Equivalent Residential (dwelling) Unit. (ERU) regardless of number of applications. Subject to application approval. Water availability is valid for one year.
- **General Facilities Fee.** (Subject to application approval and water availability) $4,500.00 effective 04/30/2012 for each Equivalent Residential (dwelling) Unit. (ERU)
- **Water Service Connection Fee.** Minimum $2,000.00 plus any additional costs that exceed the minimum to connect to the nearest adequate main.
- **Fire Line / Hydrant General Facilities Fee.** $8,500.00 plus all additional costs to connect.

- **NSF Check Fee.** $50.00
- **Shut Off/Turn On Fee** $50.00 each during business hours
- **Shut Off/Turn On Fee** $100.00 each after regular business hours
- **Collection Fee** $50.00
- **Late Fee** 10% per month on unpaid balance.
- **Transfer Fee** $50.00
- **Tampering Fee** $50.00 first offense. $250.00 second offense.
- **After Hours** $100.00 per hour

Temporary Billing Suspension:

Water service billing may be temporarily suspended at property owner's request. The property owner must submit a signed Billing Suspension Form stating date service is to be suspended. There is a $150.00 Administrative Fee (this includes the shut off fee) and account must be paid in full up to shut off date. After these requirements are met, the meter will be shut off and locked and billing will be suspended as of the requested date. A 24 hour notice must be received by district during regular business hours to have service turned back on. The standard turn on fee will be applied to the customer's account and will be reflected on the next regularly scheduled bill in addition to regular service charges.

Inactive Service:

When an account is delinquent and has been shut off for 6 consecutive months, the service will be deemed inactive and no further water service charges or related late fees will be assed. A water service shall be deemed inactive immediately when it is disconnected from the main for any reason.

In order for any inactive service to begin receiving water service from the District, all outstanding fees must be paid in full including but not limited to: Past due service charges, late fees, lien fees, reconnect fees and turn-on fees assessed by the District. Such additional fees would include the full cost to reconnect a service to the main if it was disconnected for any reason and reimbursement for initial cost to disconnect from the main. This does not apply to new connections which are governed by the new connection policy in place at that time.

Termination of Service:

If a service has been inactive for more than 1 (one) year or a billing suspension continues beyond 1 (one) year, service may be terminated by the District and may be disconnected from the main. If the property owner wishes to receive water service from the District after termination, they may be required to pay the general facilities charge at the time of the service request, less credit for the general facility charge that was in effect at the time of termination. The property owner will also be required to pay for all costs necessary to bring the existing service connection (if any) up to current district standards. The cost to reconnect to the District shall not be less than the then current turn on fee or more than the then current new service connection charge plus new or replacement road crossing if necessary.

Maxine Visser

Chuck Foster

Pete Rittmuller

Whatcom County Water District No. 2

BELLINGHAM, WASHINGTON 98225

Account #_____

Name_____

Address_____

Date_____ Acc. Bal.$_____ Delinquent Amount_____

Payment Schedule For Delinquent Utility Bill/ Max. of 120 Days

Date	Payment Amount	New Balance

This form is to cover the Delinquent Amount Only. All current amounts must be kept current.

All payments must be made on the above specified date or dates. You are to call in and let us know if your payment will not be made on schedule, at which time another date will be given.

If you do not make payment or payments according to schedule or do not call in to give reason why, your water will be shut-off and padlocked or sealed, without notification from Water District #2, on the day following due date. In this event a $25.00 turn-on fee and all delinquent charges must be paid in order to have the water turned back on.

Should the seal or padlock be broken there will be a $50.00 tampering charge added to the amount .

Customer Signature_____

Date_____

APPENDIX **D**

Appendix D

This Appendix includes information relative to consistency with the County's comprehensive plan, land use plan and development regulations.

Local Government Consistency Determination Form
Growth Projection Information

Washington State Department of Health

Local Government Consistency Determination Form

Water System Name: Whatcom County Water District No 2 PWS ID: 95700

Planning/Engineering Document Title: Water System Plan Plan Date: November 2023

Local Government with Jurisdiction Conducting Review: Whatcom County

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

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

Local Government Consistency Statement	For use by water system: Identify the 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.	1-4	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.	2-7 to 2-9	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.	NA	N/A
d) Service area policies for new service connections conform to the adopted local plans and adopted development regulations of all cities and counties with jurisdiction over the service area.	1-5	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.	1-4	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.

Signature

2-21-24
Date

Mark Personius, Whatcom County PDS Director
Printed Name, Title, & Jurisdiction

Local Government Consistency Determination Form

331-568 • 8/10/2023

Water System Name: Whatcom County Water District No. 2 PWS ID: 95700

Planning/Engineering Document Title: 2023 Water System Plan Plan Date: 12.14.2023

Local Government with Jurisdiction Conducting Review: Whatcom County Health and Community Services

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.	1-4	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.	2-7 to 2-10	Yes
c) For cities and towns that provide water service: All water service area policies of the city or town described in the plan conform to all relevant utility service extension ordinances.	N/A	N/A
d) Service area policies for new service connections conform to the adopted local plans and adopted development regulations of all cities and counties with jurisdiction over the service area.	1-4	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.	1-4	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.

Sue Sullivan

Signature

2/29/24

Date

Sue Sullivan, Env. Health Manager, WCHCS

Printed Name, Title, & Jurisdiction

WHATCOM COUNTY
PUBLIC WORKS DEPARTMENT

Elizabeth Kosa
Director

Douglas W. Ranney, P.E.
County Engineer
322 N. Commercial Street, Ste 301
Bellingham, WA 98225-4042
Phone: (360) 778-6210
Fax: (360) 778-6211

January 12, 2024

Mr. Carl Reichhardt, P.E.
Reichhardt & Ebe Engineering, Inc.
P.O. Box 978
Lynden, WA 98264

Subject: Whatcom County Water District No. 2
Water System Plan

Dear Mr. Reichhardt:

In reply to your email dated January 3, 2024, I do hereby approve the subject Whatcom County Water District 2 (WCWD2) Water System Plan ***contingent*** on compliance with the following:

- All work performed in County right-of-way requires a Revocable Encroachment Permit as a prerequisite. See Whatcom County Code (WCC) 12.16 for additional information. Feel free to call 360-778-6220, if you have any questions about this process.
- Depending on the scope of work of any given WCWD2 planned water system facilities project, the County might require:
  - Other permits (e.g., building, conditional use, land disturbance, shoreline) as a prerequisite to project execution, and;
  - Stormwater management documentation, with possible required engineered stormwater management system design.
- To accommodate our desire to minimize disturbance to County roadway surfaces, we encourage the WCWD2 to locate, where feasible, new or reworked water system facilities outside the existing pavement of any improved County roadway.
- We encourage the WCWD2 to accomplish, to the maximum extent feasible, its planned water system projects that involve work in County rights-of-way, in advance of our planned road projects. This will minimize roadway patching that would otherwise occur without coordination. We are happy to provide you with our current 6-Yr Transportation Improvement Plan upon request.

Sincerely,

Doug Ranney

Douglas W. Ranney, P.E.
County Engineer

cc: County Council
County Executive
Public Works Director
Engineering Services Development Division Manager
Engineering Services Senior Right-of-Way Inspector

	Baseline (2013)				Change 2013 - 2036				2036			
Water Purveyor	DU	HH	Pop	Emp	DU	HH	Pop	Emp	DU	HH	Pop	Emp
North Star Water Association	57	56	183	21	20	11	30	0	77	67	213	21
Northwest Mobile Home Park	28	28	74	0	0	0	0	0	28	28	74	0
Northwest Water Association	255	238	628	178	14	12	31	7	269	249	659	185
Old Settlers Water Association	219	199	555	60	53	29	78	0	272	228	633	60
Orchard Water Association	43	44	122	8	2	2	4	0	44	45	127	8
Pangborn Water Association	17	16	48	54	0	0	0	0	17	16	48	54
Paradise Park Water System	49	48	142	3	0	0	0	0	49	48	142	3
Pierce Road Water Assoc.	141	129	348	19	11	10	27	0	152	139	375	19
Pleasant Valley Water System	43	39	114	39	17	14	38	0	60	53	152	39
Point Roberts Water District No 4	2,661	725	1,441	407	164	53	134	62	2,825	778	1,575	469
Pole Road Water Association	861	837	2,447	527	200	137	369	562	1,061	974	2,815	1,088
Roderland Water Association	45	43	141	19	0	0	0	0	45	43	141	19
Samish Water District	491	360	840	43	50	19	51	0	541	379	891	43
Sandy Point Improvement Company	677	543	1,230	90	141	80	214	0	818	622	1,444	90
Skookum Chuck Water Association	328	324	980	96	17	7	19	0	345	331	999	96
Sumas Rural Water Association	232	201	576	83	-27	1	-99	-50	205	202	477	33
Sunset Water & Maintenance	121	102	260	14	18	9	24	0	139	111	285	14
Tall Cedar Water Association	47	44	103	1	0	0	0	0	47	44	103	1
Thornton Water Association	29	28	89	2	6	6	16	0	35	34	105	2
Unick Water System	169	155	483	20	27	13	35	0	196	168	518	20
Valley View Water Association	127	117	368	19	1	0	0	0	128	117	368	19
Wahl Water Association	69	65	171	6	19	15	40	0	88	80	211	6
Whatcom County Pud #1	19	29	84	1,474	0	0	0	679	19	29	84	2,153
Whatcom County Water District #13	370	285	798	41	447	353	988	232	817	638	1,786	273
Whatcom County Water District #2	689	632	1,514	324	18	7	19	0	707	639	1,533	324
Whatcom County Water District #7	814	760	2,043	108	48	28	75	0	862	788	2,118	108
Whatcom Meadows Camping Association	141	57	130	0	0	0	0	0	141	57	130	0
Wickersham Water Association	31	29	68	0	0	0	0	0	31	29	68	0
Willeys Lake Terrace Water Association	45	45	139	2	0	0	0	0	45	45	139	2
Y Squalicum Water Association	100	94	231	14	50	35	94	0	150	129	326	14
Small Water Purveyors (Combined)	799	552	1,438	205	409	247	666	117	1,209	799	2,103	321
Total	**87,609**	**73,255**	**181,583**	**77,577**	**32,340**	**28,568**	**64,045**	**36,220**	**119,949**	**101,823**	**245,628**	**113,797**

Small water purveyors are those with 50 or fewer in population and employment.
The water service area for WCWD 13 is larger than the sewer service area.

Table from:
Appendix E from the
Final EIS for the Comprehensive
Plan and Development Regulations
Update and Urban Growth Areas
Review, November 2015

APPENDIX **E**

Appendix E

This Appendix includes information relative to the District's Operation and Maintenance procedures. It includes:

Coliform Monitoring Plan
Emergency Response Plan
Water Quality Monitoring Schedule
Routine Sanitary Survey Correspondence
Water Quality Report
Asset Management Program
DBP Monitoring Plan
Water Facilities Inventory

Coliform Monitoring Plan for: Whatcom County Water District 2

A. System Information

Plan Date: 1/1/2023

Water System Name Whatcom County Water District 2	**County** Whatcom	**System I.D. Number** 95700H
Name of Plan Preparer Dave Olson	**Position** Operator	**Daytime Phone** **360-733-5770**
Sources: DOH Source Number, Name	S01, Bellingham	
Storage: List and Describe	None	
Treatment: Source Number & Process	None	
Pressure Zones: Number and name	Zone 1	
Population by Pressure Zone		
Number of Routine Samples Required Monthly by Regulation:	2	
Number of Routine Sample Sites to Represent Distribution System:	4	
***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 Exact Scientific Services	**Office Phone** 360-733-1205 **After Hours Phone** same
Address 1355 Pacific Place, Suite #101, Ferndale	**Cell Phone** n/a **Email** lab@exactscientific.com
Hours of Operation 8-5, M-F	
Contact Name NA	
Emergency Laboratory Name Exact Scientific Services	**Office Phone** 360-733-1205 **After Hours Phone** n/a
Address 1355 Pacific Place, Suite #101, Ferndale	**Cell Phone** n/a **Email** l lab@exactscientific.com
Hours of Operation 8-5, M-F	
Contact Name n/a	

C. Wholesaling of Groundwater

	Yes	No
We are a consecutive system and purchase groundwater from another water system.	☒	☐
We sell groundwater to other public water systems.	☐	☒

D. Routine, Repeat, and Triggered Source Sample Locations*

Location **Routine Sample Sites**	Location/Address for **Repeat Sample Sites**	Groundwater Sources for **Triggered Sample Sites****
1. 4144 Curtis Road	Within 5 services up & down stream	S01 Bellingham
2. 1383 Marine Drive	Within 5 services up & down stream	S01 Bellingham
3. 1610 Bayon Rd	Within 5 services up & down stream	S01 Bellingham
4. 3884 Cliffside Dr	Within 5 services up & down stream	S01 Bellingham

*NOTE: If you need more than three routine samples to cover the distribution system, attach additional sheets as needed.

**** When you collect the repeats, you must sample every groundwater source that was in use when the original routine sample was collected.**

Important Notes for Sample Collector:

Routine Sample Sites:
Samples are taken at various random locations throughout the system to ensure representation of the entire system as outlined above. The location of routine samples may be altered from a set plan in order to accommodate specific customer requests, to assure the integrity of water quality following a repair or service disruption, or for other reasons.

Repeat Sample Sites:
Care is taken to allow for repeat samples if necessary. Where dedicated sample stations are not available to collect repeat samples, the repeat sample is collected directly from the meter within five services in both directions. Occasionally samples may be taken at or near the end of dead-end lines where repeat samples downstream are not possible, in which case extra samples will be taken immediately upstream to meet the required number of repeat samples.

E. Reduced Triggered Source Monitoring Justification (add sheets as needed):

n/a

F. Routine Sample Rotation Schedule

Month	Routine Site(s)	Month	Routine Site(s)
January	1, 2	July	1, 2
February	3, 4	August	3, 4
March	1, 2	September	1, 2
April	3, 4	October	3, 4
May	1, 2	November	1, 2
June	3, 4	December	3, 4

G. Level 1 and Level 2 Assessment Contact Information

Name Dave Olson, Water System Services	**Office Phone** 360-354-7909 **After Hours Phone** same
Address 6912 Hannegan Rd #105, Lynden	**Email** dave@watersystemservices.net
Name (Alternate) John Mercer	**Office Phone** 360-354-7909 **After Hours Phone** Same
Address 6912 Hannegan Rd #105	**Email** john@watersystemservices.net

H. *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/WCHD
2. Collect repeat and triggered source samples per your Coliform Management Program. Collect additional investigative samples as necessary.
3. Notify the Board of Commissioners
4. Notify the staff
5. Distribute notification for public facilities such as restaurants, daycare, churches, businesses, etc.
6. Discuss with DOH whether to issue a Health Advisory based on the findings of steps 3-6.

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.	☐	☐	☒	☐
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 – Source S ALL				
Alternate Sources	**Yes**	**No**	**N/A**	**To Do List**
We can stop using this source and still provide reliable water service to our customers. Yes to any source depending on demand!	☒	☐	☐	☐
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? 0.40 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 – Source ALL

If we have *E. coli* in Any Source water we will immediately:

1. Call DOH/WCHD
2. Isolate the contaminated source if possible.
3. Collect repeat and triggered source samples per your Coliform Management Program. Collect additional investigative samples as necessary.
4. Notify the Board of Commissioners
5. Notify the staff
6. Distribute notification for public facilities such as restaurants, daycare, churches, businesses, etc.
7. Discuss with DOH whether to issue a Health Advisory based on the findings of steps 3-6.

GRAPHIC SCALE

700 0 350 700

(IN FEET)

1"=700' (22x34), 1"=1,400' (11x17)

LEGEND

= PARCEL EXISTING LINE

= DISTRICT BOUNDARY

DESIGNED BY CFR DRAWN BY LMH CHECKED BY CFR	R&E Reichhardt & Ebe ENGINEERING INC P.O. Box 978 | 423 Front Street Lynden, WA 98264 (360) 354-3687	NO.	DATE	DESCRIPTION	BY	WHATCOM COUNTY WATER DISTRICT No. 2 1615 BAYON ROAD BELLINGHAM, WA 98225	COLIFORM MONITORING PLAN	DWG 17012 WA-SYS JOB# 17012 SCALE H: 1"=700' V: N/A	DATE 2/8/2023 SHEET 1 of 1

P:\Projects\17012\15. Civil 3D 2015\17012 WA-SYS.dwg, COLIFORM MONITORING PLAN, 2/8/2023 10:27:14 AM, AutoCAD PDF (General Documentation).pc3

EMERGENCY RESPONSE PLAN
Water District No. 2

Section 1.
Emergency Response Mission and Goals

Mission statement for emergency response	In an emergency, the mission of the Water District No. 2 is to protect the health of customers by being prepared to respond immediately to a variety of events that may contaminate the water or disrupt our water supply
Goal 1	Be able to identify an emergency quickly and initiate timely and effective response action.
Goal 2	Be able to notify local, state, and federal agencies quickly so they can assist in the response, if necessary.
Goal 3	Protect public health by quickly being able to determine whether the water is unsafe to drink or use, notify customers of the situation immediately and effectively, and advise them of appropriate protective action.
Goal 4	Quickly respond and repair damages to minimize system down time.

Section 2.
System Information

System identification number	Water District No. 2, ID# 95700	
System name and address	1615 Bayon Road Bellingham, WA 98226	
Directions to the system	The system is located south and west of the Bellingham Airport on Marine Drive.	
Basic description and location of system facilities	The District facilities consist of a distribution system utilizing water from the City of Bellingham.	
Location and Town	Whatcom County, WA, West of Bellingham, WA	
Population served and service connections	Population approximately 1,550	582 Connections (2020)
Name, title, and phone number of person responsible for maintaining and implementing the emergency plan.	Lorrie Whitfield , Office Manager	(360) 733-5770

Section 3.
Chain of Command and Lines of Authority

The first response step in any emergency is to inform the person at the top of this list, who is responsible for managing the emergency and making key decisions.

Name and title	Responsibilities during an emergency	Contact Numbers
David Olson, Operator	Manages the emergency, assesses facilities, hires contractors, supervises repairs	(360) 354-7909 (360) 739-4416
District Commissioners	Approves communications to the media and public, manage and approve repair contracts, approve all financial transactions	(360) 733-5770
Lorrie Whitfield, Business Manager	Receives phone calls and keeps a log of events, provides a standard pre scripted message to those who call with general questions, delivers door hangers, supports operations manager, relays critical information	(360) 733-5770
Water System Services, Inc. Operations	Performs operational support such as isolating damaged areas, assists repair contractors, performs minor repairs, supports Operations Manager	(360)354-7909

Section 4.
Events that Cause Emergencies

The events below may cause water system emergencies. They appear in order from highest to lowest probable risk.

Events that cause emergencies

Type of Event	Probability or Risk (High, Medium, Low)	Comments
Earthquake • Pipelines	Medium	Emergency Bypass Available, Multiple Intertie Points Asbestos cement pipes are subject to breakage
Waterborne Diseases	Low	
High Winds	Low	
Drought	Low	Extended drought could increase chance of wildfires
Vandalism	Low	
Construction Accident	Low	
Flood	Low to High	Majority of system is located on higher ground. Areas along waterfront subject to flooding.
Chemical Spill	Low	

Section 5.
Severity of Emergencies

System personnel should collaborate when determining the severity of an incident, but the person in charge of the emergency makes the ultimate decision. The information for making the decision will accumulate over time, and may result in changing the severity assessment.

Communicate each severity assessment immediately to all those dealing with the emergency. Make sure staff have cell phones, pagers, or radios when they are in the field.

Level 1: Routine Emergency

Description:
- Distribution system breaks

Level 2: Minor Emergency

Description:
- Supply disruption
- Positive initial coliform or E. coli sample
- Minor act of vandalism

Level 3: Significant Emergency

Description:
- E. coli violation, requiring a health advisory notification
- Major water main break affecting a large number of customers

Level 4: Catastrophic Disaster or Major Emergency

Description:
- Earthquake causing significant damage
- Acts of terrorism or vandalism that contaminate the water or cause major damage to facilities
- Landslide that takes out water lines or other facilities

Section 6.
Emergency Notification

Local and State Notification call-up list

Emergency requiring help from fire department, sheriff, ambulance, state police	Call 911
Office of Drinking Water Emergency Regional Office	(887) 481-4901 (253) 395-6750
Whatcom County Health Department	(360) 778-6000
Office of Emergency Management	(360) 676-6681
Water System Operations Manager	(360)739-7909
Bellingham Water System Operations	(360)778-7700
Water testing laboratory, Edge Analytical	(360) 716-1212
Local radio station KGMI	(360)734-9790
Local radio station KPUG	(360)734-5784

Service and repair notification list

Pipeline Contractor	Len Honcoop Gravel	(360) 354-4763
Pipeline Contractor	Samish Environmental	(360) 510-7403
Pipeline Contractor	All Phase	(360) 815-1514
Pipeline Contractor	Stremler Gravel	(360) 354-8504
Equipment rental Birch Equipment	Birch Equipment	(360)734-5717
Utility Locates	Call as you dig	Call 811

Notification procedures

Notify water system customers

Who is Responsible:	Office Manager
Procedures:	Depending on the severity and location of emergency the Office Manager and Operator will take appropriate steps, including door hangers, phone calls, or radio notification

Alert local law enforcement, state drinking water officials, and local health

Who is Responsible:	Office Manager
Procedures:	If there are health concerns the local and state health departments must be notified. If there are safety issues or vandalism the sheriff must be notified.

Contact service and repair contractors

Who is Responsible:	Office Manager and Operator
Procedures:	Determine nature of the emergency and notify appropriate contractors. Select contractors on small works roster if possible. Commissioners may need to declare an emergency to perform needed work.

Contact Bellingham Water Department (if necessary)

Who is Responsible:	Office Manager
Procedures:	If the emergency involves source water quality or quantity the City, as supplier, will be notified to find and correct the problem.

Boil Water Notification

Who is Responsible:	Office Manager
Procedures:	Distribute Bellingham Boil Water Notice to media and customers

Section 7.
Water Quality Sampling

If contamination is suspected, notify and work with the Whatcom County Health Department and The Northwest Regional Office to identify the testing to be done. This may help prevent illness or even death.

Water quality sampling

Sampling parameter	Do we have procedures?	Basic sampling steps
Coliform Bacteria	Yes	Operators take samples and deliver to testing lab
Chlorine Residual	Yes	Operators take samples and test with their equipment
Chlorine Demand	Yes	Operators take samples and test with their equipment
Nitrate or Nitrite	Yes	Operators take samples and deliver to testing lab

Section 8.
Effective Communication

Communication with customers, the news media, and the public is a critical part of emergency response.

Designated public spokesperson

Designate a spokesperson (and alternates) to deliver messages to the news media and the public (see Section 6 for news media contacts in local notification list).

Designate a spokesperson and alternates

Spokesperson	Alternate 1	Alternate 2
Commissioners	Office Manager	Operator

Key messages

Develop possible messages in advance, and update them as the emergency develops:

- We are taking everything seriously and doing everything we can to resolve it.
- Our primary concern is protecting our customers' health.
- Another important concern is keeping the system operable and preventing damage.
- What we know right now is ----------.
- The information we have is incomplete. We will keep you informed as soon as we know more.
- We have contacted state and local officials to help us respond effectively.
- If you think you may be ill or need medical advice, contact a physician.
- We are sampling the water sand doing tests to determine whether there is contamination.

Section 9.
The Vulnerability Assessment

This is an evaluation of each water system component to identify weaknesses or deficiencies that may make them susceptible to damage or failure during an emergency. It also assesses facilities for security enhancements that may guard against unauthorized entry, vandalism, or terrorism.

Facility vulnerability assessment and improvements identification

System component	Description and condition	Vulnerability	Improvements or mitigating actions	Security improvements
Source	City of Bellingham Interties	Low		
Water Mains	Older water mains are asbestos cement	Medium	Replacement	

Section 10.
Response Actions for Specific Events

In any event, there are a series of general steps to take:

1. Confirm and analyze the type and severity of the emergency.
2. Take immediate action to reduce injuries, save lives, and prevent system damage.
3. Make repairs based on priority demand.
4. Return your system to normal operation.

The following tables identify the assessment, set forth immediate response actions, define necessary notifications, and describe important follow-up actions.

A. Power Outage

Assessment	Power outage does not affect the physical water system. It will affect the business office.
Immediate actions	Utilize small generator or battery backup to restore computer access. Utilize cell phones for communication
Notifications	If there is a possibility that water will curtailed to any specific area of the district, the office manager will see that customers are notified by door hangers or other means.
Follow-up actions	When power is restored, operators will check every facility affected by the outage to see that they are operating normally

B. Transmission or main break

Assessment	When a water main break is discovered by customer calls, construction calls or other events, the operations manager will do an onsite inspection to determine the location and extent of damage, and determine if there are any health hazards.

Immediate actions	Operators will isolate the damaged area by closing valves and securing the damaged area. Whatcom County Public Works will be notified if roads are, or may be, damaged. Operations manager will locate contractor who can immediately perform the needed repairs.
Notifications	Affected customers will be notified of the outage by the office manager, and told of the estimated time they will be out of water. Notification for smaller breakage will be notified by door hangers or personal contact. If a health advisory is necessary, the board of commissioners will take appropriate action.
Follow-up actions	After repairs are made the operators will flush the water lines and take water samples before re-opening the repaired lines.

D. Microbial (coliform, *E.* coli) contamination

Assessment	When a water sample has been determined to be contaminated, the Operations Manager will assess the results to determine the type of contamination. The location of the point of contamination should also be determined if possible.
Immediate actions	Operations Manager will immediately conduct repeat testing in accordance with the Coliform Monitoring Plan. E. coli present will require activation of the E. coli-presence response plan. If it has been determined that the contamination is from a tank, the tank should be chlorinated and inspected for openings or other areas where contamination could occur. If the source is contaminated, the City of
Notifications	If any of the repeat samples test positive, public notification is required.
Follow-up actions	Perform any permanent actions or improvements that could prevent further contamination.

E. Earthquake

Assessment	Business Manager will log calls of water outages. Staff will be sent out to look for damage to facilities.
Immediate actions	Broken water mains will be isolated. Contractors will be called to repair damage.

Notifications	Notifications appropriate to the situation will be made.
Follow-up actions	If major damage has occurred grants and loans for repair may be available.

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

Water Quality Monitoring Schedule

System: WHATCOM COUNTY WATER DIST #2
Contact: Lorrie Whitfield

PWS ID: 95700 H
Group: A - Comm

Region: NORTHWEST
County: WHATCOM

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

	Nov 2022	Dec 2022	Jan 2023	Feb 2023	Mar 2023	Apr 2023	May 2023	Jun 2023	Jul 2023	Aug 2023	Sep 2023	Oct 2023
Coliform Monitoring Population	1353	1353	1353	1353	1353	1353	1353	1353	1353	1353	1353	1353
Number of Routine Samples Required	2	2	2	2	2	2	2	2	2	2	2	2

- 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	0	Jan 1999 - Jan 9999	Consecutive System		
Asbestos	1	Jan 2020 - Dec 2028	standard - 9 year	08/03/2015	Aug 2024
Total Trihalomethane (THM)	1	Jan 2022 - Dec 2022	reduced - 1 year	10/06/2021	***Oct 2022***
Halo-Acetic Acids (HAA5)	1	Jan 2022 - Dec 2022	reduced - 1 year	10/06/2021	***Oct 2022***

Water Quality Monitoring Schedule

Notes on Distribution System Chemical Monitoring

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

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

For *Disinfection Byproducts (HAA5 and THM):* Collect the samples at the locations identified in your Disinfection Byproducts (DBP) monitoring plan.

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

Water Quality Monitoring Schedule

Other Information

Other Reporting Schedules	*Due Date*
Measure chlorine residuals and submit monthly reports if your system uses continuous chlorination:	monthly
Submit Consumer Confidence Report (CCR) to customers and ODW (Community systems only):	07/01/2022
Submit CCR certification form to ODW (Community systems only):	10/01/2022
Submit Water Use Efficiency report online to ODW and to customers (Community and other municipal water systems only):	07/01/2022
Send notices of lead and copper sample results to the customers sampled:	30 days after you receive the laboratory results
Submit Certification of customer notification of lead and copper results to ODW:	90 days after you notify customers

Special Notes

None

Northwest Regional Water Quality Monitoring Contacts

For questions regarding chemical monitoring:	Steve Hulsman: (253) 395-6777 or Steve.Hulsman@doh.wa.gov
For questions regarding DBPs:	Steve Hulsman: (253) 395-6777 or Steve.Hulsman@doh.wa.gov
For questions regarding coliform bacteria and microbial issues:	Ingrid Salmon: (253) 395-6754 or ingrid.salmon@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.

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
NORTHWEST DRINKING WATER REGIONAL OPERATIONS
PO Box 47800, MS K17-12, Olympia, WA 98504-7800

February 7, 2023

CHAIRMAN PETE RITTMUELLER
BOARD OF COMMISSIONERS
WHATCOM WATER DISTRICT #2
WCWD2@questoffice.net

Subject: Whatcom Water District #2 Water System (ID # 95700)
Whatcom County
Routine Sanitary Survey

Dear Chairman Rittmueller,

This letter is to follow up to my routine sanitary survey of Whatcom Water District #2's Water System on 2/2/23. I appreciate Operator Dave Olson's time to meet with me and show me around the water system.

The sanitary survey program's goals are to provide a line of communication between the Dept. of Health and water systems, and to work with operators and their governing organizations to strive for excellent water system reliability and safety. This includes assessing technical, managerial, and financial capacity, as well as identifying immediate health and system operations risks.

First, I would like to acknowledge the Districts effort on their planning document. I look forward to reviewing your Water System Plan!

While the system is in good general condition, we did discuss some areas that have room for improvement. These findings may have been part of the original approved design and may have been in place for many years without DOH requiring changes.

I have enclosed a copy of my sanitary survey notes. Please review them for accuracy. These notes, along with this letter, reflect my understanding of your water system and highlight the key issues and specific recommendations (**in bold type**) that we discussed during my visit.

In the next 30 days, please write an email responding to all of the following action items including observations and recommendations with photos of your completed solution, your schedule for making improvements, or your proposed alternative to address the issue. I would like you hear about your plans. Send responses and photos to me at laura.mclaughlin@doh.wa.gov.

Significant Deficiencies: *Potential significant public health risks. My office enforces correction of these items.*
None observed.

Significant findings: *Defects in your facilities or operations that need immediate attention. My office enforces correction of these items.*
None observed.

Observations and Recommendations: to *notify you of other drinking water rule violations or improve your technical, managerial, or financial capacity. I would appreciate hearing about your progress on these items and may ask about them at your next survey.*

1. I understand you're updating your Water System Plan (WSP) and the District's previous planning document has expired. This is important to keep the District's unspecified designation current and potentially to align with special purpose district code. **If the District plans any main extensions before the new WSP is approved, send them to my office for review and approval before construction.**
2. Chlorine residuals look like they dipped below the required 0.2 PPM minimum from June-November 2022. They were back up in December 2022 and the problem appears to be fixed for now. **Monitor chlorine residuals through time and work with the City to keep them consistently above 0.2 PPM.** Residuals must be always over 0.2 PPM.

The Drinking Water Regulations require that all Group A public water systems have a sanitary survey every 3-5 years. Regulations establishing a schedule of fees for sanitary surveys have been adopted (WAC 246-290-990). To receive credit for the survey, a sanitary survey fee must be paid. The total cost is **$408.00.** An itemized invoice for this survey has been sent to the DOH primary contact on file for your water system. Please remit complete payment within thirty days of the date of this letter. See DOH Pub 331-688 (https://doh.wa.gov/sites/default/files/2022-03/331-688.pdf) for electronic payment instructions.

Please note that satisfying the conditions of this sanitary survey does not necessarily mean that your water system is fully compliant with other applicable requirements that may be found under other federal, state, or local statutes, ordinances, or regulations. These and other departmental requirements should be addressed separately from the sanitary survey process.

Please give me a call at (564) 669-0753 if you have any questions or concerns.

Sincerely,

Laura McLaughlin, PE
Regional Engineer
NW Drinking Water Operations

cc: Dave Olson – Water System Services, Inc. dave@watersystemservices.net
Lorrie Whitfield – Whatcom Water District #2 wcwd2@qwestoffice.net
Patrick Hull – Whatcom County Health Department phull@co.whatcom.wa.us
James Hayes – Whatcom County Health Department JHayes@co.whatcom.wa.us
Carmen Tupas, DOH – Sanitary Survey Program Manager

Enclosures:

- Invoice (only copy sent to: Lorrie Whitfield, DOH Primary Contact, per ODW DOH policy)

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
NORTHWEST DRINKING WATER REGIONAL OPERATIONS
PO Box 47800, MS K17-12, Olympia, WA 98504-7800

ROUTINE SANITARY SURVEY REPORT
Date: February 2, 2023

WHATCOM WATER DISTRICT #2 Whatcom County (ID # 95700)

The purpose of a routine sanitary survey is to understand water systems, provide a strong line of communication between the State Dept. of Health (DOH) and individual water systems, and to identify any immediate health concerns or operational risks. During sanitary surveys, DOH also assesses the financial, managerial, and technical capacity of water systems. Overall, we hope to support and encourage sustainable and safe water systems for communities.

Attendees:
Laura McLaughlin – DOH
Dave Olson – Water System Services, Inc.

SYSTEM SUMMARY / FINDINGS
Last surveyed: May 31, 2018

ISSUES FROM LAST SURVEY:
- None

Approval status:	Existing Connects	=	578 (560 FT res, 1 multi-fam, 18 non-res)
	Eng Capacity	=	Unspecified
	Total Lots	=	?
System Type:	Group A –Community		

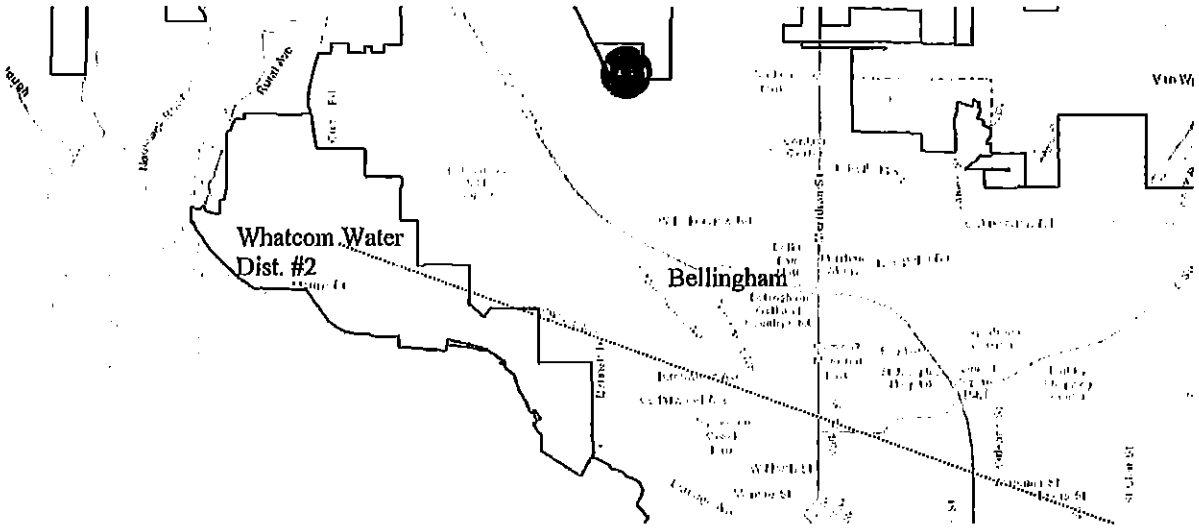
CHANGES SINCE LAST SURVEY:
none

RECENT PROJECT HISTORY

				View Submittal Detail
91-0916	WATER SYSTEM ANALYSIS			04/07/1992

	93-0305	BOXWOOD AVE WATER MAIN EXTENSION			05/03/1993
	93-0503	WATER MAIN EXTENSIONS		NEW PLANS, ETC 7/20/93	09/24/1993 11/18/1994
	93-1212	WATER LINE EXTENSION, DAN LUKE PROPERTY			04/03/1995
	98-0802	WATER SYSTEM PLAN - 2003	0	All source and storage is provided by City of Bellingham. WSP says existing distribution system is adequate for 20-year growth as well as ultimate buildout of service area and, therefore, system capacity is	09/08/2003
▶	09-1106	WATER SYSTEM PLAN		System capacity is unspecified. They have stadard P&S for waterline extensions.	04/30/2010

SERVICE AREA MAP



- The Whatcom County Flood District continues to buy up property in the high-risk flood zone on the west end of the service area.
- Approximately 1/3 of the service area (on the east side) is within the Bellingham Urban Growth Area and may be annexed to the City of Bellingham's service area at some point. Water District 2's largest customer, Smith Gardens Nursery, would likely remain a customer in the District's service area.

WATER QUALITY HISTORY:

Contaminant	Monitoring Notes and Results	MCL/Action levels
Coliform	No coliform hits since last survey	
Nitrates	N/A	*MCL= 10 PPM*

Lead and Copper	Bellingham manages LCR	*Lead action level = 15 PPB, Copper action level = 1.3 PPM*
Iron and Manganese	N/A	Secondary contams MCL Iron= 0.3 PPM, Mn=0.05 PPM
Arsenic	N/A	*MCL = 10 PPB*
Disinfection Byproducts (DBPs), Total THMs, HAA (5)	HAA(5): 1.5 PPB (2022); ranged from 3.0-22.5 since 2007. TTHMs: 6.0 PPB (2022); ranged from 6 to 66 PPB since 2019	*MCL TTHMs = 80 PPB, MCL HAA (5) = 60 PPB*

MCL = Maximum Contaminant Level, based on health data, established by the US Environmental Protection Agency.
PPM = parts per million. It's a measure of concentration and is equal to mg/L for water contamination.
PPB = parts per billion. It's a measure of concentration and is equal to ug/L for water contamination.

GENERAL SYSTEM DESCRIPTION

Water District #2 has two active interties with Bellingham, and one intertie that is normally closed. It is located on the east side of Bellingham. There is no treatment, no storage, and no pumps.

SOURCES:

Source 01: Intertie with Bellingham
Designated: Primary

The system has two interties with Bellingham that balance pressure over the service area. PRVs enable the system to control flow (and pressure) provided by each intertie to optimize water turnover and system pressure. A third intertie (Boxwood Avenue) is normally closed. Vaults are relatively new, within the past 15 years. The operator inspects intertie vaults, tests, and services annually as required by the City of Bellingham.

Protected from vandalism? Bolted vaults.

TREATMENT:

Treatment Type	Purpose	Verification Method
Chlorine from Bellingham (no chlorine added on site)	Distribution disinfection	Daily chlorine monitoring

Purpose: Disinfection

Facilities: none, chlorine is added at City of Bellingham's plant.

Monthly treatment plant reports: Treatment plant reports are turned in reliably. Residuals were generally above the required minimum 0.2 PPM residual. There was a dip in residuals from June to November well below the required 0.2 PPM. I understand that you're working with the City to keep the residuals over 0.2 PPM. December 2022 was good, so the current situation seems to be working.

STORAGE: None

DISTRIBUTION:

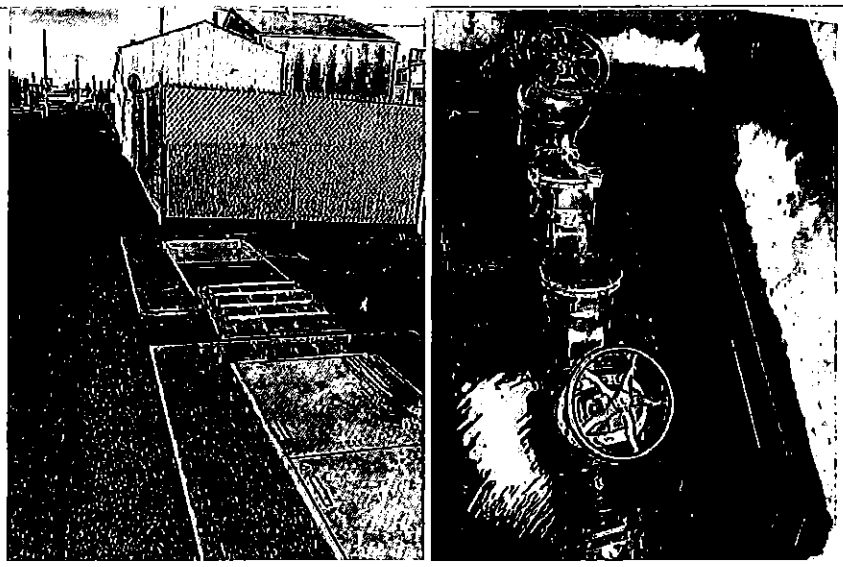
Number of pressure zones: 1

PRVs: two city-owned, prior to intertie.

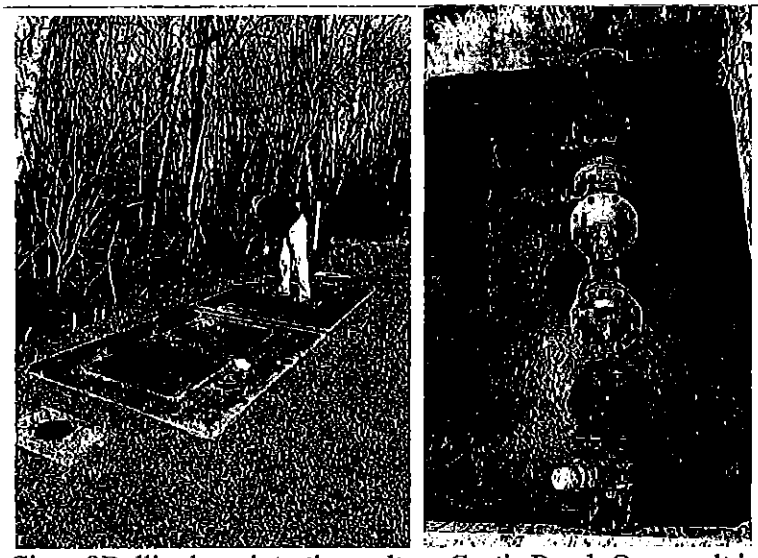
Pressure setting at PRVs: min/max psi setting: all controlled by the City.

Maps and plans (lines, pressure zones, facilities, valves, elevations, layout): yes

Type of main (AC, pvc, ductile iron): AC, PVC, and ductile iron, see WSP.



City of Bellingham intertie vault on Marine View Drive. One vault is the double check and the intertie, the other vault is the Bellingham-owned PRV (left). Double check and intertie valves (right).



City of Bellingham intertie vault on Curtis Road. One vault is the double check and the intertie, the other vault is the Bellingham-owned PRV (left). Double check and intertie valves (right).

MANAGEMENT & OPERATIONS:

Water System Plan	WSP approved 2010, valid through April 2016. This means that your standard spec is no longer valid. **New main extensions need to be sent to DOH for review and approval.** The District may also want to review Title 57 of the Special Purpose District code to see if they are taking on any risk by not having an approved Planning Document. I understand the District is working on their WSP update. Plans for development: none. Plans for improvements: see water system plan, main replacement schedule.
WFI Update	No changes needed
Water Quality Monitoring Schedule	OK
Coliform Monitoring Plan	Yes.
DBP Monitoring Plan	TTHM/HAA sample locations are 1615 Bayon (TTHMs) and 4500 Curtis HAA(5). TTHM – 6.0 ppb , HAA – 1.5 ppb; (2022)
Consumer Confidence Report	Last submitted June 18, 2021, by Lorrie Whitfield
Operating Permit	Green
Overall Design Approval	Yes
Certified Operator	Yes Dave Olson
Adequate Staffing	Yes
O&M Manual	They have a WSP.
Flushing Program	Every 3-5 years. They use UDF.
Valve Exercise Program	Every 3 years
Routine practice for main repair	Follow industry standards – maintain positive pressure, contractor is hired, and district oversees the work.
Water Use Efficiency Program	Yes. Lorrie Whitfield.
Individual Customer Meters	Yes
Distribution System Leakage	2021 6.3%, 6.0% 3-year annual average
Cross Connection Program	10-15 backflow devices – They are tested annually. Dave keeps them on file. CCS on contract: none
Emergency Response Plan	The office receptionist would take the first call and direct it to Water System Services, Inc. They have a written program in their soon-to-be submitted WSP. Lorrie would handle concerns/calls from the public. Dave is designated PR person, and the chairperson is the secondary.
E.coli Response Plan	Yes
Power/water outages	They get water from Bellingham. N/A.
Financial Viability Program	Good, annual budget/reserves. Excellent budget planning.
Management Structure	3 commissioners, monthly meetings.

Complaints	None on file since last survey; Lorrie would receive them and decide if operations manager or chairperson should respond.

Are you in discussion with any other systems regarding consolidation? Who? What are the barriers/challenges? None.

Whatcom County
Water District #2

WATER QUALITY 2022

30 June 2023

Water District #2 is a reseller of water. All water sold by the District is purchased from the City of Bellingham and processed by the City's water treatment plant, located in Whatcom Falls Park. We have three locations where city water enters our system, Alderwood Ave., Curtis Rd and Marine Dr.

This report is a requirement of the Safe Drinking Water Act. It provides you with a summary of the monitoring results from your drinking water. Once again, our water purchased from the City of Bellingham met all standards for purity in 2022.

Your Elected Board of Commissioners

Pete Rittmueller, Chuck Foster,
Maxine Visser
Yaprak Goertz completed Maxine's term

The commissioners meet at 10:00 a.m. once a month at the district office located at 1615 Bayon Rd.

You are cordially invited to attend.

Office Hours are from 8:30 to 12:00 a.m. Monday thru Friday. Call Lorrie Whitfield, Office Manager or Dave Olson, Operations Manager at (360) 733-5770 or email us at wcwd2@qwestoffice.net for meeting dates.

Impurities and Your Health

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses of health risk. More information about contaminants and potential health effect can be obtained by calling the EPA's Safe Drinking Water Hotline (1-800-426-4791).

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons, such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune-system disorders, some elderly, and infants, can be particularly at risk for infections. These people should seek advice about drinking water from their healthcare providers. The EPA/CDC guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-4826-4791).

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

Microbial Contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operation, and livestock, and wildlife.

Inorganic contaminants, such as salts and metals, which can be naturally occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, and farming.

Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.

Organic chemical contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.

Radioactive contaminants, which can be naturally occurring or the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink the Department of Health and EPA prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The Food and Drug Administration (FDA) an the Washington State Department of Agriculture regulations establish limits for contaminants in bottled water that must provide the same protection for public health

Elevated levels of lead in drinking water can cause serious health problems, especially for pregnant women and young children, In Bellingham, fortunately, lead is not found in the treated water, but lead in drinking water can come from pipes and faucets in our customers' homes. The City of Bellingham and Water District #2 are responsible for providing high quality drinking water, but cannot control the variety of materials used in customers' plumbing. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for at least 30 seconds before using the water for drinking or cooking. You can capture this water use on plants. If you are concerned about lead in your water, you may opt to have your water analyzed by a local laboratory. To learn more about lead in water, go to: http://www.epa.gov/safewater/lead.

Definitions

Action Level: (AL) The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

Maximum Contaminant Level or MCL: The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

Maximum Residual Disinfectant Level or MRDL: The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of disinfectant is necessary for control of microbial contaminants (e.g., chlorine, chloramines, chlorine dioxide).

Maximum Contaminant Level Goal or MCLG: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Health Agency.

2021 Water Quality analysis results

The City of Bellingham provided Water District 2 with the following page containing information in accordance with federal and state regulations. The table includes all results from contaminants that were detected or are above the state reporting level.

Disinfection By-products: (DBP's) Total Trihalomethanes (THM) and Haloacetic Acids –5(HAA-5). THMs and HAAs are formed as byproduct of the drinking water chlorination process.. **Water District 2 is required to take1 sample of the above in 2022.**	**THM:** Average 6.0 ppb. Range 6.0 to 32.7 ppb. **HAA:** Average 1.5 ppb. Range:1.5 to 11.1 ppb.	**THM:** Below 80 ppb **HAA:** below 60 ppb Water District 2 is In Compliance.
Free Chlorine Residual: **Water District 2 takes daily samples within the district. All samples were under the maximum level.**	Total chlorine avg was 0.15 mg. for District 2.	

Reducing water use should no longer be thought of as *voluntary,* but rather a lifestyle change that is necessary throughout our community and our region.

Your district's goal over the next 6 years is to reduce unaccounted for water to under 8% and individual water use per household by approximately 2%. To further help meet our goal we changed our rate structure by charging a flat base rate and charging for all water used.

This provides an opportunity to save on your water bill If you conserve.

We encourage customers to use the ODD/EVEN water schedule, use Rain Barrels, and through public education with the help of the Whatcom Water Alliance program.

In 2022 we purchased 54.4 million gallons of water, and delivered 46.6 million gallons leaving about 14.2 % unaccounted for, most likely due to main breaks and leaks.

We encourage you to call the Utilities Underground Location Center dial **811** at least two (2) business days before you dig, whether it is on the public right of way or your yard, where phone or electric wires may be buried.

Water District #2 does not locate water lines past the meter box, toward the residence.

In accordance with federal and state regulations, the table below includes all results from contaminants that were detected or are above the state detection reporting limit.

		EPA Regulations		Bellingham Water Results		
Parameter (2022 or most recent)	**Units**	**Public Health Goal or MCLG**	**Maximum Allowable MCL**	**Bellingham Drinking Water Range or Reported Value**	**Average Value or Highest Result**	**In Compliance?**
Total Coliform Bacteria	% Positive	0	5% positive per month	2% positive in July. 1% positive in August. 0% positive all other months. No E. coli bacteria were detected.	2% positive in July.	Yes
Bellingham collects over 100 samples a month at locations throughout our water distribution system and analyzes these for coliform bacteria to ensure water purity. No more than 5% of these samples can be positive for total coliform bacteria and none can be positive for *Escherichia coli* (E.coli). No *Escherichia coli* was detected in 2022.						
Free Residual Chlorine Levels	ppm	Detectible in 95% of samples	4.0 MRDL	Range:< 0.02 to 0.93 ppm	Average 0.50 ppm free available chlorine	Yes
Bellingham monitors chlorine levels continuously at the water filtration plant. Over 100 distribution system samples are also analyzed each month to ensure a disinfectant residual remains in treated water on its way to our customer's homes. We must be able to detect free chlorine in 95% of the samples we analyze in the distribution system.						
Haloacetic Acids-5 (HAA-5)	ppb	0	60	Range: 7 to 18 ppb	Highest site $\bar{x}$ 14 ppb	Yes
Total Trihalomethanes (TTHM)	ppb	0	80	Range: 16 to 50 ppb	Highest site $\bar{x}$ 39 ppb	Yes
Haloacetic acids and total trihalomethanes are formed as byproducts of the drinking water chlorination process. The HAA-5 and TTHM results are from 8 representative locations in Bellingham's treated water distribution system. Compliance is based on a site-specific running average. The highest site average from 2022 is shown above.						
Turbidity	NTU	< 0.3	Treatment Technique	Range: 0.02 to 0.07 NTU At or below 0.3 NTU 100% of the time.	Highest value 0.07 NTU	Yes
The turbidity limit is 0.3 NTU. In 2022 no filtered water turbidity result exceeded 0.3 NTU so Bellingham met the Department of Health's limit 100% of the time.						
Lead (2020 sampling)	ppb	0	15*	6 ppb as the 90th percentile	< 1 to 12 ppb	Yes
Copper (2020 sampling)	ppb	1300	1300*	65 ppb as the 90th percentile	2 to 118 ppb	Yes
Lead and copper are monitored every 3 years in our customers' homes to assess the amount of corrosion occurring in home plumbing. The water sampled is the first draw of stagnant water in homes identified as having lead solder and copper pipe. There are no lead service lines in Bellingham. Sampling will next be conducted in 2023.						
Treatment Technique is a required process intended to reduce the level of a contaminant in drinking water. *The 90th percentile value of all samples collected.						
Barium	ppm		2	0.0069	0.0069	Yes
Nitrate, (also nitrate + nitrite)	ppm		10	0.10	0.10	Yes
Inorganics detected that do not have a Maximum Contaminant Level (MCL):						
Hardness	ppm			20.3	20.3	Yes
Manganese	ppb			3.0	3.0	Yes
Sodium	ppm			9.3	9.3	Yes
Inorganics with detections above state detection reporting levels:				**Bellingham Level 2022**	**SMCL Limit Allowed****	
Chloride	ppm			5.6	250	Yes
Sulfate	ppm			8.2	250	Yes

**Secondary maximum contaminant levels are limits that are not based on health concerns, but instead based on the aesthetic properties of water such as taste, color, and odor.

Whatcom County Water District 2 is pleased to announce that after 3 years of planning and budgeting, in 2021, the District has completed converting the old Handheld Meter Reading System to a Radio Read System.

The new system allows staff to drive through the district while a laptop computer program in the car reads the meters. This reduces meter reading from 3 days to 3+ hours, while minimizing manual entry errors. The Radio Read System will notify staff of potential leaks and other meter errors as soon as reading is complete. This new system is working well.

Water Shut Off Policy Water charges are the responsibility of the property owner and change of ownership or occupancy shall not affect this responsibility. Bills may be addressed to a person other than the owner upon request by the owner or authorized agent.

Water bills are mailed at the beginning of every other month (bi-monthly) and are due upon receipt. Current bills are past due after the due date shown on the bill. Subsequent water bills for current charges do not extend the due date of past due balances.

Water bills not paid in full by the due date are delinquent and subject to 10% (Ten Percent) late charge, per month on the past due balance.

Past due notices are mailed every other month (bi-monthly) opposite the billing month. Past due notices are due upon receipt and include late fees and the date after which water service may be shut off for non payment of a delinquent balance.
When a delinquent amount is greater than 90 days past due the district may suspend service after notice of the pending shut off has be mailed to the last known billing address on record. Adequate Shut Off Notice shall include any regular bill or past due notice showing the shut off date.

Accounts with a past due balance greater than $200.00 may have a lien attached to the property. The district will assess the current Turn-Off/Turn-On/Lien charges and in no case shall service be reconnected until all delinquent charges have been paid in full.

It is a federal crime to tamper with a public water system and tampering is subject to prosecution. Should any person turn on the water service without authorization after it has been shut off by the district for failure to pay delinquent charges, water service shall be shut off again and the account shall be assessed an Initial Tampering Fee of $100 (One Hundred Dollars). All outstanding fees and delinquent charges must be paid in full before service is reconnected.

Leak Adjustment Policy

If your bill reflects water usage from a leak or break in the water lines on your side of the meter, including within your residence, and you would like Water District #2 to take this into consideration, please provide us with the following REQUIRED information in writing.:

Name, Service address and Account number where leak occurred, Description of leak and date repaired, Copy of repair bill or materials receipts. If there are no invoices or receipts available, a written assertion that the leak is now repaired is acceptable. Signature of customer.

Water leak adjustments are limited to one per account per year. The leak adjustment applies to one billing cycle only.

All requests for adjustment will be forwarded to the Commission for their consideration.

Asset Management Program

Whatcom County Water District No. 2
November 2023

Authority: WAC 246 290-100(4)(e)iii, Inventory and analysis of water system facilities.

The District's water system facilities consist of a water distribution system which includes water mains, fire hydrants, service meters and backflow preventers at the 3 Bellingham interties. There are no wells, pumps, storage facilities or other special purpose valves.

The source meters and related valves are owned, operated, and maintained by the City of Bellingham. Individual pressure reducing valves are owned and maintained by customers.

The WAC quoted above requires an analysis of the facilities. The inventory of pipelines included in this program includes an analysis of every section of pipe, describing the pipe material and condition. Many of the pipes are older asbestos cement, but appear to be in satisfactory condition. There is no reason at this time to replace pipes because of age or type of material. It is assumed that the pipes listed as satisfactory in the inventory can last many more years. If individual pipe runs become damaged or prone to leakage and require replacement they will be included in a revised Capital Improvement Program and scheduled for replacement.

The 3 backflow preventers at the intertie meters were installed by the District within the past few years. They are tested by the District annually and are not expected to be replaced for at least 30 years or more.

Service meters were replaced with new radio read meters in 2021 and 2022. Life expectancy is approximately 25 years or more. The meters can be rebuilt as necessary rather than replaced. The District believes there are no lead service lines, but will complete an inventory in 2024. There are approximately 582 service meters in the system. Individual pressure reducing valves and backflow preventers on service lines are owned and operated by the customers. The District requires annual testing of backflow preventers by the owners.

Fire Hydrants are checked periodically and exercised as lines are flushed. They are in good working condition and are not expected to be replaced as they can be re-built as necessary. There are 94 fire hydrants in the system. When water mains on the Capital Improvement Plan are replaced new fire hydrants will be included.

Each pipe in the pipeline inventory and analysis table has a designation starting with the letter P and is shown on the accompanying map.

Whatcom County Water District 2					
Pipeline Asset Inventory and Analysis November 2023					
Label	**Length (ft)**	**Diam. (in)**	**Material**	**Condition**	**Comment**
P1	55	8	Ductile Iron		
P2	410	6	Asbestos Cement	Satisfactory	
P3	1112	6	Asbestos Cement	Satisfactory	
P4	821	6	Cast iron	Satisfactory	
P5	500	8	Ductile Iron	Satisfactory	
P6	300	8	Ductile Iron	Satisfactory	
P7	500	8	Ductile Iron	Satisfactory	
P8	543	8	Ductile Iron	Satisfactory	
P9	194	4	Asbestos Cement	Undersized	UGA, No Replacement
P10	546	4	Asbestos Cement	Undersized	UGA, No Replacement
P11	1243	4	Asbestos Cement	Undersized	UGA, No Replacement
P12	317	8	Ductile Iron	Satisfactory	
P13	187	4	Asbestos Cement	Undersized	UGA, No Replacement
P14	154	4	Asbestos Cement	Undersized	UGA, No Replacement
P15	218	8	Ductile Iron	Satisfactory	
P16	500	4	Asbestos Cement	Undersized	UGA, No Replacement
P17	333	4	Asbestos Cement	Undersized	UGA, No Replacement
P18	160	4	Asbestos Cement	Undersized	UGA, No Replacement
P19	245	4	Asbestos Cement	Undersized	UGA, No Replacement
P20	469	8	Asbestos Cement	Satisfactory	
P21	297	8	Asbestos Cement	Satisfactory	
P22	573	8	Asbestos Cement	Satisfactory	
P23	529	8	Asbestos Cement	Satisfactory	
P24	627	8	Asbestos Cement	Satisfactory	
P25	540	8	Asbestos Cement	Satisfactory	
P26	685	8	Asbestos Cement	Satisfactory	
P27	524	8	Asbestos Cement	Satisfactory	
P28	359	8	Asbestos Cement	Satisfactory	
P29	165	8	Asbestos Cement	Satisfactory	
P30	595	8	Asbestos Cement	Satisfactory	
P31	786	8	Asbestos Cement	Satisfactory	
P32	457	8	Ductile Iron	Satisfactory	
P33	471	8	Ductile Iron	Satisfactory	
P34	426	8	Ductile Iron	Satisfactory	
P35	636	4	Asbestos Cement	Poor, Undersized	CIP 1
P36	523	4	Asbestos Cement	Poor, Undersized	CIP 1
P37	257	4	Asbestos Cement	Poor, Undersized	CIP 1
P38	160	4	Asbestos Cement	Poor, Undersized	CIP 1
P39	235	4	Asbestos Cement	Poor, Undersized	CIP 1
P40	175	4	Asbestos Cement	Poor, Undersized	CIP 1
P41	320	4	Asbestos Cement	Poor, Undersized	CIP 1
P42	428	4	Asbestos Cement	Poor, Undersized	CIP 1
P43	996	8	Asbestos Cement	Poor	CIP 2
P44	567	8	Asbestos Cement	Satisfactory	
P45	450	8	Asbestos Cement	Satisfactory	

P46	1156	4	Asbestos Cement	Undersized	Serves one home, no replacement
P47	481	8	Asbestos Cement	Satisfactory	
P48	713	8	Asbestos Cement	Poor	CIP 3
P49a	1014	8	Asbestos Cement	Poor	CIP 3
P49b	1014	8	Asbestos Cement	Poor	CIP 4
P50	385	8	Asbestos Cement	Poor	CIP 4
P51	597	8	Asbestos Cement	Satisfactory	
P52	541	6	Asbestos Cement	Satisfactory	
P53	643	6	Asbestos Cement	Satisfactory	
P54	607	6	Asbestos Cement	Satisfactory	
P55	561	6	Asbestos Cement	Satisfactory	
P56	595	4	Asbestos Cement	Potential Slide Area	CIP 7
P57	602	4	Asbestos Cement	Potential Slide Area	CIP 7
P58	512	4	Asbestos Cement	Potential Slide Area	CIP 7
P59	978	4	Asbestos Cement	Satisfactory	
P60	824	4	Asbestos Cement	Satisfactory	
P61	419	4	Asbestos Cement	Satisfactory	
P62	404	4	Asbestos Cement	Satisfactory	
P63	582	4	Asbestos Cement	Satisfactory	
P64	169	4	Asbestos Cement	Satisfactory	
P65a	682	8	PVC	Satisfactory	
P65b	50	4	Asbestos Cement	Satisfactory	
P66	714	8	PVC	Satisfactory	
P67	220	8	Asbestos Cement	Satisfactory	
P68	105	6	Ductile Iron	Satisfactory	
P69	779	6	Asbestos Cement	Satisfactory	
P70	1087	6	Asbestos Cement	Satisfactory	
P71	565	6	Asbestos Cement	Satisfactory	
P72	302	8	Ductile Iron	Satisfactory	
P73	186	6	Asbestos Cement	Undersized	CIP 5
P74	723	8	Asbestos Cement	Satisfactory	
P75	635	8	Asbestos Cement	Satisfactory	
P76	200	8	Ductile Iron	Satisfactory	
P77	612	8	Asbestos Cement	Satisfactory	
P78	433	8	Asbestos Cement	Satisfactory	
P79	265	8	Ductile Iron	Satisfactory	
P80	488	8	Ductile Iron	Satisfactory	
P81	515	8	Ductile Iron	Satisfactory	
P82	417	8	Asbestos Cement	Satisfactory	
P83	522	8	Asbestos Cement	Satisfactory	
P84	292	8	Asbestos Cement	Satisfactory	
P85	967	6	Asbestos Cement	Undersized	CIP 5
P86	548	4	Asbestos Cement	Satisfactory	
P87	441	4	Asbestos Cement	Satisfactory	
P88	520	8	Ductile Iron	Satisfactory	
P89	779	6	Asbestos Cement	Undersized	CIP 5
P90	715	8	Ductile Iron	Satisfactory	
P91	891	6	Asbestos Cement	Satisfactory	

P92	650	6	Asbestos Cement	Satisfactory	
P93	809	6	Asbestos Cement	Satisfactory	
P94	500	8	Ductile Iron	Satisfactory	
P95	614	8	Ductile Iron	Satisfactory	
P96	600	8	Asbestos Cement	Satisfactory	
P97	645	6	Asbestos Cement	Satisfactory	
P98	512	8	Asbestos Cement	Satisfactory	
P99	449	8	Asbestos Cement	Satisfactory	
P100	629	6	Asbestos Cement	Satisfactory	
P101	568	6	Asbestos Cement	Satisfactory	
P102	534	6	Asbestos Cement	Satisfactory	
P103a	713	8	PVC	Satisfactory	
P103b	30	4	Asbestos Cement	Satisfactory	
P104	732	8	PVC	Satisfactory	
P105	650	4	Asbestos Cement	Satisfactory	
P106	509	8	Ductile Iron	Satisfactory	
P107	358	8	Asbestos Cement	Satisfactory	
P108	392	8	Asbestos Cement	Satisfactory	
P109	543	8	Ductile Iron	Satisfactory	
P110	178	8	Ductile Iron	Satisfactory	
P111	175	8	Ductile Iron	Satisfactory	
P112	538	8	PVC	Satisfactory	
P113	313	4	Asbestos Cement	Satisfactory	
P114	277	4	Asbestos Cement	Satisfactory	
P115	356	4	Asbestos Cement	Satisfactory	
P116	445	4	Asbestos Cement	Satisfactory	
P118	560	8	PVC	Satisfactory	
P119	597	8	PVC	Satisfactory	
P120	358	4	Asbestos Cement	Satisfactory	
P121	720	4	Asbestos Cement	Satisfactory	
P122	500	8	Ductile Iron	Satisfactory	
P123	400	8	Asbestos Cement	Satisfactory	
P124	845	4	Asbestos Cement	Satisfactory	
P125	310	8	Asbestos Cement	Satisfactory	
P126	558	4	Asbestos Cement	Undersized	CIP 6
P127	463	4	Asbestos Cement	Undersized	CIP 6
P128	518	4	Asbestos Cement	Undersized	CIP 6
P129	425	6	Asbestos Cement	Satisfactory	
P130	346	6	Asbestos Cement	Satisfactory	
P131	500	6	Asbestos Cement	Satisfactory	
P132	732	6	Asbestos Cement	Satisfactory	
P133	520	6	Asbestos Cement	Satisfactory	
P134	513	6	Asbestos Cement	Satisfactory	
P135	742	4	Asbestos Cement	Satisfactory	
P136	540	4	Asbestos Cement	Satisfactory	
P137	628	4	Asbestos Cement	Satisfactory	
P138	557	4	Asbestos Cement	Satisfactory	
P139	691	4	Asbestos Cement	Satisfactory	

P140	416	4	Asbestos Cement	Satisfactory
P141	788	6	Asbestos Cement	Satisfactory
P142	476	6	Asbestos Cement	Satisfactory
P143	257	8	Ductile Iron	Satisfactory
P144	536	8	Ductile Iron	Satisfactory
P145	552	8	Ductile Iron	Satisfactory
P146	624	4	Ductile Iron	Satisfactory
P147	632	8	Ductile Iron	Satisfactory
P148	983	8	Ductile Iron	Satisfactory
P149	502	8	Ductile Iron	Satisfactory
P151	235	8	Ductile Iron	Satisfactory
P200	0	16	Ductile Iron	Satisfactory
P201	0	16	Ductile Iron	Satisfactory
P202	4592	12	Asbestos Cement	Satisfactory
P203	4592	10	Asbestos Cement	Satisfactory
P204	4592	16	Asbestos Cement	Satisfactory

GRAPHIC SCALE

800 0 400 800

(IN FEET)
1 inch = 800 ft.

LEGEND

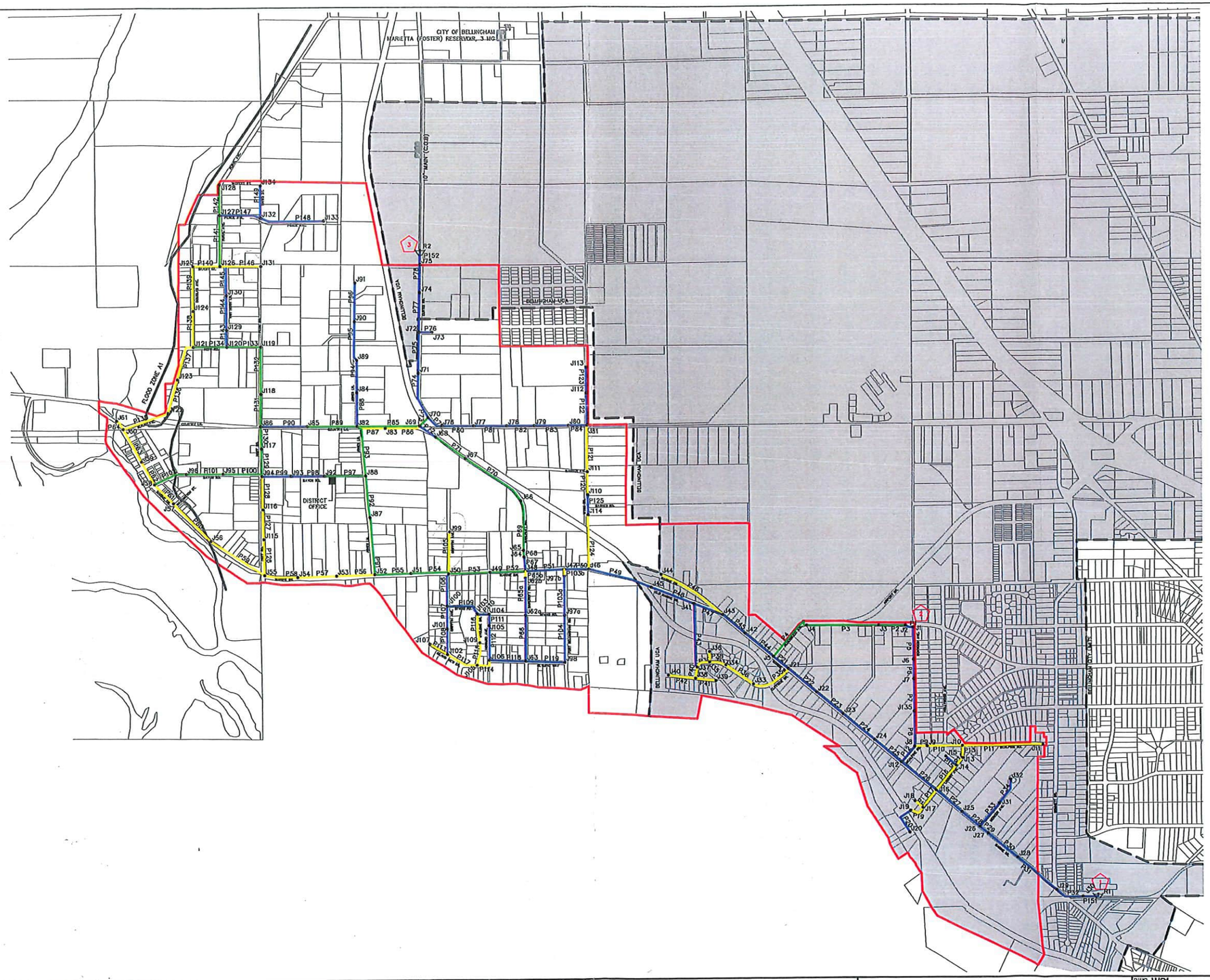
- = 4" MAIN
- = 6" MAIN
- = 8" MAIN
- = 10" MAIN
- = DISTRICT BOUNDARY
- = BELLINGHAM UGA

1. Marine Dr. Connection Point to City of Bellingham System
   - 6" Rockwell Turbo Meter w/ Strainer
   - 6" Single Check Valve
2. Boxwood Ave. Connection Point to City of Bellingham System
   - 6" Sensus Meter
   - 6" DCVA, Febco 805YD
   - 6" Cla-Val Pressure Reducing Valve (Connection Inactive)
3. Cutis Rd. Connection Point to City of Bellingham System
   - 6" Hersey FMCT Meter
   - 6" Single Check Valve

NOTES:

1. UPGRADE/CONSTRUCT ALL EXISTING/FUTURE WATER MAINS REQUIRED FOR FIRE FLOW WITHIN RESIDENTIAL ZONES TO A MINIMUM OF 8" DIAMETER.

2. UPGRADE/CONSTRUCT ALL EXISTING/FUTURE WATER MAINS REQUIRED FOR FIRE FLOW WITH COMMERCIAL & INDUSTRIAL ZONES TO A MINIMUM OF 12" DIAMETER.



DESIGNED BY	CFR
DRAWN BY	IDH
CHECKED BY	

R&E Reichhardt & Ebe ENGINEERING INC
P.O. Box 978 | 423 Front Street
Lynden, WA 98264 (360) 354-3687

NO.	DATE	DESCRIPTION	BY

WHATCOM COUNTY WATER DISTRICT NO. 2
1615 BAYON ROAD
BELLINGHAM, WA 98225

2022 COMPREHENSIVE WATER SYSTEM PLAN

DWG WSI

DATE 3/11/2022

JOB # 17012

SCALE H: 1"=800' V: N/A

SHEET 1 of 1

P:\Projects\17012\11 Civil\2022\17012.dwg, Layout1, 3/11/2022 1:48:23 PM, PDF-XChange Standard

DBP Monitoring Plan
(Annual Schedule)

This template should be used by:

* Surface water systems who serve less than 500 population
* Surface water systems who serve between 500-3,300 population on reduced monitoring
* Groundwater systems who serve less than 10,000 population
* Groundwater systems who serve 500-99,999 population on reduced monitoring

For more information, refer to the Reference Sheets on the separate tabs

System Name:	Whatcom County Water District No. 2
PWSID#:	95700
Population:	1,500
Type of Source Water:	Treated Surface Water
Completed by:	Dave Olson
Date:	11/1/2023

Monitoring Requirments

	Annual
Monitoring Frequency:	
Number of TTHM Samples Required:	1
Number of HAA5 Samples Required:	1

Monitoring Locations and Month Assigned

Monitoring Location (Name of Site)	Month Assigned
Bayon (TTHM)	October
Curtis (HAA5)	October

Determining Compliance for TTHM and HAA5

Our system is required to monitor annually. Compliance will be achieved if the TTHM and the HAA5 at each monitoring location is less than or equal to 0.080 mg/L for TTHM and less than or equal to 0.060 mg/l for HAA5. If these levels are exceeded the monitoring frequency will be increased to quarterly.

To qualify for reduced monitoring:

The TTHM LRAA must be less than or equal to 0.040 mg/l AND the HAA LRAA must be less than or equal to 0.030 mg/l at each monitoring location.

If your system is on reduced annual monitoring, to remain on reduced monitoring:

The TTHM LRAA must be less than or equal to 0.060 mg/l AND the HAA LRAA must be less than or equal to 0.045 mg/l at each monitoring location. If these levels are exceeded, but the MCL is not exceeded, the monitoring frequency will be returned to quarterly.

Disinfectant Residual Monitoring

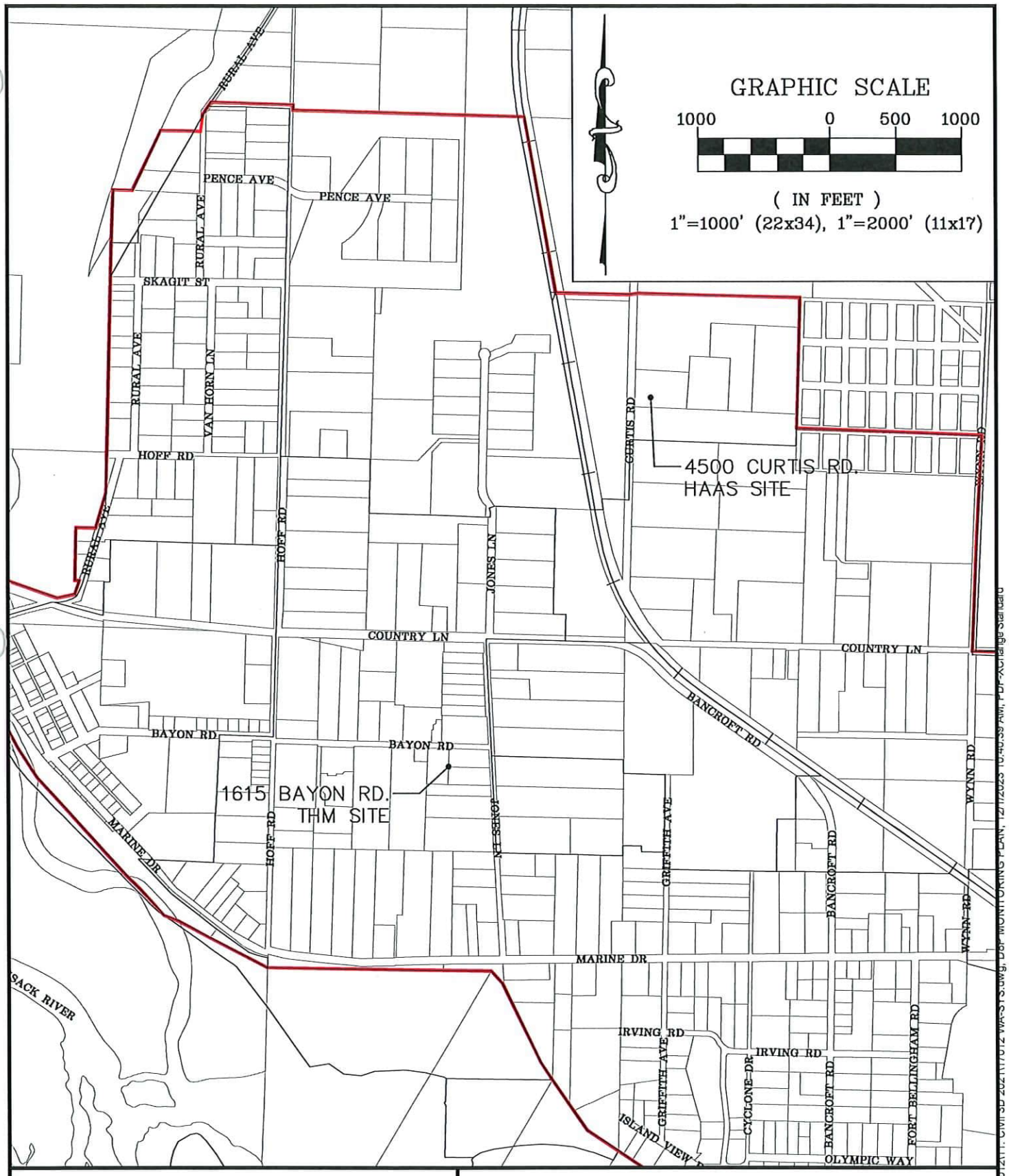
Chlorine residuals must be measured at the same time and place as routine or repeat coliform samples
MRDL for chlorine and chloramines = 4.0 mg/l as Cl_2

Determining Compliance for disinfectant residuals

Compliance is based on the running annual average (RAA) of 12 consecutive months

Daily residual measurements will / will not be included in the compliance calculations (circle one)

(Attach a distribution map with sample locations. You will need to print a hard copy for your records and make it available upon request. You do not need to submit a copy to DOH. If you need this publication in an alternate format, call (800) 525-0127. For TTY/TDD call (800) 833-6388.)



R&E Reichhardt & Ebe ENGINEERING INC
P.O. Box 978 | 423 Front Street
Lynden, WA 98264 (360) 354-3687

WHATCOM COUNTY WATER DISTRICT No. 2

D8P MONITORING PLAN

CURRENT SERVICE AREA

DATE	SCALE	JOB#
11/28/23	1"=1000'	17012

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

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 1
Updated: 04/13/2022

Printed: 1/19/2023
WFI Printed For: On-Demand
Submission Reason: Pop/Connect 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
95700 H	WHATCOM COUNTY WATER DIST #2	WHATCOM	A	Comm

6. PRIMARY CONTACT NAME & MAILING ADDRESS

LORRIE WHITFIELD [OFFICE MANAGER]
1615 BAYON RD
BELLINGHAM, WA 98225

STREET ADDRESS IF DIFFERENT FROM ABOVE

ATTN
ADDRESS
CITY STATE ZIP

7. OWNER NAME & MAILING ADDRESS

WHATCOM COUNTY WATER DIST #2 MANAGER
LORRIE WHITFIELD
1615 BAYON RD
BELLINGHAM, WA 98225

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) 733-5770		Owner Daytime Phone: (360) 733-5770	
Primary Contact Mobile/Cell Phone: (360) 201-3333		Owner Mobile/Cell Phone:	
Primary Contact Evening Phone: (xxx)-xxx-xxxx		Owner Evening Phone: (xxx)-xxx-xxxx	
Fax: (360) 671-4912	E-mail: wxxx2@qwestoffice.net	Fax: (360) 671-4912	E-mail: wxxx2@qwestoffice.net

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

- [x] Not applicable (Skip to #12)
- [ ] Owned and Managed
- [ ] Managed Only
- [ ] Owned Only

SMA NAME: _____ SMA Number: _____

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

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

13. WATER SYSTEM OWNERSHIP (mark only one)

- [ ] Association
- [ ] City / Town
- [ ] County
- [ ] Federal
- [ ] Investor
- [ ] Private
- [x] Special District
- [ ] State

14. STORAGE CAPACITY (gallons)

15	16	17	18 SOURCE CATEGORY										19 USE			20	21 TREATMENT						22	23	24 SOURCE LOCATION			
Source Number	LIST UTILITY'S NAME FOR SOURCE AND WELL TAG ID NUMBER. Example: WELL #1 XYZ466 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	056003/BELLINGHAM WATER DIV (2)	05600 3											X				X							0	SW SW	26	38N	03E

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
95700 H	WHATCOM COUNTY WATER DIST #2	WHATCOM	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?)		560	Unspecified
A. Full Time Single Family Residences (Occupied 180 days or more per year)	530		
B. Part Time Single Family Residences (Occupied less than 180 days per year)	0		
26. MULTI-FAMILY RESIDENTIAL BUILDINGS (How many of the following do you have?)			
A. Apartment Buildings, condos, duplexes, barracks, dorms	1		
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	30		
C. Part Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied less than 180 days/year	0		
27. NON-RESIDENTIAL CONNECTIONS (How many of the following do you have?)			
A. Recreational Services and/or Transient Accommodations (Campsites, RV sites, hotel/motel/overnight units)	0	0	
B. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	18	18	
28. TOTAL SERVICE CONNECTIONS		578	

29. FULL-TIME RESIDENTIAL POPULATION

A. How many residents are served by this system 180 or more days per year? 1353

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

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

32. REGULAR NON-RESIDENTIAL USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. If you have schools, daycares, or businesses connected to your water system, how many students, daycare children and/or employees are present each month 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
	2	2	2	2	2	2	2	2	2	2	2	2

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 F

Appendix F

This Appendix includes the District's Design and Construction Standards

Development Standards and Policies
Water Service and Extension Procedures
Standard Details and Construction Notes
Construction Completion Report Form

DEVELOPMENT STANDARDS

WATER DISTRICT NO. 2
1615 Bayon Road
Bellingham, Washington 98226
(360) 733-5770

Prepared by:
Reichhardt & Ebe Engineering, Inc.
423 Front Street, #201
P.O. Box 978
Lynden, WA 98264

360-354-3687

(Revised November 2023)

Table of Contents

The current edition of the "Standard Specifications for Road, Bridge, and Municipal Construction" as published by the Washington State Department of Transportation and the Washington State Chapter of the American Public Works Association, hereinafter referred to as the "Standard Specifications", is hereby adopted for all development work performed within Water District #2 service area. Any references therein to the "Secretary", or to the "Engineer" shall be interpreted to mean the Water District Attorney, Engineer or their designated representative.

The Standard Specifications, except as modified or superseded by these provisions shall govern all phases of work.

1-05 CONTROL OF WORK

1-05.4 Conformity With and Deviations From Plans and Stakes

This Section is revised to read: "Grade stakes and right-of-way markers must be present at all times or survey markers of such that grades can be established any time. Any survey costs will be at the expense of the developer."

7-09 WATER MAINS

7-09.2 Materials

Add to this Section: "Pipe shall meet the requirement of Section 9-30.1(1) Ductile Iron Pipe (DI), Section 9-30.1(5) Polyvinyl Chloride Pipe (PVC), Section 9-30.1(6) Polyethylene Pipe (PE). Ductile iron pipe shall have a cement-mortar lining meeting the requirements of AWWA C104. DI pipe to be joined using bolted flanged joints shall be standard Thickness Class 53. All other DI pipe shall be Standard Thickness Class 50. Fittings for DI Pipe and PVC Pipe shall meet the requirements of Section 9-30.2(1). Fittings shall be DI or Class 250 gray iron and shall meet the requirements of AWWA C110 or AWWA C153. Joints shall meet the requirements of AWWA C111. Fittings shall be cement mortar lined, meeting the requirements of AWWA C104.

Bolted, sleeve-type couplings, reducing or transition couplings, and flanged coupling adapters used to join plain-end pipe shall meet the requirements of AWWA C219. Buried couplings to connect ductile iron, or PVC pipe shall be Romac or approved equivalent."

7-09.3 Construction Requirements

Supplement this Section with: "The District requires all water mains to be bedded and backfilled in accordance with Sections 7-09.3(9) *Bedding the Pipe* and 7-09.3(10) *Backfilling Trenches*."

7-09.3(5) Grade and Alignment

Supplement this Section with: "The minimum size water main shall be eight (8) inches in diameter. The minimum depth of installation for water mains shall be three and one half (3.50) feet below finish grade of road or shoulder side of ditch against roadway".

7-09.3(19)A Connections to Existing Mains

Add to this Section: "The Contractor shall be responsible for determining which residents will be affected by shutoffs, and will notify them 24 hours in advance. The Contractor shall locate and verify the type, size, and depth of pipe prior to making the connection. Detailed sketches and plans of the connection proposed by the Contractor shall be given to the system operator not less than one week prior to the expected construction.

All other parts of the Section 7-09.3(19) of the Standard Specifications which do not conflict with the above addition shall apply and be adhered to by the Contractor."

All watermain extensions shall include the installation of gate valve at the connection to the existing watermain.

7-09.3(22) Blowoff Assemblies

Add to this section: "Blowoff assemblies for no further extension shall be Kupferle Foundry Co., No. 77 Mainguard 2-inch diameter blowoff hydrants as shown in the Standard Plans."

7-09.3(23)A Testing Extensions From Existing Mains

Add to this section: "Water used for testing may be taken from a direct connection to existing mains providing an approved backflow device is utilized."

7-09.3(24) Disinfection of Water Mains

Add to this section: "Chlorine content at the beginning and end of each required 24 hour disinfection period, and prior to bacteriological testing shall be sampled by the system operator. The cost of all sampling and lab testing shall be paid for by the Contractor. The system operator shall be notified 24 hours prior to conducting disinfecting and flushing operations. Disinfecting and flushing operations shall be done during normal business hours under the supervision of the District."

7-09.3(24)A Flushing

Add to this section: "Water for flushing mains may be taken from a direct connection to existing mains providing an approved backflow device is utilized. Velocity for testing must equal or exceed 2.5 fps. The connection must be capable of passing at least 400 gallons per minute (gpm) for flushing 8-inch diameter mains."

7-09.3(24)J Preventing Reverse Flow

Add to this section: "The contractor will be responsible for all cost associated with installation of a back-flow preventor approved for installation in Washington State when required by the District. The contractor shall provide the backflow assembly.

7-09.3(24)O Repetition of Flushing and Testing

Add to this section: "The District shall furnish water for the initial flushing and testing process. In the event additional water is needed for flushing or testing, the Contractor shall connect a meter and pay the District for actual water used, at the commercial rate. Additional bacteriological testing required because of failed samples will be paid for the Contractor. The Contractor will be responsible for all cost associated with re-testing, including but not limited to backfill replacement and compacting, replacement of thrust blocks, replacement of surface restoration, laboratory fees, and inspection."

7-12 VALVES FOR WATER MAINS

7-12.2 Materials

Add to this section: "Valves shall meet the requirements of AWWA C509 and shall be iron body, bronze-mounted, with resilient seated wedge device and O-ring stuffing box. All valves shall be provided with a valve box conforming to Section 9-30.3(4) and 9-30.3(6) and valves outside of the pavement section shall be furnished with a concrete valve marker conforming to Section 9-30.3(5). Vaults for air valves or other valves that could allow contamination from non-potable water to enter through vents or test cocks shall have positive drainage provided."

7-12.3 Construction Requirements

Add to this section: "Valve boxes shall be centered over the valve nut and shall not obstruct the functioning of the valve. The ground surrounding valve boxes which are located outside of paved areas shall be sloped away from the valve box opening at a grade of five (5) percent or as indicated on the plans or directed by the system operator."

7-14 HYDRANTS

7-14.2 Materials

Add to this section: "The District Standard Fire Hydrants are "Waterous Pacer Model 90 WB-67". New hydrants shall be field painted District colors with two coats of paint. Hydrants shall be painted red with white cap. The paint type shall be Aervoe Pacific or approved equivalent."

Fire hydrants shall include a Stortz adapter attached to the body with an aircraft cable.

A blue reflector, installed two (2) feet off the road centerline towards the hydrant.

7-15 SERVICE CONNECTIONS

7-15.2 Materials

Add to this Section: "The District requires either Romac 101 or 202 bronze saddles with single or double straps, with I.P. standard tapping. Saddles shall be factory pre-sized."

Corporation stops shall be brass, Ford F700, ¾ inch, or approved equal with inlet I.P. standard thread and outlet thread compatible with Type K copper connection piping, with no special adapters, minimum 150 psi. For services greater than 1 inch, Corporation stops shall be Ford FB700 or approved equal. Curb stops shall be Ford B-21-444W or approved equal.

Service pipe shall be ¾" copper tubing and shall conform to the requirements of ASTM B88, Type K, annealed. All underground fittings shall be flared within the public right-of-way. No sweat or compression connections are to be used. The use of Teflon tape as a sealant is acceptable, the use of pipe dope is not acceptable. For services greater than 1" inch, service piping may be Schedule 80 PVC. All service road crossings are to be installed through a 2-inch minimum schedule 40 PVC (or equal) pipe, and is to extend beyond the outer edge of any ditches within 5-feet of the road shoulder or right-of-way.

Couplings. Copper pipe couplings shall be bronze alloy Ford C22 Flared Copper Couplings or equal.

Meter setter shall be Ford V72-9W or approved equal.

Meter boxes shall be either high density plastic or Cascade Concrete, or approved equal. High density plastic boxes may be used in non-vehiculary traffic installations only. High density plastic meter boxes shall not be installed in concrete or asphalt paved areas. Concrete meter box inspection lids shall be cast iron. High density plastic meter box inspection lids shall be cast iron or plastic.

7-15.3 Construction Requirements

Add the following to this Section:

A. The District is responsible for installation of water service from water main to property line including meter box, meter setter, and meter for new water main construction. The Property Owner is responsible to install water service from property line to house including a customer shutoff valve within 12-inches of meter.

B. All fittings shall be lead free brass.

C. Corporation taps shall make as nearly as possible a 45 degree angle off the vertical centerline of the main. No tap is to be made on the top of a water main.

D. The water service pipe shall have a minimum of 24 inches depth and a maximum of 36 inches depth, including under ditch sections. If the Contractor changes the ground elevation after completion of the water service installation, the Contractor shall be responsible for all costs incurred for the water service as a result of said change in grade elevation.

E. A meter will be installed by the District. Meter setter shall be set to provide 8-12 inches of cover for meters when installed. Meter will be Sensus SR 5/8" x ¾" with cubic feet dial readout and cast iron frost bottom.'

F. Top of the meter box shall be flush with the finished grade. The bottom section of the meter box shall be set carefully to assure that the copper has clearance in the notch area. The weight of the meter box must not be on the service pipe. Meter box shall be located within one (1) foot of the property line. The bottom of the meter box shall be filled with a minimum of 12-inches of clean pea gravel with the top of the gravel to be 3-inches below the meter body. A mole screen shall be installed below the meter box.

G. All service pipe and appurtenances shall be prechlorinated prior to installation. After installation, the service connection shall be flushed prior to connecting the meter. No service is to be covered until the system operator has inspected the initial installation. All corporations must be in an ON position and all curb stops must be in the Off position.

H. Existing services shall be disconnected from the existing water mains and connected to the new mains. In the event that the existing service lines are made of materials other than minimum size ¾" Type K copper pipe, they shall be replaced with new copper pipe

meeting the specifications. Copper-setters and meters needing replacement shall be provided by the District to the Contractor for installation

I. Before final acceptance and final payment if required, the Contractor shall provide the system operator with as-built sketches. These as-builts drawings shall include the exact location of all underground and above ground utilities and shall include but no be limited to the following information on the water service location:

1. The location of all water service taps into the water main.

2. The location of all water service boxes and meters with distances to the right-of-way and distances to the nearest property corners.

J. Correct water service locations are the responsibility of the Contractor. Initial stakes shall be provided by the System operator. Locations are to be as shown on the approved drawings.

7-15.3(1) Flushing and Disinfection

Add to this section: "Service testing shall be done in conjunction with water main testing. An acceptance inspection will be made by the Engineer upon completion of all project work. During the inspection, every service shall be turned on to its full capacity to check flow and guarantee that each service line has been flushed. In no case shall the acceptance inspection be made until all project work is complete. Damage incurred during other construction work on the project shall be corrected by the Contractor prior to acceptance by the District."

WHATCOM COUNTY WATER DISTRICT #2

1615 Bayon Rd. * Bellingham, WA 98225 * (360) 733-5770

APPLICATION FOR WATER SERVICE

This form is to be completed for any change in account status: e.g. Change of owner, Change of Renter, Change of Address, Change of Party To Receive Billing.

Possession Date_____ Account #_____

1. Applicant is the: Owner _____ Renter _____ Authorized Agent _____

2. Property Location: (Street Address) _____

3. To whom are billings to be directed? Owner _____ Renter _____ Agent _____

4. Name of Owner: _____

   Mailing Address: _____

   Complete item #5 only if the renter or agent is to receive the billing.

5. Name of Renter/Agent: _____

   Mailing Address: _____

6. Please provide us with a phone number(s) and a contact person (s) only to be used in the case of a possible emergency notification, preferably the person(s) living at the residence. Please list in preferred order of contact.

   1. Name _____ Phone # _____

   2. Name _____ Phone # _____

7. $25.00 Non-Refundable "Set Up Fee" Please enclose set up fee with application. Changes will not be made without payment of this fee.

8. Review attached rules and regulations.

9. In the making of this application I affirm that I am the Owner or duly authorized agent of the owner. I am familiar with the regulations governing water usage and rates and understand that the owner is fully responsible for all water bills against the property located at the above address.

10. Undersigned owner or agent understands that continuation of water service is contingent upon compliance with applicable water district regulation.

11. Date: _____
    Signature of owner or agent. _____
    (If agent, state capacity.)

12. PLEASE RETURN SIGNED ORIGINAL APPLICATION WITH PAYMENT.

WHATCOM COUNTY WATER DISTRICT NO. 2
WHATCOM COUNTY, WASHINGTON

APPLICATION TO CONSTRUCT A SMALL
EXTENSION OF THE WATER SYSTEM

_____, of _____
(mailing address)
this_____ day of _____, 20_____, hereinafter referred to as "owner", hereby makes application to Whatcom County Water District No. 2 (the "District") in Whatcom County, Washington, to design and construct a water line extension under the District's Small Extension Program on property owned by the Owner and in the public right-of-way under the District's franchise therefore, and/or on easements which are subject to the approval of the District, and to connect to the District's water distribution system, and makes the following representation and agreements, to-wit:

1. LOCATION AND EXTENSION

The proposed extension will be installed on property owned by the Owner and in roads and/or easements and/or on other approved rights-of-way and shall be for the use and benefit if the property hereafter legally described as follows:

Legal Description of Property
(May Be Attached As Exhibit A)

The Owner certifies that it is the owner of the above-described property and will submit such evidence of ownership as the District requires.

2. DESCRIPTION OF EXTENSION

The proposed small extension will consist of approximately _____ Lineal feet of water main and appurtenances and shall be designed, constructed and installed in accordance with plans approved by the District, and in accordance with the standards and conditions for constructing extensions to the water system adopted by the Board of Commissioners of the District, the terms and conditions of which are attached hereto and made a part hereof.

3. STANDARD SPECIFICATION AND ENGINEERING SERVICES

All design and construction shall be in accordance with the Water District No. 2 Standard Plans and Standard Specifications.

"Engineer" means the engineering firm, and the firm's representatives, which is retained and assigned by the District to act as Engineer for the inspection of work to be performed under this agreement.

4. FEES AND CHARGES

A. A non-refundable administration charge of $500.00 shall be paid by the Owner to the District with this application.

B. All cost incurred by the District on this project shall be borne by the Owner. Fees to cover District costs shall be based upon actual time and expenses and shall be as follows:

1. The fees shall be adjusted by the District if the actual costs incurred indicate that the original fees will not cover all costs. The fees shall be paid to the District in consideration of the following work:

(a.) Fee for engineering design and inspection design.

5. PAYMENT OF FEES AND CHARGES

All fees and charges shall be paid by the Owner to the District as follows:

A. Engineering Design and inspection fee shall be paid to the District.

B. Final adjustment of fees will be calculated and all outstanding fees shall be paid prior to connection of the system.

6. EASEMENTS

Any required easements shall be obtained by the Owner at his sole cost and expense. A preliminary easement shall be delivered to the District prior to the time the District commences construction. At the completion of construction and prior to the Owner connection to the water extension, final signed easements shall be delivered to the District by the Owner. Where applicable the Owner shall provide an easement compatible with the Districts Comprehensive plan to insure continuation of the water line.

7. OWNERSHIP

The water mains, all appurtenances thereto include services from the main to and including the water meters shall become the property of the District.

8. GRADING OF NEW ROADS

Owner shall grade all new roads in which water lines will be installed to the design

Subgrade elevation prior to the start of construction. If the Owner changes the subgrade elevation of the road after completion of the extension, or any part thereof, the Owner shall be responsible for all costs incurred for the extension as a result of said change in subgrade elevation. This obligation shall remain in full force until Whatcom County or other municipality releases the right-of-way or road construction bond or bond of other description in connection with the Owner's obligation for completion of roads with in the area.

9. LIMITATION OF PERIOD OF APPLICATION

The extension shall be complete and acceptance of this Application by the District. If the extension is not completed and accepted within one (1) year from the date below, then the Owner's right under this agreement shall cease and no additional service shall be connected to such extension unless and until Owner shall make a new Application or District consents to the Renewal of the existing Application and Owner shall pay the additional administrative, legal and engineering costs involved, all as determined by the Board of Commissioners.

10. NO THIRD PARTY RIGHTS CREATED

This agreement is made entirely for the benefit of the District and the Owner and successors in interest. No third party shall have any rights hereunder, whether by agency or as a third party beneficiary or otherwise.

11. AGREEMENT

I, _____, the Owner of the herein described property, have read and accept the terms and conditions set forth in this application.

_____

_____

Owner

APPROVED THIS _____ day of _____, 20_____.

WHATCOM COUNTY WATER DISTRICT NO. 2
Whatcom County, Washington

By:_____
President, Board of Commissioners

WATER DISTRICT NO. 2
WHATCOM COUNTY, WASHINGTON

CHECKLIST

Owner's Water System Extension

Location:_____

_____

A. Preliminary

Date

_____ 1. Application form completed (Owner)

_____ 2. Non-refundable Administrative charge $500.00 paid (Owner) Section 4

_____ 3. Plan of project submitted (Owner)

_____ 4. Application approved by Board of Commissioners (District)

_____ 5. SEPA checklist or other requirements submitted (Owner)

_____ 6. Notice to District's engineer to proceed with review (District)

B. Required Before Construction Begins

_____ 1. Engineering cost and construction cost estimates are paid (Owner)
Amount Paid: $_____

_____ 2. Plans approved (District)

_____ 3. Plans submitted to DSHS (District/Owner)

_____ 4. Selection of contractor (from Small Works Roster (District)

A. Contractor must be bonded and licensed within the state

B. Contractor must be experienced in potable water line construction

_____ 5. State and/or County permits obtained (District/Owner)

_____ 6. DSHS approval received (District/Owner)

_____ 7. Preconstruction meeting held (Contractor)

_____ 8. Property corner or easement Alignment stakes in place (Owner)

_____ 9. Preliminary easements submitted (Owner)

C. Required Before Acceptance and Connection of Water System Extension

_____ 1. Payment of connection or facilities fee (Owner)

_____ 2. Payment of final engineering and construction costs

_____ 3. Final easements submitted (Owner) Section 7

APPLICANT WATER EXTENSION INDIVIDUAL OR PARTNERSHIP
BILL OF SALE

NAME OF PROJECT _____

KNOW ALL PEOPLE BY THESE PRESENTS: That the undersigned party of the first part, hereafter designated "Vender," for valuable consideration received from Whatcom County Water District #2, of Whatcom County, Washington, party of the second part, hereafter designated "Vendee", does by these presents grant, bargain, sell and deliver unto the Vendee, the following described personal property located in _____, as recorded in Volume _____ of Plats, pages _____, Records of Whatcom County, Washington, to wit:

TO HAVE AND TO HOLD the same unto the Vendee, its successors and assigns forever. And the Vendor, jointly and severally, and its respective successors and assigns, covenant and agree to and with the Vendee, its successors and assigns, that the Vendor is the owner of said property, and has good right and authority to sell the same, and that it will, and does hereby warrant and agree to defend the sale thereof hereby made unto the Vendee, its successors and assigns, against all and every person or persons whomsoever, lawfully claiming or to claim the same.

Vendor further guarantees that the said facilities are fit for purposes intended, i.e., for use as a water system including water lines adequate for the service intended.

Vendor further convenants and agrees with the Vendee to replace, repair and correct any defect in work or materials in respect to the personal property subject to this Bill of Sale arising during a period of two (2) years from date hereof, without cost to Vendee.

Vendor further convenants and warrants that the price of the above property as charged to and received from the Vendee is the actual cost thereof to the Vendor and is computed in accordance with the provisions of Section _____, Paragraph _____ of the Comprehensive Plan of Whatcom County Water District #2 of Whatcom County, Washington. _____ Vendee as described in its Resolution No. _____, as amended, adopted the _____ day of _____, 20

Whatcom County Water District No. 2
Water Service Procedure

1615 Bayon
Bellingham, Washington 98225
Telephone 360-733-5770
Fax 360-671-4912

TYPES OF WATER SERVICE

The following types of water service are provided by the District.

A. "Residential, metered" services include only those services connecting the water system to a single-family dwelling unit, and located within the corporate limits of the District. The service size shall be three-quarter-inch in diameter, except existing one-inch services, which may be continued at the discretion of the Board of Commissioners.

B. All services will be metered! All nonresidential services, Multiple-family residential, and single-family residential within the District limits desiring a service larger than three-quarter-inch shall present a request to the District.

C. "Standby fire-protection" service is a water service installed solely for the purpose of providing water to automatic fire sprinklers, on-site fire hydrants, or standpipes. All privately-owned fire-protection services shall include a WSDOH approved backflow preventor with a flow-detection device of a type approved by the District. No domestic water supply connections are allowed on a fire-protection service.

D. A "construction" service is a metered service installed for the sole purpose of providing water during the construction of a building prior to occupancy. Water supplied for construction is not for domestic use.

APPLICATION FOR WATER SERVICE

Any person desiring to have a premises connected with the District water supply system shall make application at the District office on printed forms furnished for that purpose. Every such application shall be made by the owner of the property to be benefited, or by his authorized agent. The application must state fully the purposes for which the water is required, and the applicant must agree to conform to the use of water, and further agree, as a condition to the furnishing of water, that the District has the right to shut off the water supply for repairs, extensions, or doing other necessary work.

WATER SERVICE INSTALLATION FEES

A. Prior to approval of application for water service by the District office, the fees applicable to the requested service shall be determined. The fees consist of connection fees, assessments, installation fees, and other applicable charges.

B. Specified fees shall be paid to the District office in full at the time of application.

CONNECTION CHARGES

A. Demand Charge

1. Any person seeking a water service shall pay a connection charge at such time as the permit is approved or the water service granted. Such charge is imposed in order to insure that each connected property bears its equitable share of the capital cost of the water system.

2. The basic connection charge is as stated in this handout and shall be paid prior to issuance of a water service and/or water permit.

3. WCWD#2 shall reserve the right to determine the minimum size water service needed, using the 1982 Uniform Plumbing Code method for sizing water systems and the American Water Works Association's "Manual of Water Supply Practices" for determining recommended meter sizes (eighty percent maximum capacity).

B. Latecomer's and/or front foot assessment charges shall be paid prior to service installation.

C. Credits. Demand charge credits shall be calculated as follows:

1. If an existing service is exchanged for a larger service, credit shall be given for the smaller service at the current rate.

2. No refunds will be given for exchanges or reactivation to smaller size services.

ABANDONED SERVICES

A. An abandoned service is any water service that does not connect to a water-using system.

B. Services installed part of a main extension and not put into service will not be considered abandoned.

C. A new Water service for a premises where an abandoned service exists may use the abandoned service anytime within three years of abandonment. A $50.00 re-activation fee shall be paid and the customer must install a shutoff valve 12-inches from the meter on the customer side.

D. A service abandoned for longer than three years may use the existing service if it is determined to be in satisfactory condition by the District.

If repairs, re-alignment or modifications are necessary, all costs are borne by the customer. There is no charge for meter replacement.

The customer must install a shutoff 12-inches from meter on customer side.

The resident or his agent must be present during turn-on.

There will be a $50.00 re-activation fee.

LIMITATION ON WATER USE

No person supplied with water from the District mains shall be entitled to use it for any purpose other than those stated in the application for service or to supply other persons or premises in any way.

WATER SERVICE CONNECTIONS

A. When the premises abuts upon a street or utility easement through which there is a water main, the owner may apply for a service. The District will install a service pipe from the main to the property line, and will include a stopcock and meter placed within the street right-of-way; this equipment constitutes the "water service" and shall thereafter be maintained by and kept within the exclusive control of the District. The water line from the stopcock to the shutoff, within 12" of meter on owner's side, shall be installed by the property owner subject to inspection by the District, and it shall remain under the exclusive control of the property owner. The inspection shall be conducted before water service in initiated.

B. When the premises for which service is sought does not abut a street or right-of-way through which there is a District water main, the application for service shall be rejected.

C. When the premises for which service is sought does not abut a main with sufficient pressure and capacity to provide the required flow at the property line, the application for service shall be rejected.

D. The property owner or developer may petition the District for a water main extension should the street or right-of-way not contain a water main. See Water Main Extension Procedure Section.

E. All separate premises must have their own separate service connection with a District water main, except:

1. Standby fire-protection services; and

2. Commercial metered services, and industrial water services, in which cases each service shall be metered and computed separately.

All new residential services shall be ¾" diameter.

NOTE: The information provided in this handout is accurate as of the date shown. It is only a brief summary of the information contained in the District. Therefore, it is a good idea to check with staff and ordinances to assure that your proposal complies with ordinance requirements.

WATER SERVICE INSTALLATION

A. All water services shall be installed in accordance with current American Water Works Association (AWWA) standards and District specifications.

B. All materials used for a water service installation shall be AWWA approved and accepted for use on the District water system by the Board of Commissioners.

C. Installation of a requested water service will be scheduled after all applicable fees and charges have been paid.

D. The District shall be the entity responsible for the installation of the service. The District may, at their option, select either installation by District forces or by construction contract.

E. The location of the water service will be determined by the District Engineer. In the event of conflict between the selected service location and the location desired by the applicant, the question may be appealed to the Board of Commissioners.

F. The water service shall consist of the tap to the main, the corporation stop at the main, pipe, connections, service or meter box, meter and stopcock. This service shall be owned and maintained by the District from the main to the house side of the stopcock. The connection to the premises side of the stopcock including a pressure reducing valve if needed is not part of the water service and is the responsibility of the property owner.

G. The water service shall be installed within County rights-of-way or easements in accordance with department standards.

H. All services other than single-family residential shall be sized by the District Engineer using the Uniform Plumbing Code and the AWWA "Sizing Water Service Lines and Meters;" except that standby fire-protection services shall be sized based on fire-flow requirements determined by the Fire Department.

I. Water service and electrical service lines shall not share the same trench unless:

1. They are separated by a minimum of twenty-four-inches; or

2. The electric line is in a rigid metallic conduit.

J. No electric-grounding devices or wires from any utility shall be attached to any water service unless authorized by the District.

K. No sewer service shall be installed within ten feet of a water service unless it is located at least twenty-four-inches below the water service.

L. Individual pressure reducing valves for services located in high pressure areas shall be installed on the premises side of the meter, owned and maintained by the owner of the premises.

INSPECTION

The District or District's agent will inspect the installation to assure that the conditions of the permit are met and that safety instructions are followed.

Whatcom County Water District No. 2
Watermain Extension Procedure

1615 Bayon Road
Bellingham, Washington 98225
Telephone 360-733-5770
Fax 360-671-4912

WHEN MAIN EXTENSION IS REQUIRED

A main extension is required whenever property within the water service zone is developed and that property does not abut a water main, or when existing abutting water main is not adequate to provide the required water pressure or flow rate.

PETITION FOR WATER MAIN EXTENSION

A. The person desiring a main extension shall petition the commissioners requesting permission to extend the Districts water system.

B. The Commissioners shall review the request, and if the requested extension is determined to be desirable, shall provide the petitioner with the design requirements for the extension. If the requested main extension is determined to be an undesirable extension of the water system, the petition shall be denied.

DESIGN OF WATER MAIN EXTENSION CONSTRUCTION PERMIT

A. Upon receipt of the design requirements from the District, the petitioner shall cause the plans and specifications for the extension to be prepared, all design and construction drawings and specifications shall be in accordance with engineering standards adopted by the District. The completed design and specifications, having a valid engineer's seal from a licensed Washington State Professional Engineer, shall be submitted to the District for review and approval.

B. The project for main construction will be carried out in accordance with the provisions of a contract entered into between the District and the petitioner. In the discretion of the Commissioners, appropriate security may be required covering construction performance and guaranteeing the construction after completion for a period of one year.

C. The main construction shall extend the opposite property line or as directed by the Board of Commissioners.

CONSTRUCTION OF WATER MAIN EXTENSION

A. The petitioner shall contract with a contractor to install the main extension as approved by the District. The contractor shall be certified, bondable, licensed and

experienced in water main construction. The District may also require written performance of previous water line construction jobs.

The petitioner and contractor must have a working understanding of this booklet.

B. The Districts inspector shall inspect the installation of the water main to insure compliance with the specifications. The charges for such inspection, including administrative and overhead charges, shall be withdrawn from the construction inspection fee deposited at the District office. At such time as the inspector and Commissioners determine the remaining funds are not adequate to provide necessary inspection for the project, the petitioner shall be notified and an estimate of additional inspection fee required will be provided. The additional fees shall be deposited with the District reserves the right to reject any installation not inspected and approved by the District's inspector. Any monies unexpended from the inspection fee upon completion of the project shall be returned to the petitioner.

C. Upon satisfactory completion of all required tests and acceptance of the main extension, the inspector, with approval from commissioners shall cause the extension to be connected to the Districts' system. All costs incurred in the connection, including overhead and administrative charges, shall be paid by the petitioner. Any adjustment of the actual cost of installation because of variance between the estimate and the actual cost shall be refunded upon completion of the job to the petitioner, or by payment by the petitioner, or by payment by the petitioner to the District of any additional expense above the estimate.

D. When a main extension is to serve a new single family residential area, individual services shall be installed by the developer to supply each proposed building site. These services shall be installed to District standards. All fees and charges for installation of the services shall be paid at the time a connection permit is obtained.

"AS-BUILT" CONSTRUCTION DRAWINGS REQUIRED

A. Upon completion of a main extension, the petitioner shall provide a reproducible mylar drawing the accurately indicates the main extension and appurtenances as actually installed, in plan and profile.

B. No main extension will be accepted until satisfactory "as-built" drawings are provided.

ENERGIZING MAIN EXTENSIONS

No main extension shall be energized other than for text purposes by duly authorized personnel until the main extension has been accepted by the District and all fees and charges have been paid. If energizing a main is necessary to restore service to existing customers, fire hydrants will not be activated until acceptance of the main extension.

PAYMENT FOR WATER MAIN

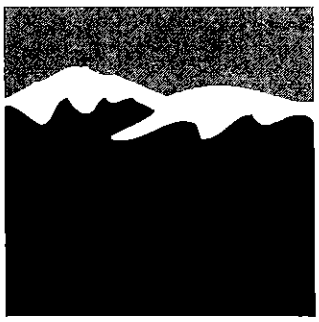
A. Water mains laid in public rights-of-way or easements and connected to District mains may be paid for by:

1. The person benefiting from the installation; or
2. The District; or
3. A local improvement district, as provided by law.

B. The District may, in accordance with State law, grant the person constructing a new water main the right to partial reimbursement from other abutting property owners benefited by the improvement. Such reimbursement shall be administered by the District and shall be subject to reasonable overhead and administrative charges by the District.

NOTE: The information provided in this handout is accurate as of the date shown. It is only a brief summary. Therefore, it is a good idea to check with the District and the ordinances to assure that your proposal complies with ordinance requirements.

Whatcom County Water District No. 2
Watermain Extension Policies



1615 Bayon Road
Bellingham, Washington 98225
Telephone 360-733-5770
Fax 360-671-4912

When adding to or extending the District's water distribution system, the following policies will apply. These are minimum standards, however, and larger mains or other additions may be required where deemed necessary by WCWD #2.

RESIDENTIAL ZONES: The minimum size water main shall be 8" in diameter.

COMMERCIAL/INDUSTRIAL AND INSTITUTIONAL ZONES: The minimum size water main shall be as required to meet the requirements of the Whatcom County Fire Marshal. Within the City of Bellingham Urban Growth Area the City requirements will govern.

SUPPLY WATER MAINS: Where required, the minimum size supply main shall be 12" in diameter and shall be spaced approximately 3,000' centers. The actual size of the supply main shall be determined by its ability to deliver water based on the peak daily demand plus designated fire flow.

VALVE SPACING RESILIENT TYPE: Gate valves shall be placed on each main at a junction point (node). Gate valves should be spaced along water main at intervals not to exceed 500' for pipe sizes 10" Diameter and above, and not to exceed 800' for pipe sizes less than 10" diameter.

FIRE-HYDRANT SPACING: Fire hydrants shall be spaced as follows:

A. One- and two-family unit developments: no greater than 500' intervals along public streets or approved fire routes.

B. All other developments: no greater than 300' intervals along public streets or approved fire access routes.

FIRE FLOW RATES: All water main construction and reconstruction shall be done pursuant to a design that, when fully implemented, will provide the fire flow requirements of the Fire Department's fire protection standards. Within the City of Bellingham Urban Growth Area fire flow rates must meet City Standards.

In any circumstance, when improvements which increase the fire flow requirement are made, the water system must be upgraded to support the changes.

FIRE MAINS AND HYDRANTS LOCATED ON PRIVATE PROPERTY

All fire hydrants and water mains serving hydrants will be publicly owned and maintained. A minimum 20-foot maintenance easement shall be granted to the District and recorded for any public water main on private property. Construction must meet District standards.

Water mains on private property serving building sprinkler systems will be privately owned and maintained as long as the main serves only one property and no hydrants are required. In this case, the following requirements apply:

1. An approved backflow assembly must be installed

2. No domestic or other water service allowed on fire main.

3. No requirement for construction standards imposed by WCWD #2, contact the Fire Department for these standards.

4. No maintenance easement is necessary.

5. Water main to be pressure tested by the Fire Department according to Fire Department Standards.

6. Water main to have two consecutive bacteriological samples taken 24 hours apart.

7. Connection of main to the District's water system will be by District forces after bacteriological tests have passed.

WHATCOM COUNTY WATER DISTRICT 2

WATER CONSTRUCTION GENERAL NOTES

1. All work and materials shall conform with American Water Works Association Standards (AWWA); the current Edition of the Standard Specifications for Road, Bridge and Municipal Construction and Supplement as prepared by Washington State Department of Transportation (WSDOT); the Washington State Chapter of American Public Works DISTRICT (APWA); Water District 2 (DISTRICT); and shall be subject to approval by the DISTRICT.

2. A pre-construction conference shall be held prior to commencing construction. 48 hours prior to the pre-construction conference, the Contractor shall provide to DISTRICT the following documents: Performance Bond (when applicable), Insurance Acord sheet with DISTRICT listed as an Additional Insured, material submittals from suppliers, right-of-way permit (when applicable), Traffic Control Plan for public and/or private roadways, and draft easement description when applicable. Also, the project Surveyor shall have the construction staking completed.

3. Contractor's Surveyor shall provide horizontal control and appropriate offsets for alignment. All staking shall be completed prior to the pre-construction conference. Construction staking shall be based upon the easement descriptions and be provided to DISTRICT 48 hours prior to the pre-construction conference. Staking may occur in stages on larger projects with DISTRICT approval.

4. Contractor shall contact Utility Underground Locate Center (800-425-5555) 48 hours in advance of any work and prior to the pre-construction conference.

5. Temporary connection to the existing main shall be made with cross connection devices in accordance with WSDOT Specification 7-09.3(19)A, and per DISTRICT Standard Details. The cross-connection test report for the device being used shall be provided to DISTRICT prior to its use.

6. All pipe for water mains shall conform to WSDOT Specification 9-30.1 Pipe Specifications - unless approved plans reflect otherwise. Ductile Iron Pipe shall be polyethylene encased per WSDOT Specification 9-30.1(2)

7. All fittings shall be comply with WSDOT Specification 9-30.2.

8. All valves shall comply with WSDOT Specification 9-30.3. Valves installed on lines constructed with flexible pipe materials shall have the valve supported by an anchored concrete cradle or cradle block per the Standard Details. A valve box shall be included with each gate valve and shall be adjusted to existing ground level upon completion of the project. Gate Valves located in unpaved areas shall have a 2' x 2' x 4" concrete pad poured around them. Upon DISTRICT direction, a valve marker post shall be included in accordance with WSDOT Specification 9-

30.3(5). Connection to existing DISTRICT water mains shall be done with a stainless steel tapping sleeve and valve assembly in accordance with WSDOT Specification 9-30.3(8). Fire hydrants shall comply with WSDOT Specification 9-30.5. Guard posts shall be installed where shown on the plans.

9. Minimum depth of cover shall be 36 inches except for road crossings where a minimum cover of 42 inches shall be maintained.

10. Bedding of the pipe shall be in accordance with WSDOT Specification 7-09.3(9) and shall extend from 4 inches below the pipe to 6 inches over the top of the pipe.

11. All unsuitable material excavated from trenches shall be transported by the Contractor to a waste site that is appropriate and approved for this unsuitable material.

12. Contractor shall install 14 gauge copper, solid core, neoprene coated, continuous wire on all new water mains and service lines. The Locate Wire shall be taped to these pipes every 10 feet.

13. Concrete thrust blocking shall be placed at all bends, tees, wyes, crosses, plugs, caps, bends, valves and hydrant as per DISTRICT Standard Details. Blocking shall be concrete mix poured in place. Concrete blocking shall bear against solid undisturbed earth at the sides and bottom of the trench excavation and shall be shaped to not obstruct access to the joints of the pipe or fittings.

14. Contractor shall pressure test water main in accordance with WSDOT Specification 7-09.3(23) in the presence of DISTRICT.

15. Contractor shall provide and certify the quantity of chlorine used for disinfection and shall test the chlorine residual - in the presence of DISTRICT - 24 hours after disinfection. Flushing and water sampling of the new main prior to the physical connection to the existing system shall be in the presence of DISTRICT. Contractor shall disinfect and flush the water main in accordance with WSDOT Specifications 7-09.3(24) and (24)A.

16. Contractor shall provide copies of satisfactory bacteriological test results to DISTRICT prior to connection to the DISTRICT facilities. An additional bacteriological test shall be required after final connection and prior to actual use of the system. After final connection, flushing and water sampling shall conform to WSDOT Specification 7-09.3(24)N.

17. Contractor shall restore lawns, fences, gravel, asphalt and concrete driveways, roads, etc. together with all other surface and subsurface improvements that are affected by the construction of the improvements, on both private and public property, within a three week period after disturbance. Any variance from this time period shall require approval from DISTRICT and/or the property owner.

18. The Contractor shall provide to DISTRICT a one-year Maintenance Bond for the satisfactory warranty of all work relating to the project. The one-year shall commence upon project acceptance by the Board of DISTRICT.

19. This plan reflects the proposed design configuration. It shall be the responsibility of the Contractor to identify and relocate existing improvements in the vicinity as required to avoid conflicts with the proposed water main. Any deviation from the proposed design configuration requires prior approval of the DISTRICT Engineer.

20. Services: New meter boxes, meter setters are to be provided for each service in accordance with the DISTRICT Standard Details. Unless indicated otherwise, each service shall have its own connection to the main. Contractor shall remove the old meter boxes and re-connect existing service lines to the new meter. All meter boxes and appurtenances removed shall be retained by the DISTRICT. Contractor shall restore disturbed landscaping to previous condition. Meters will be provided and set by the DISTRICT

21. Location of existing utilities, power and communication lines and services shown on the drawings are based upon visual observations. Contractor shall determine actual location of utility, communications and power crossings. Upon approval of DISTRICT, the water meters and fire hydrants may be relocated to avoid conflicts.

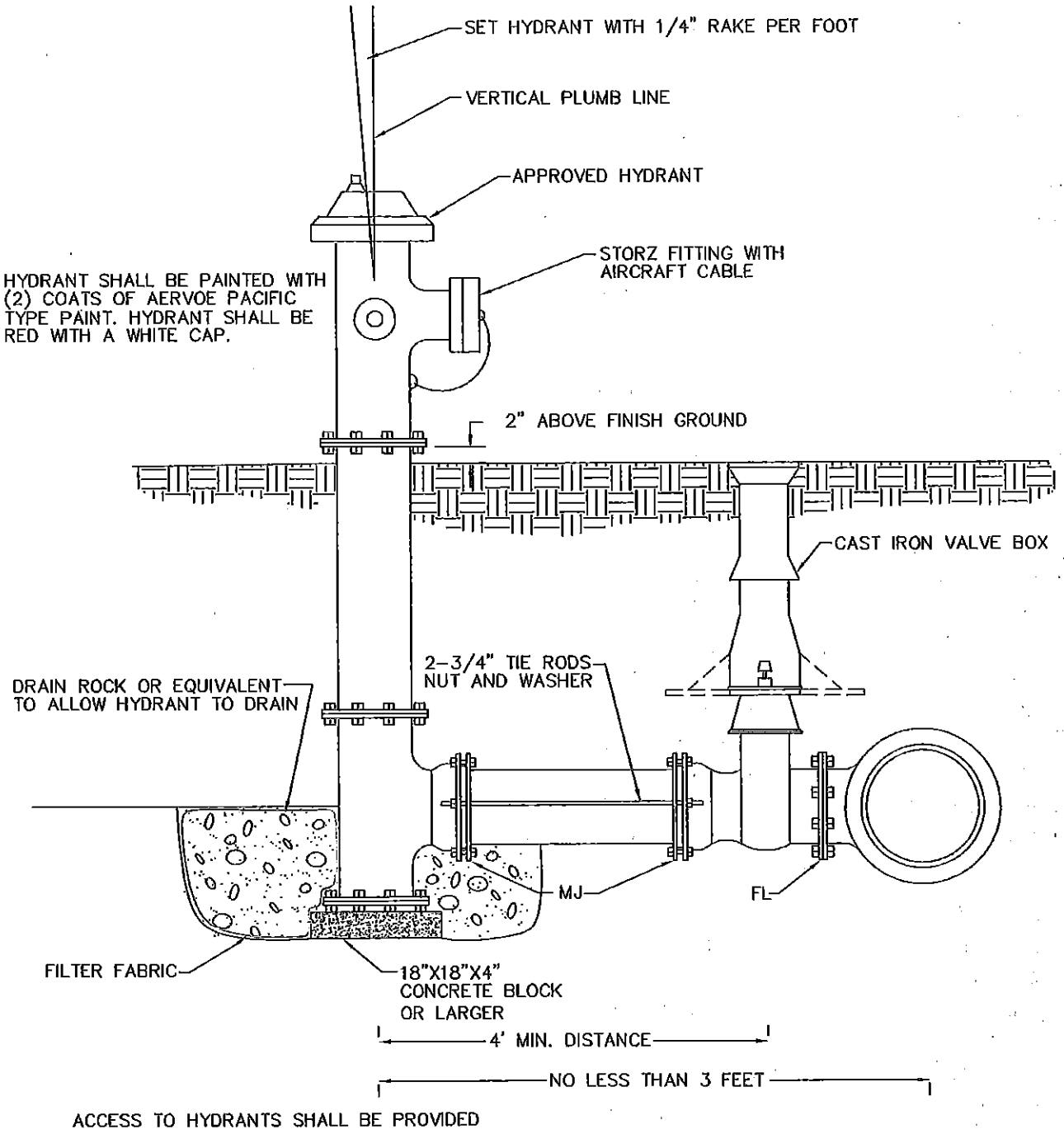
22. The existing water system shall be kept operational until the new system is flushed, pressure tested, disinfected and is ready to activate and connect water services. Contractor shall notify DISTRICT and affected customers of planned water outages 24 hours in advance.

23. After project completion and acceptance by DISTRICT the Contractor shall disconnect existing abandoned facilities. Abandoned pipelines shall be plugged or capped.

24. Excavation in roadway shoulders and driveways shall be backfilled with pit run gravel. Surface of shoulders and driveways shall be surfaced with 2" crushed rock. Asphalt shall be saw cut where required to be removed.

25. Mailboxes and road signs disturbed during construction shall be removed and replaced to their previous condition or better. Landscaping shall be replaced to the satisfaction of the landowner.

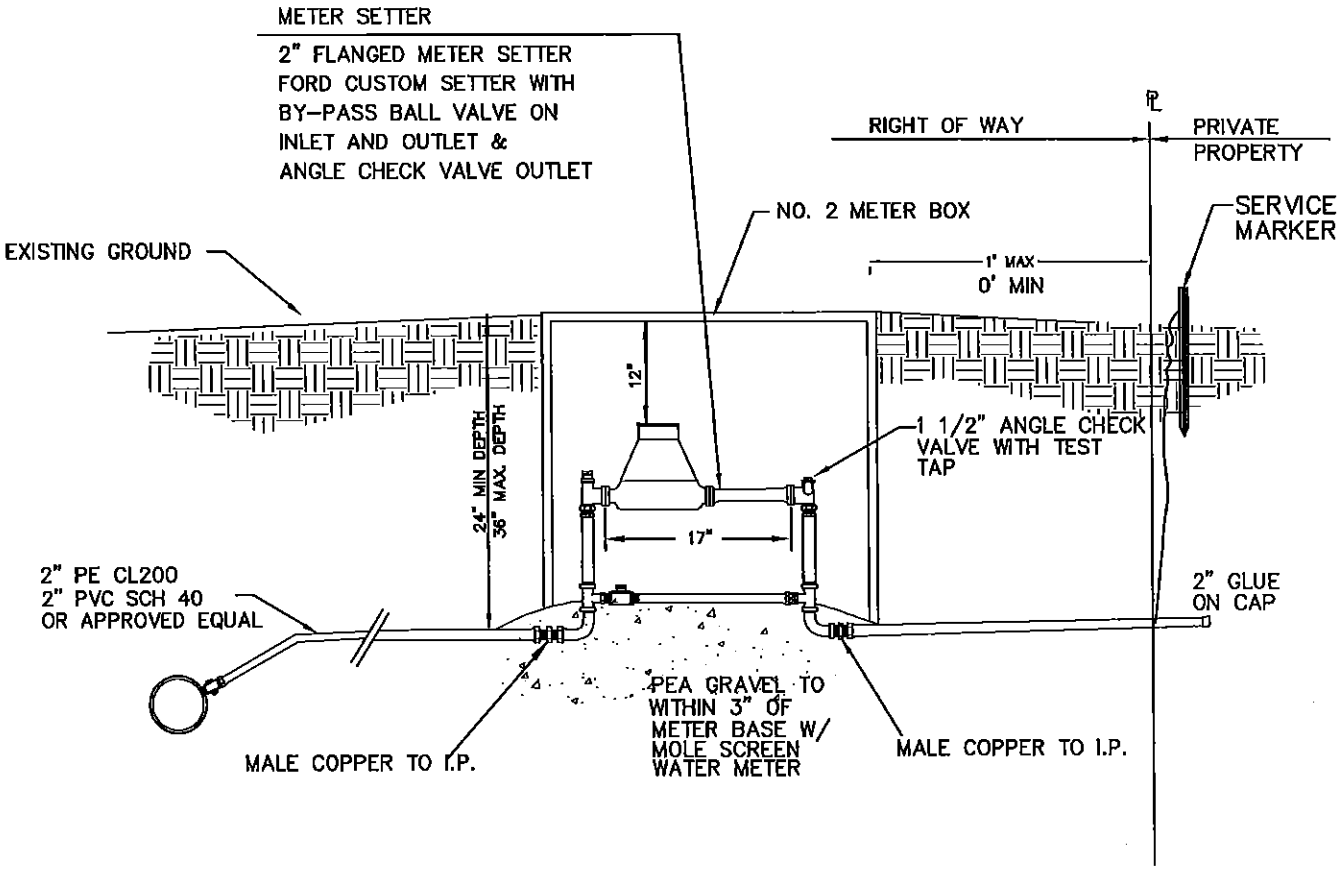
26. CONTRACTOR shall apply for and obtain a Whatcom County Revocable Encroachment Permit for work done in County Right of Way .



ACCESS TO HYDRANTS SHALL BE PROVIDED

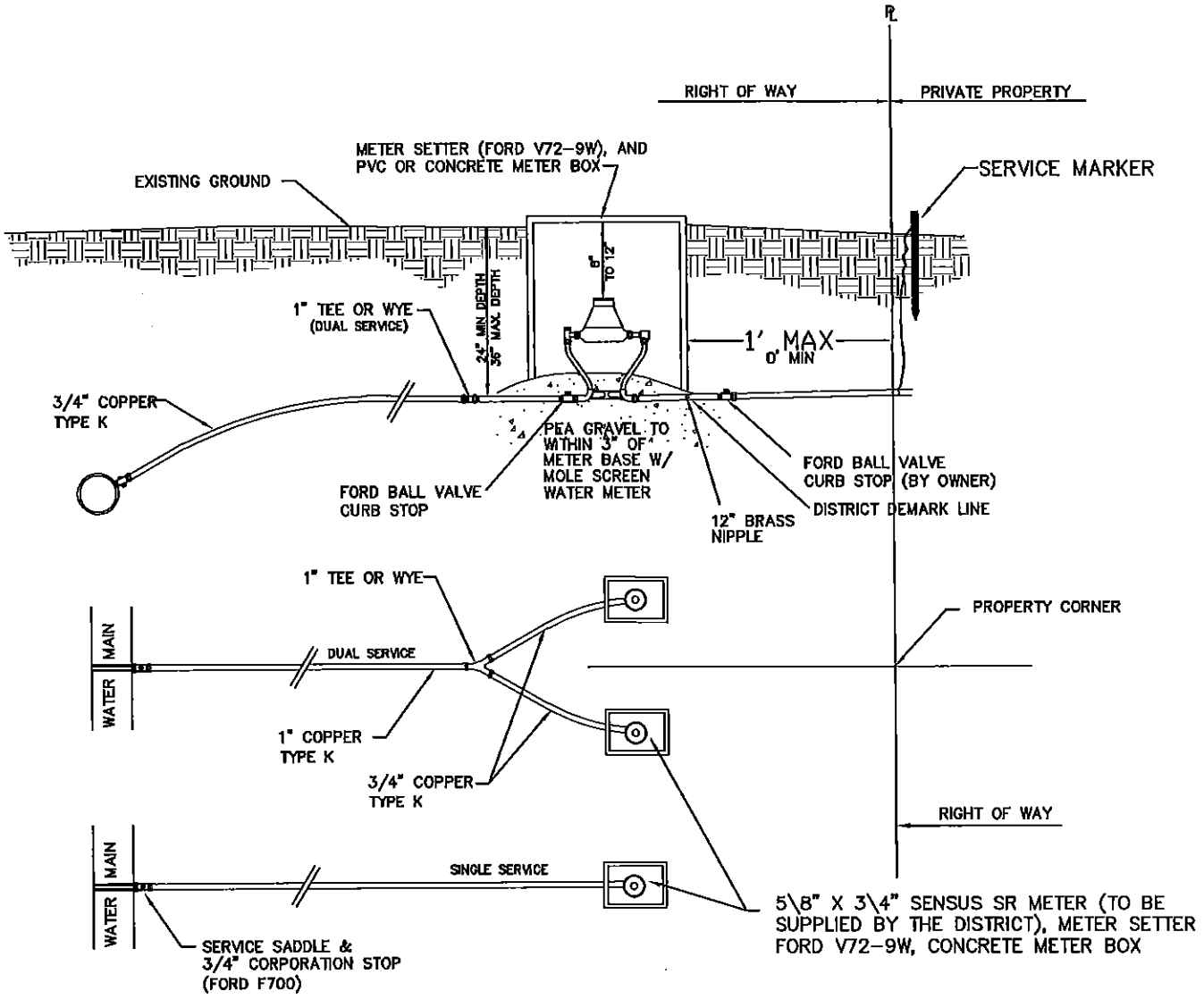
NOT TO SCALE

WATER DISTRICT #2 STANDARD PLANS	HYDRANT INSTALLATION DETAIL			FIGURE 1
	APPROVED BY:	DATE: 3-17-98	DWG: WA1.DWG	



WATER DISTRICT #2 STANDARD PLANS	2" WATER SERVICE DETAIL			FIGURE 3
	APPROVED BY:	DATE: 11/23	DWG: WA3.DWG	

P:\Projects\17012\11. Civil 3D 2021\WS FIGURE 3.dwg, Layout1, 12/1/2023 1:37:51 PM, PDF-XChange Standard

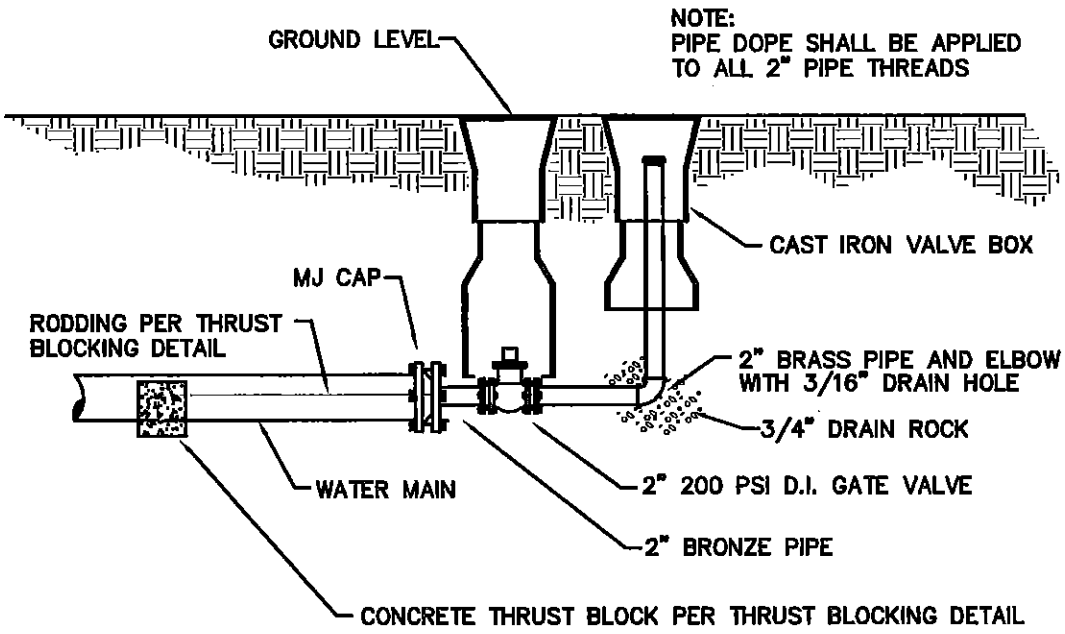


NOT TO SCALE

ALL SERVCIE ROAD CROSSINGS TO BE INSTALLED INSIDE A 2-INCH SCHEDULE 40 (OR BETTER) PVC PIPE TO EXTEND BEYOUND THE OUTER EDGE OF DITCH OR R/W.

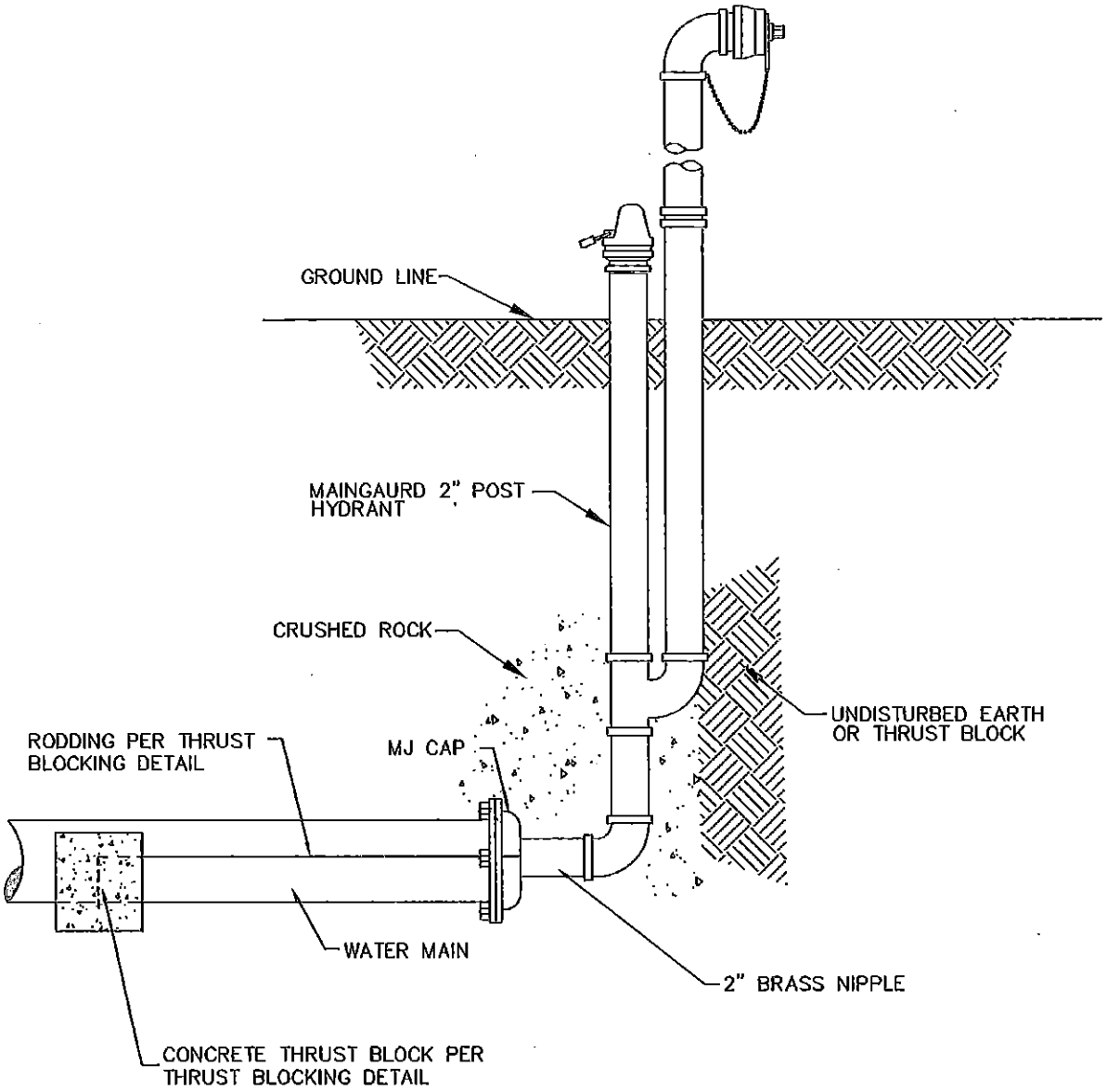
WATER DISTRICT #2 STANDARD PLANS	TYPICAL WATER SERVICE DETAIL			FIGURE 2
	APPROVED BY:	DATE: 11/23	DWG: WA2.DWG	

P:\Projects\17012\11. Civil 3D 2021\WS FIGURE 2.dwg, Layout1, 12/1/2023 1:37:33 PM, PDF-XChange Standard



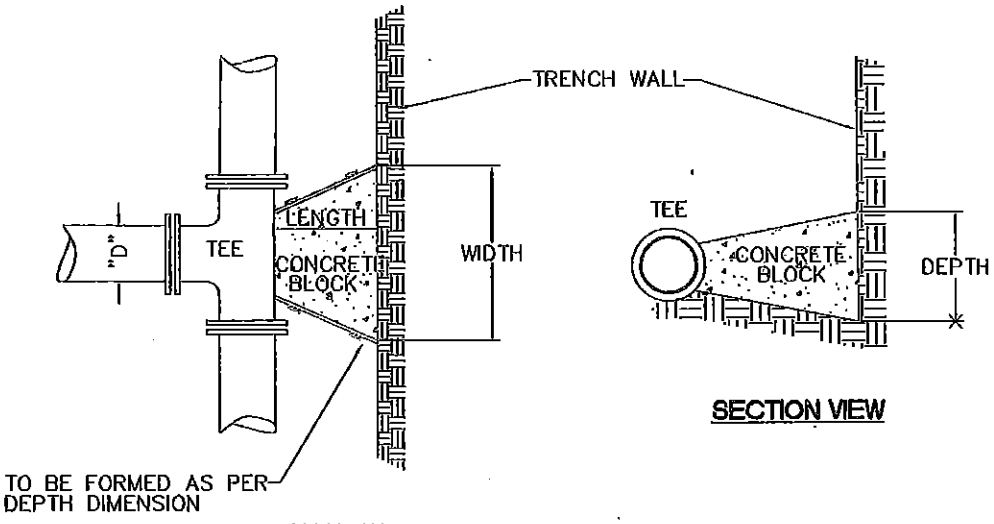
NOT TO SCALE

WATER DISTRICT #2 STANDARD PLANS	**2" BLOW-OFF DETAIL / FURTHER EXTENSION**			FIGURE 4
	APPROVED BY:	DATE: 6-30-03	DWG: WA4.DWG	



NOT TO SCALE

WATER DISTRICT #2	KUPFERLE NO.77 BLOW-OFF HYDRANT NO FURTHER EXTENSION			FIGURE
STANDARD PLANS	APPROVED BY:	DATE: 1-28-97	DWG: WA5.DWG	5

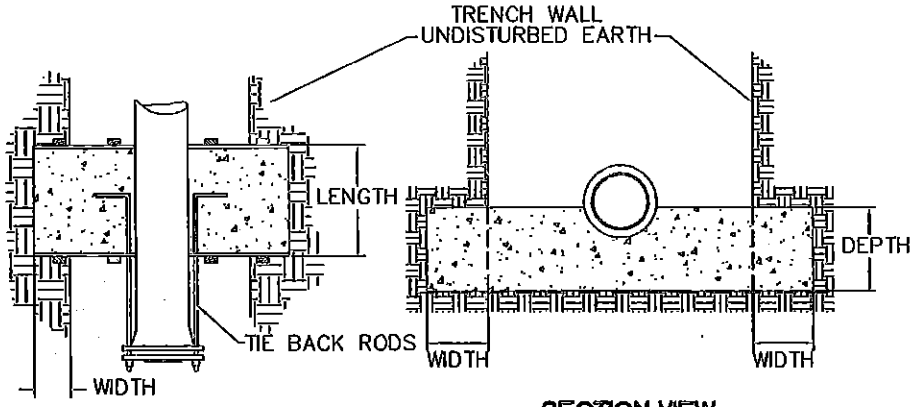


PLAN VIEW

SECTION VIEW

"D"	WIDTH	DEPTH	LENGTH	VOL.
6"	1'-6"	1'-6"	12"	3.0
8"	2'-0"	2'-0"	12"	4.5
10"	2'-6"	2'-6"	12"	7.0
12"	3'-0"	3'-0"	18"	14.0

VOL. = Approx. Volume of Blocking Material Required in cu. ft.



PLAN VIEW

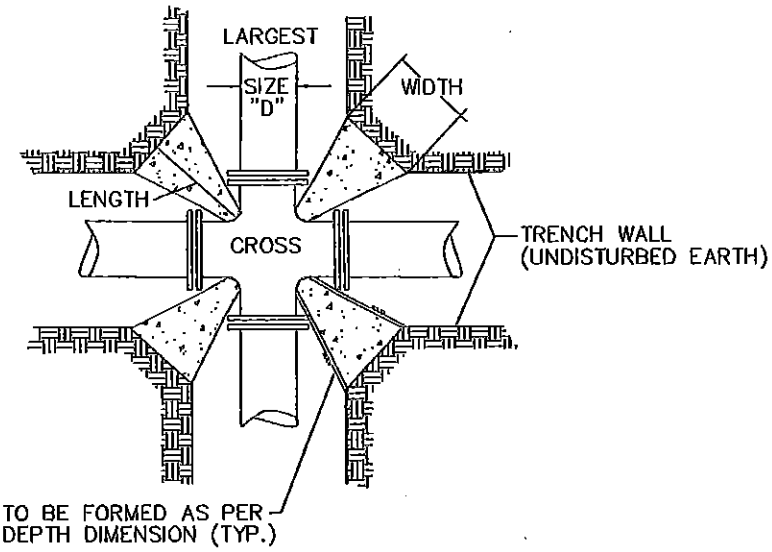
SECTION VIEW

"D"	WIDTH	DEPTH	LENGTH	*VOL.	# OF RODS	ROD DIA.
6"	1'-6"	1'-6"	12"	7.5	2	1/2"
8"	2'-0"	2'-0"	18"	20.0	2	5/8"
10"	2'-6"	2'-6"	24"	37.5	2	3/4"
12"	2'-9"	2'-9"	24"	44.0	4	3/4"

*VOL. = Approx. Volume of Blocking Material Required in cu. ft.
RODS: A36 STEEL MINIMUM

NOT TO SCALE
SOIL BEARING CAPACITY 1500 PSF MINIMUM
100 P.S.I. OPERATING PRESSURE

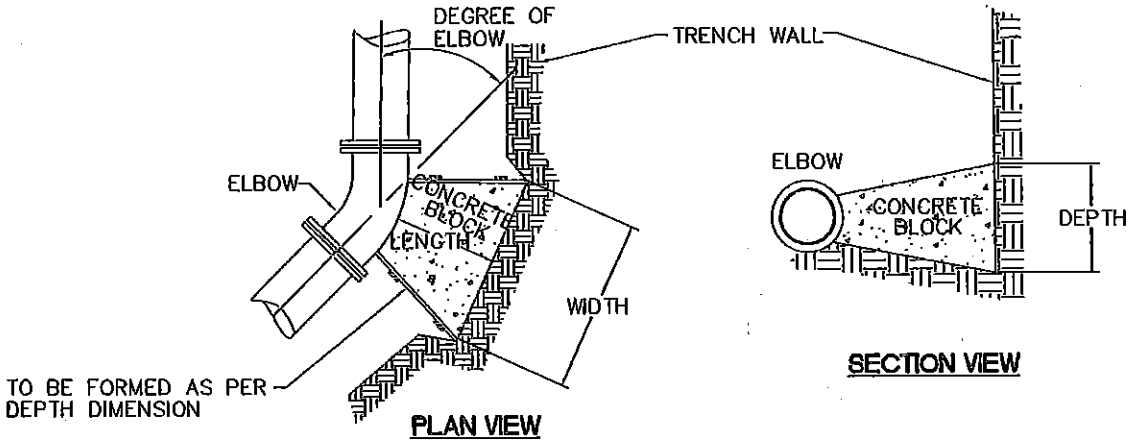
WATER DISTRICT #2 STANDARD PLANS	TYPICAL THRUST BLOCKING DETAIL			FIGURE 6A
	APPROVED BY:	DATE: 1-28-97	DWG: WA6.DWG	



PLAN VIEW

"D"	WIDTH	DEPTH	LENGTH	VOL.	X4 blocks/joint
6"	1'-0"	1'-0"	12"	0.63	2.50 cu ft
8"	1'-3"	1'-3"	12"	1.00	4.01 cu ft
10"	1'-6"	1'-6"	12"	1.63	6.50 cu ft
12"	1'-9"	1'-9"	18"	3.05	12.19 cu ft

VOL. = Approx. Volume of Blocking Material Required in cu. ft.



PLAN VIEW

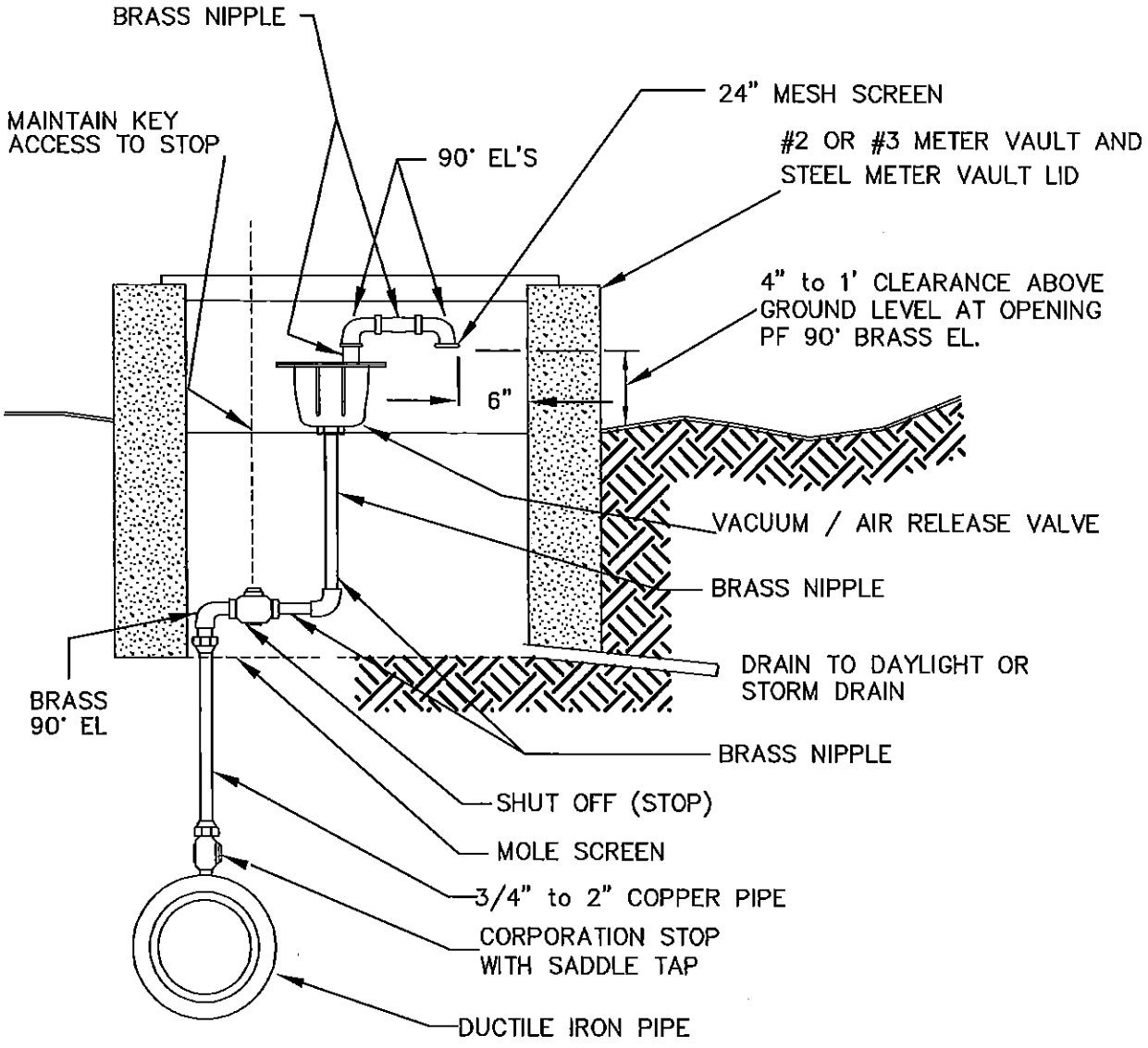
SECTION VIEW

SIZE	LENGTH	11 1/4°			22 1/2°			45°			90°		
		WIDTH	DEPTH	VOL.	WIDTH	DEPTH	VOL.	WIDTH	DEPTH	VOL.	WIDTH	DEPTH	VOL.
6"	12"	1'-0"	1'-0"	0.63	1'-0"	1'-0"	0.63	1'-6"	1'-6"	1.25	2'-3"	1'-6"	1.88
8"	12"	1'-3"	1'-3"	1.00	1'-3"	1'-3"	1.00	1'-9"	1'-9"	1.75	3'-0"	2'-0"	3.33
10"	12"	1'-9"	1'-6"	1.72	1'-9"	1'-6"	1.72	2'-3"	2'-3"	2.88	3'-6"	2'-6"	4.861
12"	18"	2'-0"	1'-9"	3.48	2'-0"	1'-9"	3.48	2'-9"	2'-6"	5.98	4'-0"	3'-0"	10.00

VOL. = Approx. Volume of Blocking Material Required in cu. ft.

NOT TO SCALE
SOIL BEARING CAPACITY 1500 PSF MINIMUM
100 P.S.I. OPERATING PRESSURE

WATER DISTRICT #2	TYPICAL THRUST BLOCKING DETAIL			FIGURE
STANDARD PLANS	APPROVED BY:	DATE: 1-28-97	DWG: WA6.DWG	6B

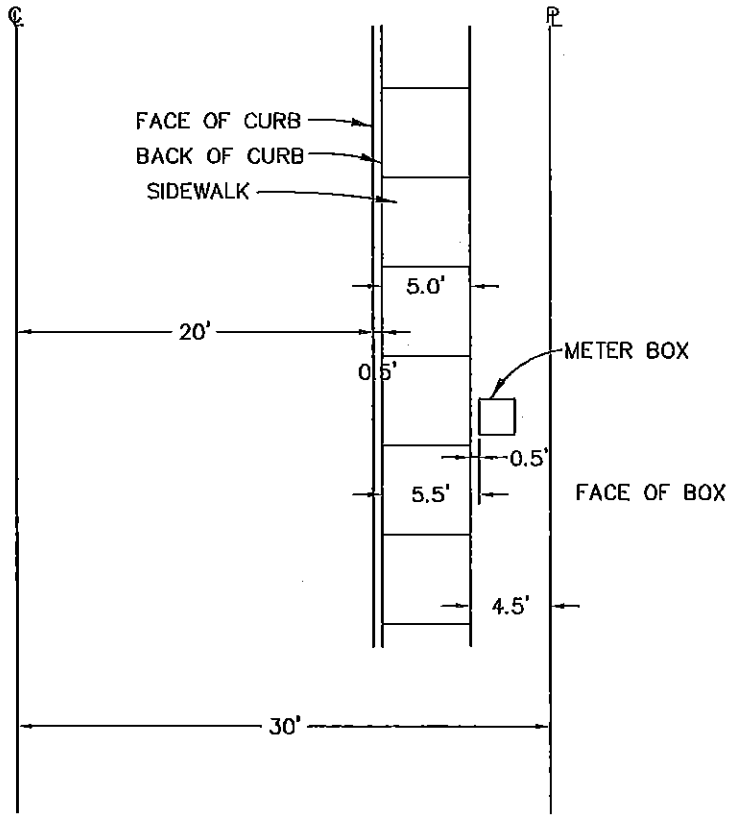


NOTE: PROVIDE AIR GAP
ABOVE HIGH WATER LEVEL

NOT TO SCALE

WATER DISTRICT #2 STANDARD PLANS	VACUUM/AIR RELEASE VALVE			FIGURE 8
	APPROVED BY:	DATE: 11/23	DWG: WA8.DWG	

P:\Projects\17012\11. Civil 3D 2021\WS FIGURE 8.dwg, Layout1, 12/1/2023 2:18:04 PM, PDF-XChange Standard



NOT TO SCALE

WATER DISTRICT #2	TYPICAL WATER METER LOCATION			FIGURE
STANDARD PLANS	APPROVED BY:	DATE: 1-28-97	DWG: WA9.DWG	9

CONSTRUCTION COMPLETION REPORT FORM FOR DISTRIBUTION MAIN PROJECTS

In accordance with WAC 246-290-120(5), a ***Construction Completion Report*** is required for all construction projects. Under the submittal exception process for distribution main projects, designed by a professional engineer but not submitted to the Department of Health (DOH) for approval, the report does not need to be submitted. **However, the purveyor must keep the Construction Completion Report on file and make it available for review upon request by DOH in accordance with WAC 246-290-125 (2)(b).** Furthermore:

(1) The report form **must** bear the seal, date and signature of a professional engineer (PE) licensed in the state of Washington; and

(2) Per WAC 246-290-120(5)(c), the amount of change in the physical capacity of a system must be documented, if the project results in a change in physical capacity.

Name of Water System

DOH System ID No.: _____

Name of Purveyor (Owner or System Contact)

Date Water System Plan that includes Standard Construction Specifications

Mailing Address

Date Standard Specifications Approved by DOH: _____

City State Zip

PROJECT NAME AND DESCRIPTIVE TITLE:

(Include the name of any development project and number of services.)

Date Project or Portions Thereof Completed

PROFESSIONAL ENGINEER'S ACKNOWLEDGMENT

The undersigned professional engineer (PE), or his/her authorized agent, has inspected the above-described project that, as to layout, size and type of pipe, valves and materials, and other designed physical facilities, has been constructed and is substantially completed in accordance with construction documents reviewed by the purveyor's engineer. In the opinion of the undersigned engineer, the installation, physical testing procedures, water quality tests, and disinfection practices were carried out in accordance with state regulations and principles of standard engineering practice.

I have reviewed the disinfection procedures, pressure test results, and results of the bacteriological test(s) for this project and certify that they comply with the requirements of the construction standards/specifications approved by DOH.

P.E.'s Seal

Date Signed

Name of Engineering Firm

Name of PE Acknowledging Construction

Mailing Address

City State Zip

Engineer's Signature

State/Federal Funding Type (if any) _____

Please keep a completed, signed, and stamped copy on file.

☐ Northwest Drinking Water
Department of Health
PO Box 47800
Olympia WA 98504
Phone: 253-395-6750
Fax: 253-395-6760

☐ Southwest Drinking Water
Department of Health
PO Box 47823
Olympia, WA 98504-7823
Phone: 360-236-3030
Fax: 360-664-8058

☐ Eastern Drinking Water
Department of Health
16201 E Indiana Ave, Suite 1500
Spokane Valley, WA 99216
Phone: 509-329-2100
Fax: 509-329-2104

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

APPENDIX G

Appendix G

This Appendix includes the District's Cross Connection Control Program

WHATCOM COUNTY WATER DIST. #2

CROSS CONNECTION ORDINANCE

The purpose of this ordinance, in conjunction with the Uniform Plumbing Code Chapter 10, State of Washington cross connection regulations and the current edition of the Cross Connection Control Manual - Accepted Procedure and Practice, published by the Pacific Northwest Section, American Water Works Association, is to protect the health of the water consumer and the potability of the water in the distribution system. Inspection and regulation of all actual or potential cross connections between potable and non-potable systems is required in order to minimize the danger of contamination or pollution of the public potable water supply. Controlling and preventing cross connections is accomplished by either removing the cross connection or installing an approved backflow prevention assembly to protect the public potable water supply.

Whatcom County Water District #2 is required to eliminate or control all cross connections throughout it's service area. Therefore, anyone wanting or using water from Whatcom County Water Dist. #2 is required to comply with these regulations. The owner of the property in which a cross connection occurs is fully responsible for all damages incurred.

The Board of Commissioners will enforce the provisions of this ordinance. The President of the Board may delegate responsibilities to a Certified Cross Connection Control Specialist/Inspector. The provisions of this ordinance may supersede State regulations but in no case shall they be less stringent. All approved standards shall be approved by Whatcom County Water Dist. #2 and the the Board of Commissioners. All backflow prevention assemblies required by this ordinance shall be a model approved by the Whatcom County Health Department.

Approved backflow prevention assemblies required by this ordinance shall be installed under the direction of the Board of Commissioners and/or under the supervision of the Cross Connection Specialist/Inspector per Whatcom County Water Dist. #2. standards.

All RPBAs, RPDAs, DCVAs, DCDAs, and PVBAs are required to be tested at least annually and all Air Gaps installed in lieu of an approved backflow prevention assembly shall be inspected at least annually. Completed Test Reports shall be returned to Whatcom County Water Dist. #2 within 30 days after receipt of the yearly test notification. Tests and inspections may be required on a more frequent basis at the discretion of Board of Commissioners.

Authorized employees of Whatcom County Water Dist. #2 with proper identification shall have free access at reasonable hours of the day to all parts of a premise or within buildings to which water is supplied. Water service shall be refused or terminated to any premise for failure to allow necessary inspections.

Failure of the customer to cooperate in the installation, maintenance, repair, inspection or testing of backflow prevention assemblies required by this ordinance shall be grounds for termination of water service to the premise or the requirement for an Air Gap separation.

Whatcom County Water District No. 2

BELLINGHAM, WASHINGTON 98225

CROSS CONNECTION SURVEY

DATE: _____ CONSULTANT: _____

OWNER: _____ TELEPHONE: _____

ADDRESS: _____

OCCUPANT: _____ TELEPHONE: _____

ADDRESS: _____

HEIGHT OF BUILDING: _____ TYPE OF ESTABLISHMENT: _____

RESOLUTION #01-96
THE COMMISSIONERS OF WHATCOM COUNTY WATER DISTRICT #2 ORDAIN AS FOLLOWS:

Pursuant to WAC 246.290.490 of the Washington Administrative Code, and the Cross Connection Control Manual, Accepted Procedure and Practice, Revised May 1990, Published by the Pacific Northwest Section, American Water Works Association, it is the responsibility of Whatcom County Water District #2 to protect its drinking water by instituting and enforcing a cross connection control program.

The purpose of these regulations is to protect the water consumers and the potability of the water supply of Whatcom County Water District #2 from contamination or pollution due to any existing or potential cross connections.

No cross connections shall be created, installed, used or maintained within the service boundaries served by Whatcom County Water District #2 except in accordance with these regulations.

Approved backflow prevention assemblies shall be installed at the expense of the user, either at the service connection or within the premises, as determined by a certified cross connection control specialist employed by Whatcom County Water District #2 in each of the following circumstances.

(1) If the nature and extent of any activity on the premises, or the materials used in connection with any activity on the premises, or materials stored on the premises, could contaminate or pollute the drinking water supply in any way.

(2) On premises having any one or more cross connections as that term is defined in definitions on page 3.

(3) Internal cross connections that are not correctable, or intricate plumbing arrangements which make it impractical to ascertain whether or not cross connections exist.

(4) A repeated history of cross connections being established or re-established.

(5) Unduly restricted entry so that inspections for cross connections cannot be made with sufficient frequency or with sufficient notice to assure that cross connections do not exist.

(6) Materials of a toxic or hazardous nature being used such that, if back siphoning should occur, a health hazard could result.

(7) Any mobile apparatus which uses water from the system or water from any premises within the system service boundaries.

(8) Any irrigation system.

(9) Any fire service and or fire sprinkler.

(10) All Unified Plumbing Codes must be maintained.

(11) All construction, new, remodel, commercial, business, industrial, and private homes shall submit their plans to Whatcom County Water District #2 for review and determination of the necessity of an assembly.

(12) On any premise where installation of an approved backflow prevention device is deemed to be necessary to accomplish the purpose of these regulations in the judgment of certified cross connection control specialist employed by Whatcom County Water District #2.

(13) On any premise where an appropriate cross connection report form has not been filed with the office of Whatcom County Water District #2.

A. The Board of Commissioners will enforce the provisions of this ordinance. The President of the Board may delegate responsibilities to a Certified Cross Connection Control Specialist/Inspector. The provisions of this ordinance may supersede State regulations but in no case shall they be less stringent. All approved standards shall be approved by Whatcom County Water District #2 and the Board of Commissioners. All backflow prevention assemblies required by this ordinance shall be a model approved by the Whatcom County Health Department.

Any variances from installation requirements shall be requested in writing by the owner and approved by Whatcom County Water District #2 prior to device installation.

ACCESS TO PREMISES

Authorized employees of Whatcom County Water District #2 with proper identification, shall have access during reasonable hours to all parts of a premise and within the building to which water is supplied. However, if any water user refuses access to a premise or to the interior of a structure at reasonable times and on reasonable notice for inspection by a cross connection specialist appointed by Whatcom County Water District #2 a reduced pressure principle assembly will be required to be installed at the service connection to that premise.

ANNUAL TESTING AND REPAIRS

All backflow assemblies installed within the service boundaries served by Whatcom County Water District #2 shall be tested immediately upon installation and at least annually thereafter by a state certified tester. All such devices found not functioning properly shall be promptly repaired or replaced by the water user. If any such device is not promptly repaired or replaced, Whatcom County Water District #2 may deny or discontinue water to the premise. All testing and repairs are the financial responsibility of the water user.

COSTS OF COMPLIANCE

All costs associated with purchase, installation, inspections, testing, replacement, maintenance, parts, and repairs of the backflow device are the financial responsibility of the water user.

A. Failure on the part of any customer to discontinue the use of all cross connections except, in accordance with this ordinance is sufficient cause for the immediate discontinuance of public water service to the premises. (WAC 246.290.490)

Definitions

A. "Cross Connection" means any physical arrangement where a public water system is connected, directly or indirectly, with any other water system or auxiliary system, sewer, drain conduit, swimming pool, storage reservoir, plumbing fixture, swamp coolers, or any other device which contains, or may contain, contaminated water, sewage, or other liquid of unknown or unsafe quality which may be capable of imparting contamination to the public water system as a result of backflow. Bypass arrangements, jumper connection, removable sections, swivel or change over devices, or other temporary or permanent devices through which, or because of which, backflow may occur are considered to be cross connections.

B. "Backflow" means the flow in the direction opposite to the normal flow or the introduction of any foreign liquids, gases, or substances into the water distribution system of Whatcom County Water District #2.

Resolved by the Board of Commissioners this 26 day of March 1996.

Greg Christensen

Robert S. Krebs

Joseph P. Roberts

APPENDIX H

Appendix H

This Appendix includes the Hydraulic Calculations and Computer Model

HYDRAULIC ANALYSIS

Methodology and Description of Program

The primary analysis method used for this plan was the instantaneous simulation, which provides analysis of an instantaneous case or event. Specific system demands, such as average or peak water consumption, fire flows within the system, or a combination of demands, are examples of possible events. In this mode of analysis, distribution mains can be reviewed for their adequacy and a general understanding of the system's performance can be established.

The existing water pipe network was modeled as a series of nodes and elements, which together comprise a "nodal schematic" of the water system. Nodes are used to model particular points of interest. Nodes may be used to indicate where two or more pipes intersect, a change in pipe diameter, or the location of a fire hydrant. Elements are simply the pipes between the nodes. Water consumption is represented as a "demand" in gallons per minute being removed from a node.

Input Parameters

Demand Data

The nodes were weighted based on the number of parcels adjacent to the node. Demands were then proportionately applied to the system to match the calculated existing & future peak hourly and maximum daily demands.

Elevation Data

The pressure at any location in the system is a function of the elevation difference between the hydraulic grade line and the elevation of the point of interest. The HGL elevation at the City of Bellingham connection is 276 feet, which remains constant. Elevations, for modeling purposes, are based on the Whatcom County lidar maps.

Coefficients

In order to model the system, the characteristics of each element or pipe were determined from existing records. These characteristics include the diameter of the pipe, the pipe material (asbestos cement, ductile iron, PVC, etc.), age of the pipe, and its length.

Demand Scenarios

1. Peak Hourly Demand (PHD)
   The model was run at PHD with both interties open at Bellingham's normal hydraulic grade line, which is very consistent. Minimum pressure calculated within the District's Service Area was 48.71 psi on Alderwood Avenue, which allows for a cushion in the event that pressure drops in the Bellingham system.

2. Fire Flow at MDD (Maximum Day Demand) The Hydraulic model calculates fire flow at each node in the model. Input is the flow required at that particular node, under maximum day demand. The output for each node is the flow available without system wide pressure dropping below 20 psi. The model was run under current system configuration and again after capital improvements have been made in the next 10 years.

2020 PHD

FlexTable: Junction Table

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure Head (ft)	Pressure (psi)	Notes
J1	157.00	LII	0.00	271.70	114.70	49.62	
J2	155.00	LII	0.00	271.69	116.69	50.49	
J3	159.00	LII	4.69	271.58	112.58	48.71	
J4	157.00	AO	0.00	271.30	114.30	49.45	
J5	127.00	AO	0.78	271.07	144.07	62.33	
J6	143.00	LII	3.91	271.74	128.74	55.70	
J7	125.00	UR(3)	0.00	271.77	146.77	63.50	
J8	116.00	URMX	0.00	271.86	155.86	67.44	
J9	120.00	BHM	0.00	271.87	151.87	65.71	
J10	125.00	BHM	6.25	271.89	146.89	63.55	
J11	120.00	BHM	8.61	271.80	151.80	65.68	
J12	116.00	UR(3)	3.91	271.89	155.89	67.45	
J13	123.00	URMX	0.00	271.96	148.96	64.45	
J14	122.00	URMX	6.25	272.01	150.01	64.90	
J15	122.00	URMX	3.91	272.01	150.01	64.90	
J16	111.00	UR(3)	13.29	272.38	161.38	69.82	
J17	107.00	LII	2.34	272.37	165.37	71.55	
J18	107.00	UR(3)	0.00	272.37	165.37	71.55	
J19	97.00	LII	0.00	272.37	175.37	75.88	
J20	85.00	UR(3)	1.56	272.37	187.37	81.07	
J21	132.00	AO	0.78	271.13	139.13	60.20	
J22	133.00	AO	2.34	271.31	138.31	59.84	
J23	125.00	LII	3.13	271.48	146.48	63.37	
J24	123.00	UR(3)	7.03	271.69	148.69	64.33	
J25	100.00	LII	0.00	272.95	172.95	74.83	
J26	89.00	LII	0.78	273.35	184.35	79.76	
J27	87.00	LII	0.00	273.53	186.53	80.70	
J28	83.00	LII	4.69	274.19	191.19	82.72	
J29	81.00	BHM	0.00	275.09	194.09	83.97	
J30	79.00	BHM	0.00	275.69	196.69	85.10	
J31	84.00	LII	0.78	273.35	189.35	81.92	
J32	93.00	LII	0.00	273.35	180.35	78.03	
J33	86.00	UR(3)	3.91	270.79	184.79	79.95	
J34	85.00	UR(3)	1.56	270.58	185.58	80.29	
J35	84.00	UR(3)	3.91	270.49	186.49	80.68	
J36	90.00	UR(3)	3.13	270.49	180.49	78.09	
J37	87.00	UR(3)	0.00	270.45	183.45	79.37	
J38	85.00	UR(3)	4.69	270.41	185.41	80.22	
J39	85.00	UR(3)	4.69	270.40	185.40	80.21	
J40	83.00	UR(3)	7.81	270.38	187.38	81.07	
J41	136.00	UR(3)	6.25	270.45	134.45	58.17	
J42	125.00	AO	0.00	270.83	145.83	63.10	
J43	140.00	AO	1.56	270.65	130.65	56.52	
J44	145.00	LII	1.56	270.64	125.64	54.36	
J45	114.00	UR(3)	66.25	270.20	156.20	67.58	
J45a	109.00	RR	0.00	270.17	161.17	69.73	
J45b	78.00	RR	0.00	270.17	192.17	83.14	
J46	109.00	RR	2.34	270.11	161.11	69.70	
J47	101.00	RR	7.81	270.04	169.04	73.14	

FlexTable: Junction Table

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure Head (ft)	Pressure (psi)	Notes
J48	93.00	RR	10.17	270.03	177.03	76.59	
J49	86.00	RR	5.47	269.94	183.94	79.58	
J50	78.00	RR	8.61	269.87	191.87	83.01	
J51	75.00	RR	5.47	269.78	194.78	84.27	
J52	72.00	RR	4.69	269.71	197.71	85.54	
J53	60.00	RR	3.91	269.56	209.56	90.67	
J54	46.00	RR	3.13	269.46	223.46	96.68	
J55	33.00	RR	3.13	269.41	236.41	102.29	
J56	11.00	RR	4.69	269.32	258.32	111.76	
J57	9.00	RR	7.81	269.30	260.30	112.62	
J58	9.00	RR	6.25	269.30	260.30	112.62	
J59	8.00	RR	6.25	269.19	261.19	113.01	
J60	7.00	RR	3.91	269.12	262.12	113.41	
J61	7.00	RR	0.00	269.12	262.12	113.41	
J62a	89.00	RR	3.13	269.96	180.96	78.29	
J62b	93.00	RR	0.00	269.98	176.98	76.57	
J63	70.00	RR	13.29	269.94	199.94	86.51	
J64	92.00	RR	3.13	270.04	178.04	77.03	
J65	94.00	RR	2.34	270.07	176.07	76.18	
J66	105.00	RR	1.56	270.32	165.32	71.52	
J67	104.00	RR	0.00	270.67	166.67	72.11	
J68	104.00	RR	0.00	270.85	166.85	72.19	
J69	104.00	RR	0.00	270.88	166.88	72.20	
J70	104.00	RR	0.00	271.48	167.48	72.46	
J71	103.00	RR	2.34	272.35	169.35	73.27	
J72	100.00	LII	0.00	273.12	173.12	74.90	
J73	100.00	LII	0.78	273.12	173.12	74.90	
J74	100.00	LII	0.00	273.86	173.86	75.22	
J75	100.00	LII	0.00	274.39	174.39	75.45	
J76	104.00	RR	3.13	271.47	167.47	72.45	
J77	110.00	RR	3.91	271.44	161.44	69.85	
J78	115.00	RR	1.56	271.41	156.41	67.67	
J79	120.00	RR	4.69	271.39	151.39	65.50	
J80	128.00	RR	0.78	271.38	143.38	62.03	
J81	131.00	RR	1.56	271.37	140.37	60.73	
J82	82.00	RR	8.61	269.92	187.92	81.30	
J83	93.00	RR	0.00	270.35	177.35	76.73	
J84	80.00	RR	2.34	269.91	189.91	82.17	
J85	58.00	RR	2.34	269.58	211.58	91.54	
J86	40.00	RR	1.56	269.50	229.50	99.29	
J87	77.00	RR	5.47	269.70	192.70	83.37	
J88	78.00	RR	8.61	269.70	191.70	82.94	
J89	80.00	RR	1.56	269.91	189.91	82.17	
J90	70.00	RR	5.47	269.91	199.91	86.49	
J91	60.00	RR	3.91	269.91	209.91	90.82	
J92	65.00	RR	2.34	269.54	204.54	88.50	
J93	45.00	RR	2.34	269.51	224.51	97.14	
J94	40.00	RR	4.69	269.49	229.49	99.29	
J95	27.00	RR	5.47	269.40	242.40	104.88	

FlexTable: Junction Table

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure Head (ft)	Pressure (psi)	Notes
J96	8.00	RR	4.69	269.34	261.34	113.07	
J97a	89.00	RR	7.81	269.98	180.98	78.30	
J97b	101.00	RR	0.00	270.00	169.00	73.12	
J98	69.00	RR	7.81	269.95	200.95	86.94	
J99	87.00	RR	5.47	269.85	182.85	79.11	
J100	70.00	RR	1.56	269.87	199.87	86.48	
J101	69.00	RR	0.00	269.87	200.87	86.91	
J102	63.00	RR	4.69	269.87	206.87	89.50	
J103	75.00	RR	0.78	269.89	194.89	84.32	
J104	78.00	RR	2.34	269.89	191.89	83.02	
J105	78.00	RR	2.34	269.90	191.90	83.03	
J106	66.00	RR	3.13	269.92	203.92	88.22	
J107	60.00	RR	4.69	269.87	209.87	90.80	
J108	60.00	RR	6.25	269.89	209.89	90.81	
J109	70.00	RR	2.34	269.89	199.89	86.48	
J110	122.00	RR	0.00	270.59	148.59	64.29	
J111	121.00	RR	2.34	270.82	149.82	64.82	
J112	145.00	RR	0.00	271.37	126.37	54.67	
J113	160.00	RR	1.56	271.37	111.37	48.18	
J114	122.00	RR	2.34	270.58	148.58	64.28	
J115	35.00	RR	3.13	269.42	234.42	101.42	
J116	37.00	RR	4.69	269.44	232.44	100.56	
J117	39.00	RR	0.78	269.49	230.49	99.72	
J118	39.00	RR	2.34	269.35	230.35	99.66	
J119	38.00	RR	7.03	269.16	231.16	100.01	
J120	30.00	RR	0.00	269.05	239.05	103.42	
J121	26.00	RR	4.69	269.04	243.04	105.15	
J122	12.00	RR	0.00	269.08	257.08	111.23	
J123	25.00	RR	3.91	269.05	244.05	105.59	
J124	27.00	RR	3.91	269.02	242.02	104.71	
J125	30.00	RR	4.69	269.01	239.01	103.41	
J126	33.00	RR	3.91	269.01	236.01	102.11	
J127	29.00	RR	3.13	268.99	239.99	103.83	
J128	31.00	RR	2.34	268.99	237.99	102.97	
J129	33.00	RR	7.03	269.04	236.04	102.12	
J130	35.00	RR	4.69	269.02	234.02	101.25	
J131	35.00	RR	3.13	269.00	234.00	101.24	
J132	29.00	RR	3.91	268.98	239.98	103.83	
J133	60.00	RR	6.25	268.98	208.98	90.42	
J134	30.00	RR	0.78	268.98	238.98	103.40	
J135	120.00	UR(3)	0.00	271.81	151.81	65.68	
J200	203.00	Bellingham	0.00	275.90	72.90	31.54	City of Bellingham
J201	78.00	Bellingham	0.00	275.70	197.70	85.53	

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FlexTable: Pipe Table

Label	Length (User Defined) (ft)	Diameter (in)	Material	Hazen-Williams C	Has Check Valve?	Status (Initial)	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/1000ft)	Start Node	Stop Node
P1	55	8.0	Ductile Iron	130.0	False	Open	53.89	0.34	0.00	0.082	J1	J2
P2	410	6.0	Asbestos Cement	140.0	False	Open	53.89	0.61	0.12	0.289	J2	J3
P3	1,112	6.0	Asbestos Cement	140.0	False	Open	49.20	0.56	0.27	0.244	J3	J4
P4	821	6.0	Cast iron	130.0	False	Open	49.20	0.56	0.23	0.280	J4	J5
P5	500	8.0	Ductile Iron	130.0	False	Open	-53.89	0.34	0.04	0.082	J1	J6
P6	300	8.0	Ductile Iron	130.0	False	Open	-57.81	0.37	0.03	0.093	J6	J7
P7	500	8.0	Ductile Iron	130.0	False	Open	-57.81	0.37	0.05	0.093	J7	J135
P8	543	8.0	Ductile Iron	130.0	False	Open	-57.81	0.37	0.05	0.093	J135	J8
P9	194	4.0	Asbestos Cement	140.0	False	Open	-5.78	0.15	0.01	0.034	J8	J9
P10	546	4.0	Asbestos Cement	140.0	False	Open	-5.78	0.15	0.02	0.033	J9	J10
P11	1,243	4.0	Asbestos Cement	140.0	False	Open	8.61	0.22	0.09	0.070	J10	J11
P12	317	8.0	Ductile Iron	130.0	False	Open	-52.02	0.33	0.02	0.077	J8	J12
P13	187	4.0	Asbestos Cement	140.0	False	Open	-20.65	0.53	0.07	0.353	J10	J13
P14	154	4.0	Asbestos Cement	140.0	False	Open	-20.65	0.53	0.05	0.353	J13	J14
P15	218	8.0	Ductile Iron	130.0	False	Open	3.91	0.02	0.00	0.001	J14	J15
P16	500	4.0	Asbestos Cement	140.0	False	Open	-30.82	0.79	0.37	0.741	J14	J16
P17	333	4.0	Asbestos Cement	140.0	False	Open	3.90	0.10	0.01	0.016	J16	J17
P18	160	4.0	Asbestos Cement	140.0	False	Open	0.00	0.00	0.00	0.000	J17	J18
P19	245	4.0	Asbestos Cement	140.0	False	Open	1.56	0.04	0.00	0.003	J17	J19
P20	469	8.0	Asbestos Cement	140.0	False	Open	1.56	0.01	0.00	0.000	J19	J20
P21	297	8.0	Asbestos Cement	140.0	False	Open	92.22	0.59	0.06	0.193	J21	J5
P22	573	8.0	Asbestos Cement	140.0	False	Open	-119.01	0.76	0.18	0.309	J21	J22
P23	529	8.0	Asbestos Cement	140.0	False	Open	-121.35	0.77	0.17	0.320	J22	J23
P24	627	8.0	Asbestos Cement	140.0	False	Open	-124.48	0.79	0.21	0.336	J23	J24
P25	540	8.0	Asbestos Cement	140.0	False	Open	-131.51	0.84	0.20	0.372	J24	J12
P26	685	8.0	Asbestos Cement	140.0	False	Open	-187.45	1.20	0.49	0.717	J12	J16
P27	524	8.0	Asbestos Cement	140.0	False	Open	-235.46	1.50	0.57	1.093	J16	J25
P28	359	8.0	Asbestos Cement	140.0	False	Open	-235.46	1.50	0.39	1.094	J25	J26
P29	165	8.0	Asbestos Cement	140.0	False	Open	-237.02	1.51	0.18	1.107	J26	J27
P30	595	8.0	Asbestos Cement	140.0	False	Open	-237.02	1.51	0.66	1.107	J27	J28
P31	786	8.0	Asbestos Cement	140.0	False	Open	-241.71	1.54	0.90	1.148	J28	J29
P32	457	8.0	Ductile Iron	130.0	False	Open	-241.71	1.54	0.60	1.317	J29	J30
P33	471	8.0	Ductile Iron	130.0	False	Open	0.78	0.00	0.00	0.000	J26	J31

FlexTable: Pipe Table

Label	Length (User Defined) (ft)	Diameter (in)	Material	Hazen-Williams C	Has Check Valve?	Status (Initial)	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/1000ft)	Start Node	Stop Node
P34	426	8.0	Ductile Iron	130.0	False	Open	0.00	0.00	0.00	0.000	J31	J32
P35	636	4.0	Asbestos Cement	140.0	False	Open	26.00	0.66	0.34	0.541	J21	J33
P36	523	4.0	Asbestos Cement	140.0	False	Open	22.09	0.56	0.21	0.400	J33	J34
P37	257	4.0	Asbestos Cement	140.0	False	Open	20.53	0.52	0.09	0.349	J34	J35
P38	160	4.0	Asbestos Cement	140.0	False	Open	3.13	0.08	0.00	0.011	J35	J36
P39	235	4.0	Asbestos Cement	140.0	False	Open	13.48	0.34	0.04	0.160	J35	J37
P40	175	4.0	Asbestos Cement	140.0	False	Open	17.20	0.44	0.04	0.252	J37	J38
P41	320	4.0	Asbestos Cement	140.0	False	Open	4.69	0.12	0.01	0.023	J38	J39
P42	428	4.0	Asbestos Cement	140.0	False	Open	7.81	0.20	0.02	0.058	J38	J40
P43	996	8.0	Asbestos Cement	140.0	False	Open	-3.72	0.02	0.00	0.001	J37	J41
P44	567	8.0	Asbestos Cement	140.0	False	Open	140.64	0.90	0.24	0.421	J5	J42
P45	450	8.0	Asbestos Cement	140.0	False	Open	140.64	0.90	0.19	0.421	J42	J43
P46	1,156	4.0	Asbestos Cement	140.0	False	Open	1.56	0.04	0.00	0.003	J43	J44
P47	481	8.0	Asbestos Cement	140.0	False	Open	137.52	0.88	0.19	0.404	J43	J41
P48	713	8.0	Asbestos Cement	140.0	False	Open	127.54	0.81	0.25	0.351	J41	J45
P50	385	8.0	Asbestos Cement	140.0	False	Open	85.45	0.55	0.06	0.167	J46	J47
P51	597	8.0	Asbestos Cement	140.0	False	Open	33.88	0.22	0.02	0.030	J47	J48
P52	541	6.0	Asbestos Cement	140.0	False	Open	38.41	0.44	0.08	0.155	J48	J49
P53	643	6.0	Asbestos Cement	140.0	False	Open	32.94	0.37	0.07	0.116	J49	J50
P54	607	6.0	Asbestos Cement	140.0	False	Open	38.14	0.43	0.09	0.153	J50	J51
P55	561	6.0	Asbestos Cement	140.0	False	Open	32.67	0.37	0.06	0.114	J51	J52
P56	595	4.0	Asbestos Cement	140.0	False	Open	17.33	0.44	0.15	0.255	J52	J53
P57	602	4.0	Asbestos Cement	140.0	False	Open	13.41	0.34	0.10	0.159	J53	J54
P58	512	4.0	Asbestos Cement	140.0	False	Open	10.28	0.26	0.05	0.097	J54	J55
P59	978	4.0	Asbestos Cement	140.0	False	Open	10.08	0.26	0.09	0.094	J55	J56
P60	824	4.0	Asbestos Cement	140.0	False	Open	5.39	0.14	0.02	0.029	J56	J57
P61	419	4.0	Asbestos Cement	140.0	False	Open	-2.43	0.06	0.00	0.007	J57	J58
P62	404	4.0	Asbestos Cement	140.0	False	Open	17.77	0.45	0.11	0.267	J58	J59
P63	582	4.0	Asbestos Cement	140.0	False	Open	11.51	0.29	0.07	0.120	J59	J60
P64	169	4.0	Asbestos Cement	140.0	False	Open	0.00	0.00	0.00	0.000	J60	J61
P66	714	8.0	PVC	150.0	False	Open	32.60	0.21	0.02	0.025	J62a	J63
P67	220	8.0	Asbestos Cement	140.0	False	Open	50.43	0.32	0.01	0.063	J64	J48
P68	105	6.0	Ductile Iron	130.0	False	Open	53.56	0.61	0.03	0.328	J65	J64

FlexTable: Pipe Table

Label	Length (User Defined) (ft)	Diameter (in)	Material	Hazen-Williams C	Has Check Valve?	Status (Initial)	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/1000ft)	Start Node	Stop Node
P69	779	6.0	Asbestos Cement	140.0	False	Open	55.90	0.63	0.24	0.310	J66	J65
P70	1,087	6.0	Asbestos Cement	140.0	False	Open	57.46	0.65	0.35	0.326	J67	J66
P71	565	6.0	Asbestos Cement	140.0	False	Open	57.46	0.65	0.18	0.326	J68	J67
P72	302	8.0	Ductile Iron	130.0	False	Open	57.46	0.37	0.03	0.092	J69	J68
P73	186	6.0	Asbestos Cement	140.0	False	Open	-198.43	2.25	0.60	3.234	J69	J70
P74	723	8.0	Asbestos Cement	140.0	False	Open	-246.81	1.58	0.86	1.193	J70	J71
P75	635	8.0	Asbestos Cement	140.0	False	Open	-249.15	1.59	0.77	1.214	J71	J72
P76	200	8.0	Ductile Iron	130.0	False	Open	0.78	0.00	0.00	0.000	J72	J73
P77	612	8.0	Asbestos Cement	140.0	False	Open	-249.93	1.60	0.75	1.221	J72	J74
P78	433	8.0	Asbestos Cement	140.0	False	Open	-249.93	1.60	0.53	1.221	J74	J75
P79	265	8.0	Ductile Iron	130.0	False	Open	48.38	0.31	0.02	0.067	J70	J76
P80	488	8.0	Ductile Iron	130.0	False	Open	45.25	0.29	0.03	0.059	J76	J77
P81	515	8.0	Ductile Iron	130.0	False	Open	41.34	0.26	0.03	0.050	J77	J78
P82	417	8.0	Asbestos Cement	140.0	False	Open	39.78	0.25	0.02	0.041	J78	J79
P83	522	8.0	Asbestos Cement	140.0	False	Open	35.08	0.22	0.02	0.032	J79	J80
P84	292	8.0	Asbestos Cement	140.0	False	Open	34.30	0.22	0.01	0.031	J80	J81
P85	967	6.0	Asbestos Cement	140.0	False	Open	105.19	1.19	0.97	0.998	J69	J82
P86	548	4.0	Asbestos Cement	140.0	False	Open	35.77	0.91	0.54	0.976	J69	J83
P87	441	4.0	Asbestos Cement	140.0	False	Open	35.77	0.91	0.43	0.976	J83	J82
P88	520	8.0	Ductile Iron	130.0	False	Open	13.29	0.08	0.00	0.006	J82	J84
P89	779	6.0	Asbestos Cement	140.0	False	Open	66.89	0.76	0.34	0.432	J82	J85
P90	715	8.0	Ductile Iron	130.0	False	Open	64.55	0.41	0.08	0.114	J85	J86
P91	891	6.0	Asbestos Cement	140.0	False	Open	10.65	0.12	0.01	0.014	J52	J87
P92	650	6.0	Asbestos Cement	140.0	False	Open	5.17	0.06	0.00	0.004	J87	J88
P93	809	6.0	Asbestos Cement	140.0	False	Open	52.18	0.59	0.22	0.273	J82	J88
P94	500	8.0	Ductile Iron	130.0	False	Open	10.95	0.07	0.00	0.004	J84	J89
P95	614	8.0	Ductile Iron	130.0	False	Open	9.39	0.06	0.00	0.003	J89	J90
P96	600	8.0	Asbestos Cement	140.0	False	Open	3.91	0.02	0.00	0.001	J90	J91
P97	645	6.0	Asbestos Cement	140.0	False	Open	48.74	0.55	0.15	0.240	J88	J92
P98	512	8.0	Asbestos Cement	140.0	False	Open	46.40	0.30	0.03	0.054	J92	J93
P99	449	8.0	Asbestos Cement	140.0	False	Open	44.06	0.28	0.02	0.049	J93	J94
P100	629	6.0	Asbestos Cement	140.0	False	Open	36.62	0.42	0.09	0.141	J94	J95
P101	568	6.0	Asbestos Cement	140.0	False	Open	31.14	0.35	0.06	0.105	J95	J96

FlexTable: Pipe Table

Label	Length (User Defined) (ft)	Diameter (in)	Material	Hazen-Williams C	Has Check Valve?	Status (Initial)	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/1000ft)	Start Node	Stop Node
P102	534	6.0	Asbestos Cement	140.0	False	Open	26.45	0.30	0.04	0.077	J96	J58
P104	732	8.0	PVC	150.0	False	Open	35.93	0.23	0.02	0.030	J97a	J98
P105	650	4.0	Asbestos Cement	140.0	False	Open	5.47	0.14	0.02	0.030	J50	J99
P106	509	8.0	Ductile Iron	130.0	False	Open	-19.28	0.12	0.01	0.012	J50	J100
P107	358	8.0	Asbestos Cement	140.0	False	Open	9.39	0.06	0.00	0.003	J100	J101
P108	392	8.0	Asbestos Cement	140.0	False	Open	9.39	0.06	0.00	0.003	J101	J102
P109	543	8.0	Ductile Iron	130.0	False	Open	-30.23	0.19	0.02	0.028	J100	J103
P110	178	8.0	Ductile Iron	130.0	False	Open	-30.35	0.19	0.01	0.028	J103	J104
P111	175	8.0	Ductile Iron	130.0	False	Open	-32.70	0.21	0.01	0.032	J104	J105
P112	538	8.0	PVC	150.0	False	Open	-35.04	0.22	0.02	0.028	J105	J106
P113	313	4.0	Asbestos Cement	140.0	False	Open	-4.69	0.12	0.01	0.023	J107	J102
P114	277	4.0	Asbestos Cement	140.0	False	Open	-9.25	0.24	0.02	0.080	J108	J106
P115	356	4.0	Asbestos Cement	140.0	False	Open	3.00	0.08	0.00	0.010	J108	J109
P116	445	4.0	Asbestos Cement	140.0	False	Open	0.66	0.02	0.00	0.001	J109	J103
P118	560	8.0	PVC	150.0	False	Open	-47.42	0.30	0.03	0.050	J106	J63
P119	597	8.0	PVC	150.0	False	Open	-28.12	0.18	0.01	0.019	J63	J98
P120	358	4.0	Asbestos Cement	140.0	False	Open	-28.84	0.74	0.23	0.655	J110	J111
P121	720	4.0	Asbestos Cement	140.0	False	Open	-31.18	0.80	0.54	0.757	J111	J81
P122	500	8.0	Ductile Iron	130.0	False	Open	1.56	0.01	0.00	0.000	J81	J112
P123	400	8.0	Asbestos Cement	140.0	False	Open	1.56	0.01	0.00	0.000	J112	J113
P124	845	4.0	Asbestos Cement	140.0	False	Open	-26.50	0.68	0.47	0.560	J46	J114
P125	310	8.0	Asbestos Cement	140.0	False	Open	-28.84	0.18	0.01	0.022	J114	J110
P126	558	4.0	Asbestos Cement	140.0	False	Open	-2.94	0.08	0.01	0.010	J55	J115
P127	463	4.0	Asbestos Cement	140.0	False	Open	-6.07	0.16	0.02	0.037	J115	J116
P128	518	4.0	Asbestos Cement	140.0	False	Open	-10.77	0.27	0.05	0.106	J116	J94
P129	425	6.0	Asbestos Cement	140.0	False	Open	-8.02	0.09	0.00	0.008	J94	J117
P130	346	6.0	Asbestos Cement	140.0	False	Open	-8.80	0.10	0.00	0.010	J117	J86
P131	500	6.0	Asbestos Cement	140.0	False	Open	54.19	0.61	0.15	0.292	J86	J118
P132	732	6.0	Asbestos Cement	140.0	False	Open	51.85	0.59	0.20	0.269	J118	J119
P133	520	6.0	Asbestos Cement	140.0	False	Open	44.82	0.51	0.11	0.206	J119	J120
P134	513	6.0	Asbestos Cement	140.0	False	Open	7.96	0.09	0.00	0.008	J120	J121
P135	742	4.0	Asbestos Cement	140.0	False	Open	7.60	0.19	0.04	0.055	J60	J122
P136	540	4.0	Asbestos Cement	140.0	False	Open	7.60	0.19	0.03	0.055	J122	J123

FlexTable: Pipe Table

Label	Length (User Defined) (ft)	Diameter (in)	Material	Hazen-Williams C	Has Check Valve?	Status (Initial)	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/1000ft)	Start Node	Stop Node
P137	628	4.0	Asbestos Cement	140.0	False	Open	3.69	0.09	0.01	0.015	J123	J121
P138	557	4.0	Asbestos Cement	140.0	False	Open	6.95	0.18	0.03	0.047	J121	J124
P139	691	4.0	Asbestos Cement	140.0	False	Open	3.03	0.08	0.01	0.010	J124	J125
P140	416	4.0	Asbestos Cement	140.0	False	Open	-1.66	0.04	0.00	0.003	J125	J126
P141	788	6.0	Asbestos Cement	140.0	False	Open	16.42	0.19	0.03	0.032	J126	J127
P142	476	6.0	Asbestos Cement	140.0	False	Open	2.34	0.03	0.00	0.001	J127	J128
P143	257	8.0	Ductile Iron	130.0	False	Open	36.86	0.24	0.01	0.040	J120	J129
P144	536	8.0	Ductile Iron	130.0	False	Open	29.83	0.19	0.01	0.027	J129	J130
P145	552	8.0	Ductile Iron	130.0	False	Open	25.13	0.16	0.01	0.020	J130	J126
P146	624	4.0	Ductile Iron	130.0	False	Open	3.13	0.08	0.01	0.012	J126	J131
P147	632	8.0	Ductile Iron	130.0	False	Open	10.95	0.07	0.00	0.004	J127	J132
P148	983	8.0	Ductile Iron	130.0	False	Open	6.25	0.04	0.00	0.002	J132	J133
P149	502	8.0	Ductile Iron	130.0	False	Open	0.78	0.00	0.00	0.000	J132	J134
P151	235	8.0	Ductile Iron	130.0	False	Open	-241.71	1.54	0.31	1.317	J30	R1
P65b	50	4.0	Asbestos Cement	140.0	False	Open	35.73	0.91	0.05	0.974	J48	J62b
P65a	682	8.0	PVC	150.0	False	Open	35.73	0.23	0.02	0.029	J62b	J62a
P103b	30	4.0	Asbestos Cement	140.0	False	Open	43.75	1.12	0.04	1.417	J47	J97b
P103a	713	8.0	PVC	150.0	False	Open	43.75	0.28	0.03	0.043	J97b	J97a
P203	4,592	10.0	Asbestos Cement	140.0	False	Open	-249.93	1.02	1.30	0.412	J75	J201
P202	4,592	12.0	Asbestos Cement	140.0	False	Open	-249.93	0.71	0.20	0.169	J201	J200
P204	4,592	16.0	Asbestos Cement	140.0	False	Open	(N/A)	(N/A)	(N/A)	(N/A)	J200	T1
P201	0	16.0	Ductile Iron	130.0	False	Open	-249.93	0.40	0.03	0.048	J200	PRV1
P200	0	16.0	Ductile Iron	130.0	False	Open	-249.94	0.40	0.02	0.048	PRV1	R2
P49a	1,014	8.0	Asbestos Cement	140.0	False	Open	61.29	0.39	0.03	0.090	J45	J45a
P49b	1,014	8.0	Asbestos Cement	140.0	False	Open	61.29	0.39	0.06	0.090	J45a	J46
P43a	0	8.0	Ductile Iron	130.0	False	Open	0.00	0.00	0.00	0.000	J45a	J45b

2020 MDD+FF (Required FF)

Fire Flow Node FlexTable: Fire Flow Results Table

Label	Zone	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Calculated Residual) (psi)	Pressure (Calculated System Lower Limit) (psi)	Junction w/ Minimum Pressure (System)	Velocity of Maximum Pipe (ft/s)	Pipe w/ Maximum Velocity	Fire Flow Status
J1	LII	0.01	1,218.14	0.01	1,218.14	20.00	20.94	J2	5.50	P151	Passed
J2	LII	0.01	1,220.89	0.01	1,220.89	20.56	20.00	J1	5.51	P151	Passed
J3	LII	0.01	1,121.45	1.94	1,123.38	20.00	26.54	J1	7.60	P2	Passed
J4	AO	1,000.00	1,139.22	1,000.00	1,139.22	20.00	26.73	J3	7.63	P4	Passed
J5	AO	1,000.00	1,526.04	1,000.33	1,526.36	30.33	20.00	J4	6.92	P73	Passed
J6	LII	1,000.00	1,276.88	1,001.61	1,278.49	25.47	20.00	J1	5.89	P8	Passed
J7	UR(3)	1,000.00	1,317.83	1,000.00	1,317.83	33.01	20.00	J1	6.28	P8	Passed
J8	URMX	750.00	1,518.27	750.00	1,518.27	37.10	20.01	J3	7.53	P12	Passed
J9	BHM	0.01	530.04	0.01	530.04	54.92	45.06	J3	10.00	P9	Passed
J10	BHM	0.01	752.93	2.58	755.50	30.09	32.25	J11	10.00	P10	Passed
J11	BHM	0.01	355.80	3.55	359.34	20.00	47.48	J3	9.17	P11	Passed
J12	UR(3)	750.00	1,587.78	751.61	1,589.39	37.70	20.01	J3	7.08	P151	Passed
J13	URMX	750.00	703.44	750.00	703.44	35.48	39.08	J10	10.00	P16	Velocity Failed
J14	URMX	750.00	639.79	752.57	642.36	42.26	42.26	J15	10.00	P16	Velocity Failed
J15	URMX	750.00	639.79	751.61	641.40	41.50	42.26	J14	10.00	P16	Velocity Failed
J16	UR(3)	750.00	1,706.58	755.47	1,712.04	38.92	20.01	J3	7.84	P151	Passed
J17	LII	1,000.00	390.06	1,000.97	391.03	57.92	47.28	J3	10.00	P17	Velocity Failed
J18	UR(3)	500.00	390.07	500.00	390.07	52.28	47.28	J3	10.00	P17	Velocity Failed
J19	LII	1,000.00	390.08	1,000.00	390.08	53.58	47.28	J3	10.00	P17	Velocity Failed
J20	UR(3)	500.00	390.07	500.64	390.71	58.21	47.28	J3	10.00	P17	Velocity Failed
J21	AO	1,000.00	1,544.36	1,000.33	1,544.69	27.40	20.00	J4	6.91	P73	Passed
J22	AO	1,000.00	1,572.46	1,000.97	1,573.42	25.59	20.00	J4	6.83	P73	Passed
J23	LII	1,000.00	1,594.44	1,001.28	1,595.72	28.65	20.00	J3	6.88	P151	Passed
J24	UR(3)	500.00	1,591.21	502.90	1,594.11	31.38	20.00	J3	6.98	P151	Passed
J25	LII	1,000.00	1,850.59	1,000.00	1,850.59	42.74	20.00	J3	8.76	P151	Passed
J26	LII	1,000.00	1,975.53	1,000.33	1,975.86	46.86	20.00	J3	9.56	P151	Passed
J27	LII	1,000.00	2,042.57	1,000.00	2,042.57	47.45	20.01	J3	9.99	P151	Passed
J28	LII	1,000.00	1,939.93	1,001.93	1,941.86	58.51	28.67	J3	10.00	P151	Passed
J29	BHM	0.01	1,777.24	0.01	1,777.24	71.81	39.45	J3	10.00	P151	Passed
J30	BHM	0.01	1,619.19	0.01	1,619.19	80.97	46.50	J3	10.00	P151	Passed
J31	LII	1,000.00	1,566.39	1,000.33	1,566.72	51.67	29.81	J3	10.00	P33	Passed

Fire Flow Node FlexTable: Fire Flow Results Table

Label	Zone	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Calculated Residual) (psi)	Pressure (Calculated System Lower Limit) (psi)	Junction w/ Minimum Pressure (System)	Velocity of Maximum Pipe (ft/s)	Pipe w/ Maximum Velocity	Fire Flow Status
J32	LII	1,000.00	1,566.39	1,000.00	1,566.39	40.05	29.81	J3	10.00	P33	Passed
J33	UR(3)	500.00	687.18	501.61	688.79	50.46	42.86	J3	10.00	P35	Passed
J34	UR(3)	500.00	645.50	500.64	646.15	55.42	43.66	J3	10.00	P39	Passed
J35	UR(3)	500.00	553.27	501.61	554.88	66.40	45.12	J3	10.00	P39	Passed
J36	UR(3)	0.01	390.39	1.29	391.68	65.29	47.16	J3	10.00	P38	Passed
J37	UR(3)	500.00	1,597.92	500.00	1,597.92	30.53	20.00	J44	8.91	P43	Passed
J38	UR(3)	500.00	384.61	501.93	386.54	70.96	47.32	J3	10.00	P40	Velocity Failed
J39	UR(3)	500.00	384.61	501.93	386.54	59.87	47.32	J3	10.00	P40	Velocity Failed
J40	UR(3)	500.00	384.61	503.21	387.82	56.90	47.32	J3	10.00	P40	Velocity Failed
J41	UR(3)	500.00	1,587.84	502.57	1,590.41	21.71	20.01	J44	7.74	P73	Passed
J42	AO	1,000.00	1,567.88	1,000.00	1,567.88	27.95	20.00	J4	7.28	P73	Passed
J43	AO	1,000.00	1,536.84	1,000.64	1,537.49	22.16	20.00	J44	7.33	P73	Passed
J44	LII	1,000.00	345.77	1,000.64	346.42	20.01	47.66	J3	8.84	P46	Residual Pressure Failed
J45	UR(3)	500.00	1,663.55	551.14	1,714.69	27.05	20.00	J44	8.42	P73	Passed
J45a	RR	500.00	1,700.64	500.00	1,700.64	27.47	20.00	J44	8.76	P73	Passed
J45b	RR	500.00	1,566.72	500.00	1,566.72	19.36	24.68	J44	10.00	P43a	Passed
J46	RR	500.00	1,782.80	500.97	1,783.77	23.88	20.00	J44	9.50	P73	Passed
J47	RR	500.00	1,808.17	503.21	1,811.38	25.13	20.19	J113	10.00	P73	Passed
J48	RR	500.00	1,749.36	504.18	1,753.54	30.10	21.19	J113	10.00	P73	Passed
J49	RR	500.00	1,585.89	502.25	1,588.14	29.91	25.24	J113	10.00	P52	Passed
J50	RR	500.00	1,635.40	503.54	1,638.94	34.88	23.45	J113	10.00	P103b	Passed
J51	RR	500.00	1,417.64	502.25	1,419.89	38.03	27.93	J113	10.00	P54	Passed
J52	RR	500.00	1,461.77	501.93	1,463.70	32.88	26.11	J113	10.00	P73	Passed
J53	RR	500.00	615.71	501.61	617.32	60.24	43.69	J113	10.00	P56	Passed
J54	RR	500.00	760.26	501.28	761.55	45.03	41.34	J113	10.00	P58	Passed
J55	RR	500.00	1,076.31	501.28	1,077.59	19.18	30.97	J54	10.00	P128	Passed
J56	RR	500.00	777.23	501.93	779.16	45.83	41.02	J113	10.00	P59	Passed
J57	RR	500.00	581.76	503.21	584.97	81.86	44.12	J113	10.00	P61	Passed
J58	RR	500.00	1,348.36	502.57	1,350.93	25.78	28.55	J113	10.00	P100	Passed
J59	RR	500.00	550.36	502.57	552.93	84.09	44.56	J113	10.00	P62	Passed

Fire Flow Node FlexTable: Fire Flow Results Table

Label	Zone	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Calculated Residual) (psi)	Pressure (Calculated System Lower Limit) (psi)	Junction w/ Minimum Pressure (System)	Velocity of Maximum Pipe (ft/s)	Pipe w/ Maximum Velocity	Fire Flow Status
J60	RR	500.00	657.54	501.61	659.15	60.46	42.98	J113	10.00	P62	Passed
J61	RR	0.01	391.68	0.01	391.68	87.42	46.57	J113	10.00	P64	Passed
J62a	RR	500.00	874.67	501.28	875.96	63.05	40.50	J113	10.00	P65b	Passed
J62b	RR	500.00	743.58	500.00	743.58	65.27	42.55	J113	10.00	P65b	Passed
J63	RR	500.00	1,084.37	505.47	1,089.84	64.78	36.75	J113	10.00	P103b	Passed
J64	RR	500.00	1,725.79	501.28	1,727.07	29.94	21.59	J113	10.00	P73	Passed
J65	RR	500.00	1,256.73	500.97	1,257.70	47.62	32.81	J113	10.00	P68	Passed
J66	RR	500.00	1,499.26	500.64	1,499.90	22.54	25.45	J113	10.00	P73	Passed
J67	RR	500.00	1,366.35	500.00	1,366.35	33.87	27.99	J113	10.00	P71	Passed
J68	RR	500.00	1,239.77	500.00	1,239.77	48.40	30.64	J113	10.00	P73	Passed
J69	RR	500.00	1,208.24	500.00	1,208.24	51.33	31.25	J113	10.00	P73	Passed
J70	RR	500.00	1,549.90	500.00	1,549.90	43.98	20.01	J113	7.05	P78	Passed
J71	RR	500.00	1,713.14	500.97	1,714.11	43.30	20.01	J113	8.10	P78	Passed
J72	LII	1,000.00	1,914.76	1,000.00	1,914.76	43.61	20.00	J113	9.38	P78	Passed
J73	LII	1,000.00	1,566.39	1,000.33	1,566.72	49.39	28.53	J113	10.00	P76	Passed
J74	LII	1,000.00	1,945.69	1,000.00	1,945.69	49.21	25.71	J113	10.00	P78	Passed
J75	LII	1,000.00	2,531.25	1,000.00	2,531.25	42.01	20.00	J113	8.52	P203	Passed
J76	RR	500.00	1,447.92	501.28	1,449.20	43.91	20.00	J113	8.51	P79	Passed
J77	RR	500.00	1,308.75	501.61	1,310.36	41.31	20.01	J113	7.48	P79	Passed
J78	RR	500.00	1,203.10	500.64	1,203.75	39.20	20.01	J113	6.71	P79	Passed
J79	RR	500.00	1,144.21	501.93	1,146.14	37.12	20.01	J113	6.29	P79	Passed
J80	RR	500.00	1,083.05	500.33	1,083.38	33.78	20.01	J113	5.85	P79	Passed
J81	RR	500.00	1,053.45	500.64	1,054.09	32.55	20.01	J113	5.64	P79	Passed
J82	RR	500.00	1,364.31	503.54	1,367.85	42.22	27.91	J113	10.00	P73	Passed
J83	RR	500.00	768.09	500.00	768.09	50.11	40.94	J113	10.00	P87	Passed
J84	RR	500.00	1,364.31	500.97	1,365.28	35.73	27.91	J113	10.00	P73	Passed
J85	RR	500.00	1,379.51	500.97	1,380.48	38.00	27.62	J113	10.00	P73	Passed
J86	RR	500.00	1,382.53	500.64	1,383.17	44.57	27.56	J113	10.00	P73	Passed
J87	RR	500.00	1,412.16	502.25	1,414.42	29.88	27.01	J113	10.00	P73	Passed
J88	RR	500.00	1,399.15	503.54	1,402.69	36.34	27.25	J113	10.00	P73	Passed
J89	RR	500.00	1,364.31	500.64	1,364.95	28.66	27.91	J113	10.00	P73	Passed

Fire Flow Node FlexTable: Fire Flow Results Table

Label	Zone	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Calculated Residual) (psi)	Pressure (Calculated System Lower Limit) (psi)	Junction w/ Minimum Pressure (System)	Velocity of Maximum Pipe (ft/s)	Pipe w/ Maximum Velocity	Fire Flow Status
J90	RR	500.00	1,364.31	502.25	1,366.56	24.31	27.91	J113	10.00	P73	Passed
J91	RR	500.00	1,364.31	501.61	1,365.92	21.28	24.31	J90	10.00	P73	Passed
J92	RR	500.00	1,393.84	500.97	1,394.81	34.95	27.35	J113	10.00	P73	Passed
J93	RR	500.00	1,393.05	500.97	1,394.02	43.33	27.36	J113	10.00	P73	Passed
J94	RR	500.00	1,392.44	501.93	1,394.36	45.51	27.37	J113	10.00	P73	Passed
J95	RR	500.00	1,132.38	502.25	1,134.64	54.81	33.83	J113	10.00	P100	Passed
J96	RR	500.00	1,249.08	501.93	1,251.01	43.86	31.06	J113	10.00	P100	Passed
J97a	RR	500.00	715.83	503.21	719.04	67.88	43.00	J113	10.00	P103b	Passed
J97b	RR	500.00	612.22	500.00	612.22	65.63	44.41	J113	10.00	P103b	Passed
J98	RR	500.00	875.16	503.21	878.37	71.80	40.52	J113	10.00	P103b	Passed
J99	RR	500.00	389.43	502.25	391.68	53.11	46.87	J113	10.00	P105	Velocity Failed
J100	RR	500.00	1,476.05	500.64	1,476.69	45.67	27.76	J113	10.00	P103b	Passed
J101	RR	500.00	1,476.05	500.00	1,476.05	41.00	27.76	J113	10.00	P103b	Passed
J102	RR	500.00	1,476.05	501.93	1,477.98	38.02	27.76	J113	10.00	P103b	Passed
J103	RR	500.00	1,333.20	500.33	1,333.52	50.40	31.31	J113	10.00	P103b	Passed
J104	RR	500.00	1,296.30	500.97	1,297.27	50.73	32.18	J113	10.00	P103b	Passed
J105	RR	500.00	1,262.67	500.97	1,263.64	52.30	32.95	J113	10.00	P103b	Passed
J106	RR	500.00	1,190.40	501.28	1,191.68	61.36	34.55	J113	10.00	P103b	Passed
J107	RR	0.01	389.75	1.94	391.68	75.77	46.88	J113	10.00	P113	Passed
J108	RR	500.00	609.42	502.57	611.99	73.42	44.37	J113	10.00	P114	Passed
J109	RR	500.00	714.29	500.97	715.26	60.35	42.92	J113	10.00	P116	Passed
J110	RR	500.00	726.39	500.00	726.39	27.03	27.40	J114	10.00	P124	Passed
J111	RR	500.00	703.09	500.97	704.06	30.13	38.07	J110	10.00	P121	Passed
J112	RR	500.00	973.93	500.00	973.93	26.50	20.01	J113	6.22	P122	Passed
J113	RR	500.00	1,090.80	500.64	1,091.44	10.27	20.00	J112	6.97	P123	Passed
J114	RR	500.00	722.68	500.97	723.65	27.46	27.74	J110	10.00	P124	Passed
J115	RR	500.00	761.81	501.28	763.10	50.63	41.29	J113	10.00	P128	Passed
J116	RR	500.00	612.05	501.93	613.98	71.05	43.69	J113	10.00	P128	Passed
J117	RR	500.00	1,387.06	500.33	1,387.39	43.46	27.48	J113	10.00	P73	Passed
J118	RR	500.00	983.33	500.97	984.30	59.59	37.04	J113	10.00	P131	Passed
J119	RR	500.00	1,048.40	502.90	1,051.30	40.74	31.77	J133	10.00	P131	Passed

Fire Flow Node FlexTable: Fire Flow Results Table

Label	Zone	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Calculated Residual) (psi)	Pressure (Calculated System Lower Limit) (psi)	Junction w/ Minimum Pressure (System)	Velocity of Maximum Pipe (ft/s)	Pipe w/ Maximum Velocity	Fire Flow Status
J120	RR	500.00	1,069.13	500.00	1,069.13	32.97	20.00	J133	9.84	P131	Passed
J121	RR	500.00	1,080.81	501.93	1,082.74	27.38	20.00	J133	9.73	P131	Passed
J122	RR	500.00	733.66	500.00	733.66	42.71	41.75	J113	10.00	P137	Passed
J123	RR	500.00	626.32	501.61	627.93	60.06	43.46	J113	10.00	P137	Passed
J124	RR	500.00	660.12	501.61	661.73	54.89	42.94	J113	10.00	P138	Passed
J125	RR	500.00	619.12	501.93	621.04	60.79	43.57	J113	10.00	P140	Passed
J126	RR	500.00	998.51	501.61	1,000.12	31.68	20.00	J133	9.20	P131	Passed
J127	RR	500.00	858.95	501.28	860.24	33.41	20.00	J133	9.82	P141	Passed
J128	RR	0.01	858.95	0.98	859.92	22.48	20.00	J133	9.82	P141	Passed
J129	RR	500.00	1,052.70	502.90	1,055.59	31.64	20.00	J133	9.69	P131	Passed
J130	RR	500.00	1,023.76	501.93	1,025.69	30.76	20.00	J133	9.43	P131	Passed
J131	RR	500.00	390.39	501.28	391.68	63.54	46.58	J113	10.00	P146	Velocity Failed
J132	RR	500.00	834.56	501.61	836.17	33.41	20.00	J133	9.55	P141	Passed
J133	RR	500.00	874.52	502.57	877.09	7.63	26.70	J134	10.00	P141	Passed
J134	RR	0.01	834.56	0.34	834.89	30.14	20.00	J133	9.55	P141	Passed
J135	UR(3)	500.00	1,400.10	500.00	1,400.10	34.97	20.01	J1	7.08	P8	Passed
J200	Bellingham	500.00	6,373.52	500.00	6,373.52	24.19	43.22	J113	10.00	P201	Passed
J201	Bellingham	500.00	3,743.84	500.00	3,743.84	71.20	37.24	J113	10.00	P202	Passed

FlexTable: Junction Table

2030 PHD

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure Head (ft)	Pressure (psi)	Notes
J1	157.00	LII	0.00	271.58	114.58	49.57	
J2	155.00	LII	0.00	271.57	116.57	50.44	
J3	159.00	LII	4.87	271.46	112.46	48.65	
J4	157.00	AO	0.00	271.19	114.19	49.41	
J5	127.00	AO	0.82	270.97	143.97	62.29	
J6	143.00	LII	4.05	271.62	128.62	55.65	
J7	125.00	UR(3)	0.00	271.65	146.65	63.45	
J8	116.00	URMX	0.00	271.74	155.74	67.38	
J9	120.00	BHM	0.00	271.75	151.75	65.65	
J10	125.00	BHM	6.46	271.76	146.76	63.50	
J11	120.00	BHM	8.87	271.67	151.67	65.62	
J12	116.00	UR(3)	4.05	271.77	155.77	67.39	
J13	123.00	URMX	0.00	271.83	148.83	64.39	
J14	122.00	URMX	6.46	271.89	149.89	64.85	
J15	122.00	URMX	4.05	271.89	149.89	64.85	
J16	111.00	UR(3)	13.74	272.27	161.27	69.77	
J17	107.00	LII	2.41	272.26	165.26	71.50	
J18	107.00	UR(3)	0.00	272.26	165.26	71.50	
J19	97.00	LII	0.00	272.26	175.26	75.83	
J20	85.00	UR(3)	1.64	272.26	187.26	81.02	
J21	132.00	AO	0.82	270.98	138.98	60.13	
J22	133.00	AO	2.41	271.16	138.16	59.78	
J23	125.00	LII	3.23	271.34	146.34	63.31	
J24	123.00	UR(3)	7.28	271.56	148.56	64.27	
J25	100.00	LII	0.00	272.86	172.86	74.79	
J26	89.00	LII	0.82	273.26	184.26	79.72	
J27	87.00	LII	0.00	273.45	186.45	80.67	
J28	83.00	LII	4.87	274.13	191.13	82.69	
J29	81.00	BHM	0.00	275.06	194.06	83.96	
J30	79.00	BHM	0.00	275.68	196.68	85.09	
J31	84.00	LII	0.82	273.26	189.26	81.89	
J32	93.00	LII	0.00	273.26	180.26	77.99	
J33	86.00	UR(3)	4.05	270.90	184.90	80.00	
J34	85.00	UR(3)	1.64	270.83	185.83	80.40	
J35	84.00	UR(3)	4.05	270.80	186.80	80.82	
J36	90.00	UR(3)	3.23	270.80	180.80	78.22	
J37	87.00	UR(3)	0.00	270.78	183.78	79.51	
J38	85.00	UR(3)	4.87	270.78	185.78	80.38	
J39	85.00	UR(3)	4.87	270.78	185.78	80.38	
J40	83.00	UR(3)	8.10	270.78	187.78	81.24	
J41	136.00	UR(3)	6.46	270.72	134.72	58.29	
J42	125.00	AO	0.00	270.87	145.87	63.11	
J43	140.00	AO	1.64	270.79	130.79	56.59	
J44	145.00	LII	1.64	270.79	125.79	54.42	
J45	114.00	UR(3)	66.46	270.50	156.50	67.71	
J45a	109.00	RR	0.00	270.48	161.48	69.86	
J45b	78.00	RR	0.00	270.48	192.48	83.28	
J46	109.00	RR	2.41	270.42	161.42	69.84	
J47	101.00	RR	8.10	270.38	169.38	73.28	
J48	93.00	RR	10.51	270.36	177.36	76.74	

FlexTable: Junction Table

2030 PHD

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure Head (ft)	Pressure (psi)	Notes
J49	86.00	RR	5.64	270.31	184.31	79.74	
J50	78.00	RR	8.87	270.27	192.27	83.19	
J51	75.00	RR	5.64	270.25	195.25	84.48	
J52	72.00	RR	4.87	270.25	198.25	85.77	
J53	60.00	RR	4.05	270.24	210.24	90.96	
J54	46.00	RR	3.23	270.24	224.24	97.02	
J55	33.00	RR	3.23	270.23	237.23	102.64	
J56	11.00	RR	4.87	270.10	259.10	112.10	
J57	9.00	RR	8.10	270.06	261.06	112.95	
J58	9.00	RR	6.46	270.06	261.06	112.95	
J59	8.00	RR	6.46	269.95	261.95	113.33	
J60	7.00	RR	4.05	269.88	262.88	113.74	
J61	7.00	RR	0.00	269.88	262.88	113.74	
J62a	89.00	RR	3.23	270.32	181.32	78.45	
J62b	93.00	RR	0.00	270.33	177.33	76.72	
J63	70.00	RR	13.74	270.30	200.30	86.66	
J64	92.00	RR	3.23	270.37	178.37	77.17	
J65	94.00	RR	2.41	270.40	176.40	76.32	
J66	105.00	RR	1.64	270.56	165.56	71.63	
J67	104.00	RR	0.00	270.82	166.82	72.17	
J68	104.00	RR	0.00	270.95	166.95	72.23	
J69	104.00	RR	0.00	270.96	166.96	72.24	
J70	104.00	RR	0.00	271.12	167.12	72.30	
J71	103.00	RR	2.41	272.05	169.05	73.14	
J72	100.00	LII	0.00	272.89	172.89	74.80	
J73	100.00	LII	0.82	272.89	172.89	74.80	
J74	100.00	LII	0.00	273.70	173.70	75.15	
J75	100.00	LII	0.00	274.27	174.27	75.40	
J76	104.00	RR	3.23	271.11	167.11	72.30	
J77	110.00	RR	4.05	271.09	161.09	69.69	
J78	115.00	RR	1.64	271.07	156.07	67.52	
J79	120.00	RR	4.87	271.06	151.06	65.36	
J80	128.00	RR	0.82	271.05	143.05	61.89	
J81	131.00	RR	1.64	271.05	140.05	60.59	
J82	82.00	RR	8.87	270.57	188.57	81.59	
J83	93.00	RR	0.00	270.75	177.75	76.90	
J84	80.00	RR	2.41	270.57	190.57	82.45	
J85	58.00	RR	2.41	270.45	212.45	91.92	
J86	40.00	RR	1.64	270.30	230.30	99.64	
J87	77.00	RR	5.64	270.27	193.27	83.62	
J88	78.00	RR	8.87	270.31	192.31	83.20	
J89	80.00	RR	1.64	270.57	190.57	82.45	
J90	70.00	RR	5.64	270.56	200.56	86.77	
J91	60.00	RR	4.05	270.56	210.56	91.10	
J92	65.00	RR	2.41	270.25	205.25	88.80	
J93	45.00	RR	2.41	270.24	225.24	97.45	
J94	40.00	RR	4.87	270.24	230.24	99.61	
J95	27.00	RR	5.64	270.15	243.15	105.20	
J96	8.00	RR	4.87	270.10	262.10	113.40	
J97a	89.00	RR	8.10	270.33	181.33	78.45	

FlexTable: Junction Table

2030 PHD

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure Head (ft)	Pressure (psi)	Notes
J97b	101.00	RR	0.00	270.35	169.35	73.27	
J98	69.00	RR	8.10	270.31	201.31	87.10	
J99	87.00	RR	5.64	270.25	183.25	79.28	
J100	70.00	RR	1.64	270.27	200.27	86.65	
J101	69.00	RR	0.00	270.27	201.27	87.08	
J102	63.00	RR	4.87	270.27	207.27	89.68	
J103	75.00	RR	0.82	270.28	195.28	84.49	
J104	78.00	RR	2.41	270.28	192.28	83.19	
J105	78.00	RR	2.41	270.28	192.28	83.19	
J106	66.00	RR	3.23	270.29	204.29	88.39	
J107	60.00	RR	4.87	270.26	210.26	90.97	
J108	60.00	RR	6.46	270.27	210.27	90.98	
J109	70.00	RR	2.41	270.27	200.27	86.65	
J110	122.00	RR	0.00	270.64	148.64	64.31	
J111	121.00	RR	2.41	270.76	149.76	64.79	
J112	145.00	RR	0.00	271.05	126.05	54.53	
J113	160.00	RR	1.64	271.05	111.05	48.04	
J114	122.00	RR	2.41	270.64	148.64	64.31	
J115	35.00	RR	3.23	270.23	235.23	101.77	
J116	37.00	RR	4.87	270.23	233.23	100.91	
J117	39.00	RR	0.82	270.27	231.27	100.06	
J118	39.00	RR	2.41	270.15	231.15	100.01	
J119	38.00	RR	7.28	269.93	231.93	100.35	
J120	30.00	RR	0.00	269.82	239.82	103.76	
J121	26.00	RR	4.87	269.81	243.81	105.48	
J122	12.00	RR	0.00	269.84	257.84	111.56	
J123	25.00	RR	4.05	269.82	244.82	105.92	
J124	27.00	RR	4.05	269.78	242.78	105.04	
J125	30.00	RR	4.87	269.78	239.78	103.74	
J126	33.00	RR	4.05	269.78	236.78	102.44	
J127	29.00	RR	3.23	269.75	240.75	104.16	
J128	31.00	RR	2.41	269.75	238.75	103.30	
J129	33.00	RR	7.28	269.80	236.80	102.45	
J130	35.00	RR	4.87	269.79	234.79	101.58	
J131	35.00	RR	3.23	269.77	234.77	101.57	
J132	29.00	RR	4.05	269.75	240.75	104.16	
J133	60.00	RR	6.46	269.75	209.75	90.75	
J134	30.00	RR	0.82	269.75	239.75	103.73	
J135	120.00	UR(3)	0.00	271.69	151.69	65.63	
J200	203.00	Bellingham	0.00	275.90	72.90	31.54	City of Bellingham
J201	78.00	Bellingham	0.00	275.68	197.68	85.53	

FlexTable: Pipe Table

2030 PHD

Label	Length (User Defined) (ft)	Diameter (in)	Material	Hazen-Williams C	Has Check Valve?	Status (Initial)	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/1000ft)	Start Node	Stop Node
P1	55	8.0	Ductile Iron	130.0	False	Open	53.35	0.34	0.00	0.080	J1	J2
P2	410	6.0	Asbestos Cement	140.0	False	Open	53.35	0.61	0.12	0.284	J2	J3
P3	1,112	6.0	Asbestos Cement	140.0	False	Open	48.48	0.55	0.26	0.238	J3	J4
P4	821	6.0	Cast iron	130.0	False	Open	48.48	0.55	0.22	0.273	J4	J5
P5	500	8.0	Ductile Iron	130.0	False	Open	-53.35	0.34	0.04	0.080	J1	J6
P6	300	8.0	Ductile Iron	130.0	False	Open	-57.40	0.37	0.03	0.092	J6	J7
P7	500	8.0	Ductile Iron	130.0	False	Open	-57.40	0.37	0.05	0.092	J7	J135
P8	543	8.0	Ductile Iron	130.0	False	Open	-57.40	0.37	0.05	0.092	J135	J8
P9	194	4.0	Asbestos Cement	140.0	False	Open	-5.53	0.14	0.01	0.031	J8	J9
P10	546	4.0	Asbestos Cement	140.0	False	Open	-5.53	0.14	0.02	0.031	J9	J10
P11	1,243	4.0	Asbestos Cement	140.0	False	Open	8.87	0.23	0.09	0.074	J10	J11
P12	317	8.0	Ductile Iron	130.0	False	Open	-51.87	0.33	0.02	0.076	J8	J12
P13	187	4.0	Asbestos Cement	140.0	False	Open	-20.86	0.53	0.07	0.359	J10	J13
P14	154	4.0	Asbestos Cement	140.0	False	Open	-20.86	0.53	0.06	0.359	J13	J14
P15	218	8.0	Ductile Iron	130.0	False	Open	4.05	0.03	0.00	0.001	J14	J15
P16	500	4.0	Asbestos Cement	140.0	False	Open	-31.37	0.80	0.38	0.765	J14	J16
P17	333	4.0	Asbestos Cement	140.0	False	Open	4.05	0.10	0.01	0.017	J16	J17
P18	160	4.0	Asbestos Cement	140.0	False	Open	0.00	0.00	0.00	0.000	J17	J18
P19	245	4.0	Asbestos Cement	140.0	False	Open	1.64	0.04	0.00	0.003	J17	J19
P20	469	8.0	Asbestos Cement	140.0	False	Open	1.64	0.01	0.00	0.000	J19	J20
P21	297	8.0	Asbestos Cement	140.0	False	Open	39.35	0.25	0.01	0.040	J21	J5
P22	573	8.0	Asbestos Cement	140.0	False	Open	-121.23	0.77	0.18	0.320	J21	J22
P23	529	8.0	Asbestos Cement	140.0	False	Open	-123.64	0.79	0.18	0.332	J22	J23
P24	627	8.0	Asbestos Cement	140.0	False	Open	-126.86	0.81	0.22	0.348	J23	J24
P25	540	8.0	Asbestos Cement	140.0	False	Open	-134.14	0.86	0.21	0.386	J24	J12
P26	685	8.0	Asbestos Cement	140.0	False	Open	-190.06	1.21	0.50	0.735	J12	J16
P27	524	8.0	Asbestos Cement	140.0	False	Open	-239.22	1.53	0.59	1.126	J16	J25
P28	359	8.0	Asbestos Cement	140.0	False	Open	-239.22	1.53	0.40	1.126	J25	J26
P29	165	8.0	Asbestos Cement	140.0	False	Open	-240.86	1.54	0.19	1.140	J26	J27
P30	595	8.0	Asbestos Cement	140.0	False	Open	-240.86	1.54	0.68	1.140	J27	J28
P31	786	8.0	Asbestos Cement	140.0	False	Open	-245.73	1.57	0.93	1.184	J28	J29
P32	457	8.0	Ductile Iron	130.0	False	Open	-245.73	1.57	0.62	1.358	J29	J30
P33	471	8.0	Ductile Iron	130.0	False	Open	0.82	0.01	0.00	0.000	J26	J31
P34	426	8.0	Ductile Iron	130.0	False	Open	0.00	0.00	0.00	0.000	J31	J32

FlexTable: Pipe Table

2030 PHD

Label	Length (User Defined) (ft)	Diameter (in)	Material	Hazen-Williams C	Has Check Valve?	Status (Initial)	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/1000ft)	Start Node	Stop Node
P35	636	8.0	PVC	150.0	False	Open	81.05	0.52	0.08	0.134	J21	J33
P36	523	8.0	PVC	150.0	False	Open	77.00	0.49	0.06	0.121	J33	J34
P37	257	8.0	PVC	150.0	False	Open	75.36	0.48	0.03	0.117	J34	J35
P38	160	8.0	PVC	150.0	False	Open	3.23	0.02	0.00	0.000	J35	J36
P39	235	8.0	PVC	150.0	False	Open	68.08	0.43	0.02	0.097	J35	J37
P40	175	8.0	PVC	150.0	False	Open	17.84	0.11	0.00	0.008	J37	J38
P41	320	8.0	PVC	150.0	False	Open	4.87	0.03	0.00	0.001	J38	J39
P42	428	8.0	PVC	150.0	False	Open	8.10	0.05	0.00	0.002	J38	J40
P43	996	8.0	PVC	150.0	False	Open	50.24	0.32	0.05	0.055	J37	J41
P43a	0	8.0	Ductile Iron	130.0	False	Open	0.00	0.00	0.00	0.000	J45a	J45b
P44	567	8.0	Asbestos Cement	140.0	False	Open	87.01	0.56	0.10	0.173	J5	J42
P45	450	8.0	Asbestos Cement	140.0	False	Open	87.01	0.56	0.08	0.173	J42	J43
P46	1,156	4.0	Asbestos Cement	140.0	False	Open	1.64	0.04	0.00	0.003	J43	J44
P47	481	8.0	PVC	150.0	False	Open	83.73	0.53	0.07	0.142	J43	J41
P48	713	8.0	PVC	150.0	False	Open	127.51	0.81	0.22	0.309	J41	J45
P49a	1,014	8.0	PVC	150.0	False	Open	61.05	0.39	0.03	0.079	J45	J45a
P49b	1,014	8.0	PVC	150.0	False	Open	61.05	0.39	0.05	0.079	J45a	J46
P50	385	8.0	PVC	150.0	False	Open	75.92	0.48	0.05	0.118	J46	J47
P51	597	8.0	Asbestos Cement	140.0	False	Open	29.99	0.19	0.01	0.024	J47	J48
P52	541	6.0	Asbestos Cement	140.0	False	Open	29.77	0.34	0.05	0.096	J48	J49
P53	643	6.0	Asbestos Cement	140.0	False	Open	24.13	0.27	0.04	0.065	J49	J50
P54	607	6.0	Asbestos Cement	140.0	False	Open	15.24	0.17	0.02	0.028	J50	J51
P55	561	6.0	Asbestos Cement	140.0	False	Open	9.61	0.11	0.01	0.012	J51	J52
P56	595	8.0	PVC	150.0	False	Open	20.32	0.13	0.01	0.010	J52	J53
P57	602	8.0	PVC	150.0	False	Open	16.27	0.10	0.00	0.007	J53	J54
P58	512	8.0	PVC	150.0	False	Open	13.04	0.08	0.00	0.005	J54	J55
P59	978	4.0	Asbestos Cement	140.0	False	Open	12.25	0.31	0.13	0.134	J55	J56
P60	824	4.0	Asbestos Cement	140.0	False	Open	7.38	0.19	0.04	0.052	J56	J57
P61	419	4.0	Asbestos Cement	140.0	False	Open	-0.72	0.02	0.00	0.001	J57	J58
P62	404	4.0	Asbestos Cement	140.0	False	Open	17.82	0.45	0.11	0.268	J58	J59
P63	582	4.0	Asbestos Cement	140.0	False	Open	11.36	0.29	0.07	0.117	J59	J60
P64	169	4.0	Asbestos Cement	140.0	False	Open	0.00	0.00	0.00	0.000	J60	J61
P65a	682	8.0	PVC	150.0	False	Open	30.08	0.19	0.01	0.021	J62b	J62a
P65b	50	4.0	Asbestos Cement	140.0	False	Open	30.08	0.77	0.04	0.708	J48	J62b

FlexTable: Pipe Table

2030 PHD

Label	Length (User Defined) (ft)	Diameter (in)	Material	Hazen-Williams C	Has Check Valve?	Status (Initial)	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/1000ft)	Start Node	Stop Node
P66	714	8.0	PVC	150.0	False	Open	26.85	0.17	0.01	0.017	J62a	J63
P67	220	8.0	Asbestos Cement	140.0	False	Open	40.37	0.26	0.01	0.042	J64	J48
P68	105	6.0	Ductile Iron	130.0	False	Open	43.60	0.49	0.02	0.224	J65	J64
P69	779	6.0	Asbestos Cement	140.0	False	Open	46.00	0.52	0.17	0.216	J66	J65
P70	1,087	6.0	Asbestos Cement	140.0	False	Open	47.65	0.54	0.25	0.230	J67	J66
P71	565	6.0	Asbestos Cement	140.0	False	Open	47.65	0.54	0.13	0.230	J68	J67
P72	302	8.0	Ductile Iron	130.0	False	Open	47.65	0.30	0.02	0.065	J69	J68
P73	186	8.0	PVC	150.0	False	Open	-217.57	1.39	0.15	0.831	J69	J70
P74	723	8.0	Asbestos Cement	140.0	False	Open	-257.56	1.64	0.93	1.291	J70	J71
P75	635	8.0	Asbestos Cement	140.0	False	Open	-259.97	1.66	0.83	1.314	J71	J72
P76	200	8.0	Ductile Iron	130.0	False	Open	0.82	0.01	0.00	0.000	J72	J73
P77	612	8.0	Asbestos Cement	140.0	False	Open	-260.79	1.66	0.81	1.321	J72	J74
P78	433	8.0	Asbestos Cement	140.0	False	Open	-260.79	1.66	0.57	1.321	J74	J75
P79	265	8.0	Ductile Iron	130.0	False	Open	39.99	0.26	0.01	0.047	J70	J76
P80	488	8.0	Ductile Iron	130.0	False	Open	36.76	0.23	0.02	0.040	J76	J77
P81	515	8.0	Ductile Iron	130.0	False	Open	32.71	0.21	0.02	0.032	J77	J78
P82	417	8.0	Asbestos Cement	140.0	False	Open	31.07	0.20	0.01	0.026	J78	J79
P83	522	8.0	Asbestos Cement	140.0	False	Open	26.20	0.17	0.01	0.019	J79	J80
P84	292	8.0	Asbestos Cement	140.0	False	Open	25.38	0.16	0.01	0.018	J80	J81
P85	967	8.0	PVC	150.0	False	Open	147.89	0.94	0.39	0.407	J69	J82
P86	548	4.0	Asbestos Cement	140.0	False	Open	22.03	0.56	0.22	0.398	J69	J83
P87	441	4.0	Asbestos Cement	140.0	False	Open	22.03	0.56	0.18	0.398	J83	J82
P88	520	8.0	Ductile Iron	130.0	False	Open	13.74	0.09	0.00	0.007	J82	J84
P89	779	8.0	PVC	150.0	False	Open	89.57	0.57	0.13	0.161	J82	J85
P90	715	8.0	Ductile Iron	130.0	False	Open	87.16	0.56	0.14	0.199	J85	J86
P91	891	6.0	Asbestos Cement	140.0	False	Open	-15.58	0.18	0.03	0.029	J52	J87
P92	650	6.0	Asbestos Cement	140.0	False	Open	-21.22	0.24	0.03	0.052	J87	J88
P93	809	6.0	Asbestos Cement	140.0	False	Open	57.75	0.66	0.27	0.329	J82	J88
P94	500	8.0	Ductile Iron	130.0	False	Open	11.33	0.07	0.00	0.005	J84	J89
P95	614	8.0	Ductile Iron	130.0	False	Open	9.69	0.06	0.00	0.003	J89	J90
P96	600	8.0	Asbestos Cement	140.0	False	Open	4.05	0.03	0.00	0.001	J90	J91
P97	645	6.0	Asbestos Cement	140.0	False	Open	27.66	0.31	0.05	0.084	J88	J92
P98	512	8.0	Asbestos Cement	140.0	False	Open	25.26	0.16	0.01	0.017	J92	J93
P99	449	8.0	Asbestos Cement	140.0	False	Open	22.85	0.15	0.01	0.015	J93	J94

FlexTable: Pipe Table

2030 PHD

Label	Length (User Defined) (ft)	Diameter (in)	Material	Hazen-Williams C	Has Check Valve?	Status (Initial)	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/1000ft)	Start Node	Stop Node
P100	629	6.0	Asbestos Cement	140.0	False	Open	35.50	0.40	0.08	0.134	J94	J95
P101	568	6.0	Asbestos Cement	140.0	False	Open	29.87	0.34	0.06	0.097	J95	J96
P102	534	6.0	Asbestos Cement	140.0	False	Open	25.00	0.28	0.04	0.070	J96	J58
P103a	713	8.0	PVC	150.0	False	Open	37.82	0.24	0.02	0.033	J97b	J97a
P103b	30	4.0	Asbestos Cement	140.0	False	Open	37.82	0.97	0.03	1.082	J47	J97b
P104	732	8.0	PVC	150.0	False	Open	29.72	0.19	0.02	0.021	J97a	J98
P105	650	4.0	Asbestos Cement	140.0	False	Open	5.64	0.14	0.02	0.032	J50	J99
P106	509	8.0	Ductile Iron	130.0	False	Open	-5.62	0.04	0.00	0.001	J50	J100
P107	358	8.0	Asbestos Cement	140.0	False	Open	9.74	0.06	0.00	0.003	J100	J101
P108	392	8.0	Asbestos Cement	140.0	False	Open	9.74	0.06	0.00	0.003	J101	J102
P109	543	8.0	Ductile Iron	130.0	False	Open	-17.00	0.11	0.01	0.010	J100	J103
P110	178	8.0	Ductile Iron	130.0	False	Open	-19.49	0.12	0.00	0.013	J103	J104
P111	175	8.0	Ductile Iron	130.0	False	Open	-21.90	0.14	0.00	0.015	J104	J105
P112	538	8.0	PVC	150.0	False	Open	-24.31	0.16	0.01	0.014	J105	J106
P113	313	4.0	Asbestos Cement	140.0	False	Open	-4.87	0.12	0.01	0.024	J107	J102
P114	277	4.0	Asbestos Cement	140.0	False	Open	-7.19	0.18	0.01	0.050	J108	J106
P115	356	4.0	Asbestos Cement	140.0	False	Open	0.74	0.02	0.00	0.001	J108	J109
P116	445	4.0	Asbestos Cement	140.0	False	Open	-1.67	0.04	0.00	0.003	J109	J103
P118	560	8.0	PVC	150.0	False	Open	-34.74	0.22	0.02	0.028	J106	J63
P119	597	8.0	PVC	150.0	False	Open	-21.62	0.14	0.01	0.012	J63	J98
P120	358	4.0	Asbestos Cement	140.0	False	Open	-19.69	0.50	0.12	0.323	J110	J111
P121	720	4.0	Asbestos Cement	140.0	False	Open	-22.09	0.56	0.29	0.400	J111	J81
P122	500	8.0	Ductile Iron	130.0	False	Open	1.64	0.01	0.00	0.000	J81	J112
P123	400	8.0	Asbestos Cement	140.0	False	Open	1.64	0.01	0.00	0.000	J112	J113
P124	845	4.0	Asbestos Cement	140.0	False	Open	-17.28	0.44	0.21	0.254	J46	J114
P125	310	8.0	Asbestos Cement	140.0	False	Open	-19.69	0.13	0.00	0.011	J114	J110
P126	558	8.0	PVC	150.0	False	Open	-2.44	0.02	0.00	0.000	J55	J115
P127	463	8.0	PVC	150.0	False	Open	-5.67	0.04	0.00	0.001	J115	J116
P128	518	8.0	PVC	150.0	False	Open	-10.55	0.07	0.00	0.003	J116	J94
P129	425	6.0	Asbestos Cement	140.0	False	Open	-28.07	0.32	0.04	0.086	J94	J117
P130	346	6.0	Asbestos Cement	140.0	False	Open	-28.89	0.33	0.03	0.091	J117	J86
P131	500	6.0	Asbestos Cement	140.0	False	Open	56.62	0.64	0.16	0.317	J86	J118
P132	732	6.0	Asbestos Cement	140.0	False	Open	54.21	0.62	0.21	0.293	J118	J119
P133	520	6.0	Asbestos Cement	140.0	False	Open	46.93	0.53	0.12	0.224	J119	J120

FlexTable: Pipe Table
2030 PHD

Label	Length (User Defined) (ft)	Diameter (in)	Material	Hazen-Williams C	Has Check Valve?	Status (Initial)	Flow (gpm)	Velocity (ft/s)	Headloss (ft)	Headloss Gradient (ft/1000ft)	Start Node	Stop Node
P134	513	6.0	Asbestos Cement	140.0	False	Open	8.76	0.10	0.01	0.010	J120	J121
P135	742	4.0	Asbestos Cement	140.0	False	Open	7.31	0.19	0.04	0.052	J60	J122
P136	540	4.0	Asbestos Cement	140.0	False	Open	7.31	0.19	0.03	0.052	J122	J123
P137	628	4.0	Asbestos Cement	140.0	False	Open	3.26	0.08	0.01	0.012	J123	J121
P138	557	4.0	Asbestos Cement	140.0	False	Open	7.15	0.18	0.03	0.050	J121	J124
P139	691	4.0	Asbestos Cement	140.0	False	Open	3.10	0.08	0.01	0.011	J124	J125
P140	416	4.0	Asbestos Cement	140.0	False	Open	-1.77	0.05	0.00	0.004	J125	J126
P141	788	6.0	Asbestos Cement	140.0	False	Open	16.97	0.19	0.03	0.034	J126	J127
P142	476	6.0	Asbestos Cement	140.0	False	Open	2.41	0.03	0.00	0.001	J127	J128
P143	257	8.0	Ductile Iron	130.0	False	Open	38.17	0.24	0.01	0.043	J120	J129
P144	536	8.0	Ductile Iron	130.0	False	Open	30.89	0.20	0.02	0.029	J129	J130
P145	552	8.0	Ductile Iron	130.0	False	Open	26.02	0.17	0.01	0.021	J130	J126
P146	624	4.0	Ductile Iron	130.0	False	Open	3.23	0.08	0.01	0.013	J126	J131
P147	632	8.0	Ductile Iron	130.0	False	Open	11.33	0.07	0.00	0.005	J127	J132
P148	983	8.0	Ductile Iron	130.0	False	Open	6.46	0.04	0.00	0.002	J132	J133
P149	502	8.0	Ductile Iron	130.0	False	Open	0.82	0.01	0.00	0.000	J132	J134
P151	235	8.0	Ductile Iron	130.0	False	Open	-245.73	1.57	0.32	1.358	J30	R1
P200	0	16.0	Ductile Iron	130.0	False	Open	-260.80	0.42	0.02	0.052	PRV1	R2
P201	0	16.0	Ductile Iron	130.0	False	Open	-260.79	0.42	0.03	0.052	J200	PRV1
P202	4,592	12.0	Asbestos Cement	140.0	False	Open	-260.79	0.74	0.22	0.183	J201	J200
P203	4,592	10.0	Asbestos Cement	140.0	False	Open	-260.79	1.07	1.41	0.446	J75	J201
P204	4,592	16.0	Asbestos Cement	140.0	False	Open	(N/A)	(N/A)	(N/A)	(N/A)	J200	T1

2030 MDD+FF (Required FF)

Fire Flow Node FlexTable: Fire Flow Results Table

Label	Zone	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Calculated Residual) (psi)	Pressure (Calculated System Lower Limit) (psi)	Junction w/ Minimum Pressure (System)	Velocity of Maximum Pipe (ft/s)	Pipe w/ Maximum Velocity	Fire Flow Status
J1	LII	0.01	1,217.55	0.01	1,217.55	20.00	20.94	J2	5.51	P151	Passed
J2	LII	0.01	1,220.40	0.01	1,220.40	20.56	20.00	J1	5.52	P151	Passed
J3	LII	0.01	1,118.68	2.50	1,121.17	20.01	26.53	J1	7.59	P2	Passed
J4	AO	1,000.00	1,136.79	1,000.00	1,136.79	20.00	26.72	J3	7.61	P4	Passed
J5	AO	1,000.00	1,536.51	1,000.42	1,536.93	30.31	20.01	J4	6.32	P151	Passed
J6	LII	1,000.00	1,277.72	1,002.07	1,279.79	25.47	20.00	J1	5.89	P8	Passed
J7	UR(3)	1,000.00	1,319.72	1,000.00	1,319.72	33.01	20.01	J1	6.29	P8	Passed
J8	URMX	750.00	1,527.26	750.00	1,527.26	37.08	20.01	J3	7.58	P12	Passed
J9	BHM	0.01	528.92	0.01	528.92	54.55	44.69	J3	10.00	P9	Passed
J10	BHM	0.01	750.66	3.31	753.96	29.79	31.94	J11	10.00	P10	Passed
J11	BHM	0.01	353.11	4.54	357.64	20.00	47.13	J3	9.13	P11	Passed
J12	UR(3)	750.00	1,599.85	752.07	1,601.92	37.69	20.01	J3	7.09	P151	Passed
J13	URMX	750.00	700.46	750.00	700.46	35.23	38.78	J10	10.00	P16	Velocity Failed
J14	URMX	750.00	637.24	753.30	640.55	41.95	41.95	J15	10.00	P16	Velocity Failed
J15	URMX	750.00	637.24	752.07	639.31	41.20	41.95	J14	10.00	P16	Velocity Failed
J16	UR(3)	750.00	1,719.24	757.03	1,726.26	38.85	20.01	J3	7.86	P151	Passed
J17	LII	1,000.00	389.61	1,001.23	390.84	57.56	46.91	J3	10.00	P17	Velocity Failed
J18	UR(3)	500.00	389.61	500.00	389.61	51.93	46.91	J3	10.00	P17	Velocity Failed
J19	LII	1,000.00	389.61	1,000.00	389.61	53.23	46.91	J3	10.00	P17	Velocity Failed
J20	UR(3)	500.00	389.61	500.84	390.45	57.86	46.91	J3	10.00	P17	Velocity Failed
J21	AO	1,000.00	1,562.29	1,000.42	1,562.71	27.82	20.00	J4	6.43	P151	Passed
J22	AO	1,000.00	1,590.30	1,001.23	1,591.53	25.82	20.00	J4	6.68	P151	Passed
J23	LII	1,000.00	1,611.69	1,001.65	1,613.34	28.75	20.00	J3	6.89	P151	Passed
J24	UR(3)	500.00	1,606.25	503.72	1,609.97	31.40	20.00	J3	6.98	P151	Passed
J25	LII	1,000.00	1,864.32	1,000.00	1,864.32	42.63	20.00	J3	8.78	P151	Passed
J26	LII	1,000.00	1,990.11	1,000.42	1,990.53	46.72	20.00	J3	9.58	P151	Passed
J27	LII	1,000.00	2,054.07	1,000.00	2,054.07	47.39	20.09	J3	10.00	P151	Passed
J28	LII	1,000.00	1,940.71	1,002.49	1,943.20	58.51	28.69	J3	10.00	P151	Passed
J29	BHM	0.01	1,764.84	0.01	1,764.84	71.81	39.32	J3	10.00	P151	Passed
J30	BHM	0.01	1,590.67	0.01	1,590.67	80.97	46.40	J3	10.00	P151	Passed
J31	LII	1,000.00	1,566.30	1,000.42	1,566.72	51.66	29.80	J3	10.00	P33	Passed

Fire Flow Node FlexTable: Fire Flow Results Table

Label	Zone	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Calculated Residual) (psi)	Pressure (Calculated System Lower Limit) (psi)	Junction w/ Minimum Pressure (System)	Velocity of Maximum Pipe (ft/s)	Pipe w/ Maximum Velocity	Fire Flow Status
J32	LII	1,000.00	1,566.30	1,000.00	1,566.30	40.04	29.80	J3	10.00	P33	Passed
J33	UR(3)	500.00	1,572.59	502.07	1,574.67	44.13	20.00	J4	6.48	P35	Passed
J34	UR(3)	500.00	1,574.15	500.84	1,574.99	43.47	20.00	J4	6.40	P151	Passed
J35	UR(3)	500.00	1,576.96	502.07	1,579.03	43.72	20.00	J4	6.40	P151	Passed
J36	UR(3)	0.01	1,565.06	1.66	1,566.72	39.38	20.39	J4	10.00	P38	Passed
J37	UR(3)	500.00	1,580.56	500.00	1,580.56	42.43	20.00	J4	6.40	P151	Passed
J38	UR(3)	500.00	1,557.59	502.49	1,560.08	41.80	20.74	J4	10.00	P40	Passed
J39	UR(3)	500.00	1,557.59	502.49	1,560.08	37.38	20.74	J4	10.00	P40	Passed
J40	UR(3)	500.00	1,557.59	504.14	1,561.73	36.75	20.74	J4	10.00	P40	Passed
J41	UR(3)	500.00	1,608.75	503.30	1,612.06	23.56	20.00	J4	6.39	P151	Passed
J42	AO	1,000.00	1,561.55	1,000.00	1,561.55	28.46	20.00	J4	6.36	P151	Passed
J43	AO	1,000.00	1,563.09	1,000.84	1,563.93	22.16	20.00	J44	6.31	P151	Passed
J44	LII	1,000.00	343.91	1,000.84	344.75	20.01	47.20	J113	8.80	P46	Residual Pressure Failed
J45	UR(3)	500.00	1,683.11	563.30	1,746.41	29.22	20.00	J4	6.39	P151	Passed
J45a	RR	500.00	1,719.48	500.00	1,719.48	29.80	20.00	J4	6.43	P78	Passed
J45b	RR	500.00	1,566.72	500.00	1,566.72	21.92	24.38	J4	10.00	P43a	Passed
J46	RR	500.00	1,795.38	501.23	1,796.61	26.74	20.00	J113	6.93	P78	Passed
J47	RR	500.00	1,765.13	504.14	1,769.27	30.73	20.00	J113	6.94	P78	Passed
J48	RR	500.00	1,739.87	505.37	1,745.25	34.06	20.00	J113	7.80	P65b	Passed
J49	RR	500.00	1,612.22	502.88	1,615.11	31.84	23.11	J113	10.00	P52	Passed
J50	RR	500.00	1,701.28	504.53	1,705.82	36.32	20.00	J113	9.81	P103b	Passed
J51	RR	500.00	1,640.27	502.88	1,643.15	33.50	20.02	J113	9.99	P54	Passed
J52	RR	500.00	1,616.21	502.49	1,618.70	37.81	20.00	J113	7.51	P54	Passed
J53	RR	500.00	1,614.06	502.07	1,616.14	41.59	20.00	J113	7.16	P54	Passed
J54	RR	500.00	1,612.79	501.65	1,614.44	47.01	20.00	J113	7.11	P73	Passed
J55	RR	500.00	1,612.35	501.65	1,614.00	52.69	20.00	J113	7.12	P73	Passed
J56	RR	500.00	710.21	502.49	712.70	66.53	41.31	J113	10.00	P59	Passed
J57	RR	500.00	599.49	504.14	603.64	84.40	43.10	J113	10.00	P61	Passed
J58	RR	500.00	1,353.60	503.30	1,356.90	41.65	27.23	J113	10.00	P100	Passed
J59	RR	500.00	548.84	503.30	552.14	87.13	43.86	J113	10.00	P62	Passed

Fire Flow Node FlexTable: Fire Flow Results Table

Label	Zone	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Calculated Residual) (psi)	Pressure (Calculated System Lower Limit) (psi)	Junction w/ Minimum Pressure (System)	Velocity of Maximum Pipe (ft/s)	Pipe w/ Maximum Velocity	Fire Flow Status
J60	RR	500.00	655.43	502.07	657.50	64.83	42.22	J113	10.00	P62	Passed
J61	RR	0.01	391.68	0.01	391.68	88.85	45.95	J113	10.00	P64	Passed
J62a	RR	500.00	877.79	501.65	879.44	63.60	39.49	J113	10.00	P65b	Passed
J62b	RR	500.00	742.28	500.00	742.28	65.67	41.70	J113	10.00	P65b	Passed
J63	RR	500.00	1,101.27	507.03	1,108.30	65.44	35.32	J113	10.00	P103b	Passed
J64	RR	500.00	1,730.22	501.65	1,731.87	33.05	20.01	J113	8.28	P67	Passed
J65	RR	500.00	1,235.50	501.23	1,236.73	49.87	32.09	J113	10.00	P68	Passed
J66	RR	500.00	1,576.66	500.84	1,577.50	19.89	22.01	J113	10.00	P68	Passed
J67	RR	500.00	1,354.03	500.00	1,354.03	36.07	27.28	J113	10.00	P71	Passed
J68	RR	500.00	1,576.51	500.00	1,576.51	38.78	20.01	J113	8.26	P72	Passed
J69	RR	500.00	1,562.89	500.00	1,562.89	42.53	20.00	J113	7.51	P73	Passed
J70	RR	500.00	1,547.97	500.00	1,547.97	44.01	20.00	J113	7.05	P78	Passed
J71	RR	500.00	1,710.78	501.23	1,712.02	43.33	20.00	J113	8.09	P78	Passed
J72	LII	1,000.00	1,911.79	1,000.00	1,911.79	43.66	20.00	J113	9.37	P78	Passed
J73	LII	1,000.00	1,566.30	1,000.42	1,566.72	49.16	28.23	J113	10.00	P76	Passed
J74	LII	1,000.00	1,939.63	1,000.00	1,939.63	49.21	25.61	J113	10.00	P78	Passed
J75	LII	1,000.00	2,527.32	1,000.00	2,527.32	42.07	20.01	J113	8.51	P203	Passed
J76	RR	500.00	1,441.50	501.65	1,443.15	43.95	20.01	J113	8.51	P79	Passed
J77	RR	500.00	1,298.95	502.07	1,301.03	41.33	20.02	J113	7.45	P79	Passed
J78	RR	500.00	1,192.12	500.84	1,192.96	39.22	20.01	J113	6.67	P79	Passed
J79	RR	500.00	1,132.95	502.49	1,135.45	37.13	20.01	J113	6.25	P79	Passed
J80	RR	500.00	1,071.78	500.42	1,072.20	33.78	20.01	J113	5.81	P79	Passed
J81	RR	500.00	1,042.25	500.84	1,043.09	32.56	20.01	J113	5.60	P79	Passed
J82	RR	500.00	1,590.82	504.53	1,595.36	44.95	20.00	J113	7.33	P73	Passed
J83	RR	500.00	749.31	500.00	749.31	52.47	40.41	J113	10.00	P87	Passed
J84	RR	500.00	1,559.69	501.23	1,560.92	37.61	20.95	J113	10.00	P88	Passed
J85	RR	500.00	1,595.49	501.23	1,596.72	49.25	20.00	J113	7.49	P89	Passed
J86	RR	500.00	1,599.62	500.84	1,600.46	53.04	20.00	J113	7.26	P73	Passed
J87	RR	500.00	1,611.81	502.88	1,614.70	25.84	20.00	J113	9.76	P92	Passed
J88	RR	500.00	1,607.73	504.53	1,612.27	35.37	20.01	J113	8.23	P93	Passed
J89	RR	500.00	1,559.69	500.84	1,560.53	28.55	20.95	J113	10.00	P88	Passed

Fire Flow Node FlexTable: Fire Flow Results Table

Label	Zone	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Calculated Residual) (psi)	Pressure (Calculated System Lower Limit) (psi)	Junction w/ Minimum Pressure (System)	Velocity of Maximum Pipe (ft/s)	Pipe w/ Maximum Velocity	Fire Flow Status
J90	RR	500.00	1,559.69	502.88	1,562.57	21.76	20.95	J113	10.00	P88	Passed
J91	RR	500.00	1,559.69	502.07	1,561.76	16.65	20.95	J113	10.00	P88	Passed
J92	RR	500.00	1,610.08	501.23	1,611.31	37.76	20.00	J113	7.56	P97	Passed
J93	RR	500.00	1,610.00	501.23	1,611.23	48.03	20.00	J113	7.15	P73	Passed
J94	RR	500.00	1,609.53	502.49	1,612.02	52.42	20.00	J113	7.15	P73	Passed
J95	RR	500.00	1,131.83	502.88	1,134.72	66.52	32.78	J113	10.00	P100	Passed
J96	RR	500.00	1,249.84	502.49	1,252.33	57.87	29.92	J113	10.00	P100	Passed
J97a	RR	500.00	716.35	504.14	720.49	68.16	42.15	J113	10.00	P103b	Passed
J97b	RR	500.00	611.87	500.00	611.87	65.75	43.65	J113	10.00	P103b	Passed
J98	RR	500.00	881.08	504.14	885.22	72.27	39.47	J113	10.00	P103b	Passed
J99	RR	500.00	388.80	502.88	391.68	53.08	46.25	J113	10.00	P105	Velocity Failed
J100	RR	500.00	1,540.34	500.84	1,541.18	46.06	24.68	J113	10.00	P103b	Passed
J101	RR	500.00	1,540.34	500.00	1,540.34	40.97	24.68	J113	10.00	P103b	Passed
J102	RR	500.00	1,540.34	502.49	1,542.83	37.52	24.68	J113	10.00	P103b	Passed
J103	RR	500.00	1,375.39	500.42	1,375.81	51.02	29.02	J113	10.00	P103b	Passed
J104	RR	500.00	1,333.68	501.23	1,334.91	51.38	30.06	J113	10.00	P103b	Passed
J105	RR	500.00	1,296.41	501.23	1,297.64	52.95	30.96	J113	10.00	P103b	Passed
J106	RR	500.00	1,216.73	501.65	1,218.38	62.04	32.81	J113	10.00	P103b	Passed
J107	RR	0.01	389.19	2.50	391.68	75.71	46.27	J113	10.00	P113	Passed
J108	RR	500.00	608.64	503.30	611.94	73.63	43.60	J113	10.00	P114	Passed
J109	RR	500.00	713.46	501.23	714.69	60.78	42.07	J113	10.00	P116	Passed
J110	RR	500.00	723.73	500.00	723.73	26.76	27.14	J114	10.00	P124	Passed
J111	RR	500.00	703.81	501.23	705.04	29.49	37.47	J110	10.00	P121	Passed
J112	RR	500.00	963.27	500.00	963.27	26.50	20.01	J113	6.15	P122	Passed
J113	RR	500.00	1,081.61	500.84	1,082.45	10.32	20.00	J112	6.91	P123	Passed
J114	RR	500.00	720.00	501.23	721.23	27.19	27.47	J110	10.00	P124	Passed
J115	RR	500.00	1,611.44	501.65	1,613.10	51.91	20.00	J113	7.13	P73	Passed
J116	RR	500.00	1,610.55	502.49	1,613.04	51.82	20.00	J113	7.14	P73	Passed
J117	RR	500.00	1,604.47	500.42	1,604.89	49.84	20.00	J113	9.47	P130	Passed
J118	RR	500.00	969.86	501.23	971.10	70.03	36.30	J113	10.00	P131	Passed
J119	RR	500.00	1,036.72	503.72	1,040.45	52.25	34.86	J113	10.00	P131	Passed

Fire Flow Node FlexTable: Fire Flow Results Table

Label	Zone	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Calculated Residual) (psi)	Pressure (Calculated System Lower Limit) (psi)	Junction w/ Minimum Pressure (System)	Velocity of Maximum Pipe (ft/s)	Pipe w/ Maximum Velocity	Fire Flow Status
J120	RR	500.00	1,075.34	500.00	1,075.34	43.08	30.10	J133	10.00	P131	Passed
J121	RR	500.00	1,100.43	502.49	1,102.92	36.07	28.97	J133	10.00	P131	Passed
J122	RR	500.00	733.15	500.00	733.15	47.83	40.91	J113	10.00	P137	Passed
J123	RR	500.00	625.76	502.07	627.83	63.83	42.69	J113	10.00	P137	Passed
J124	RR	500.00	659.37	502.07	661.44	59.16	42.15	J113	10.00	P138	Passed
J125	RR	500.00	618.51	502.49	621.00	64.53	42.80	J113	10.00	P140	Passed
J126	RR	500.00	1,076.94	502.07	1,079.01	32.13	20.45	J133	10.00	P131	Passed
J127	RR	500.00	872.60	501.65	874.25	38.51	25.09	J133	10.00	P141	Passed
J128	RR	0.01	872.60	1.24	873.83	27.27	25.09	J133	10.00	P141	Passed
J129	RR	500.00	1,075.99	503.72	1,079.72	39.63	27.99	J133	10.00	P131	Passed
J130	RR	500.00	1,076.61	502.49	1,079.10	34.85	24.09	J133	10.00	P131	Passed
J131	RR	500.00	390.03	501.65	391.68	64.97	45.96	J113	10.00	P146	Velocity Failed
J132	RR	500.00	872.60	502.07	874.67	34.58	21.17	J133	10.00	P141	Passed
J133	RR	500.00	872.60	503.30	875.90	15.09	34.15	J134	10.00	P141	Passed
J134	RR	0.01	872.60	0.43	873.02	31.06	21.17	J133	10.00	P141	Passed
J135	UR(3)	500.00	1,404.84	500.00	1,404.84	34.96	20.00	J1	7.11	P8	Passed
J200	Bellingham	500.00	6,345.38	500.00	6,345.38	24.19	43.04	J113	10.00	P200	Passed
J201	Bellingham	500.00	3,725.87	500.00	3,725.87	71.20	37.01	J113	10.00	P202	Passed

APPENDIX I

Appendix I

This Appendix includes the District's Water Rights Self Assessment and Interlocal Agreement with the City of Bellingham for water.

Water Right Self-Assessment Form for Water System Plan

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

Water Right Permit, Certificate, or Claim # *If water right is interruptible, identify limitation in yellow section below	WFI Source # If a source has multiple water rights, list each water right on separate line	Existing Water Rights: Qi= Instantaneous Flow Rate Allowed (GPM or CFS); Qa= Annual Volume Allowed (Acre-Feet/Year); This includes wholesale water sold				Current Source Production – Most Recent Calendar Year: Qi = Max Instantaneous Flow Rate Withdrawn (GPM or CFS); Qa = Annual Volume Withdrawn (Acre-Feet/Year); This includes wholesale water sold				10-Year Forecasted Source Production (determined from WSP): This includes wholesale water sold				20-Year Forecasted Source Production (determined from WSP): This includes wholesale water sold			
		Primary Qi Maximum Rate Allowed	Non-Additive Qi Maximum Rate Allowed	Primary Qa Maximum Volume Allowed	Non-Additive Qa Maximum Volume Allowed	Total Qi Maximum Instantaneous Flow Rate Withdrawn	Current Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume Withdrawn	Current Excess or (Deficiency) Qa	Total Qi Maximum Instantaneous Flow Rate in 10 Years	10-Year Forecasted Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume in 10 Years	10-Year Forecasted Excess or (Deficiency) Qa	Total Qi Maximum Instantaneous Flow Rate in 20 Years	20-Year Forecasted Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume in 20 Years	20-Year Forecasted Excess or (Deficiency) Qa
1																	
2																	
3																	
4																	
5																	
6																	
	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

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

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

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

Name of Wholesaling System Providing Water	Quantities Allowed In Contract		Expiration Date of Contract	Currently Purchased: Current quantity purchased through intertie				10-Year Forecasted Purchase: Forecasted quantity purchased through intertie				20-Year Forecasted Purchase: Forecasted quantity purchased through intertie			
	Maximum Qi Instantaneous Flow Rate	Maximum Qa Annual Volume		Maximum Qi Instantaneous Flow Rate	Current Excess or (Deficiency) Qi	Maximum Qa Annual Volume	Current Excess or (Deficiency) Qa	Maximum Qi 10-Year Forecast	Future Excess or (Deficiency) Qi	Maximum Qa 10-Year Forecast	Future Excess or (Deficiency) Qa	Maximum Qi 20-Year Forecast	Future Excess or (Deficiency) Qi	Maximum Qa 20-Year Forecast	Future Excess or (Deficiency) Qa
1 City o Bellingham	1,100 gpm	Not Specified	Not Specified	1,100 gpm	0 gpm	166 AF	none	1,100 gpm	0 gpm	169 AF	none	1,100 gpm	0 gpm	171 AF	none
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:

INTERLOCAL AGREEMENT
CITY OF BELLINGHAM-WHATCOM CO. WATER DISTRICT #2

R937—0440

I. RECITALS

The CITY OF BELLINGHAM (the "City") is a municipal corporation formed under the laws of the State of Washington and a first-class city. It maintains a water supply system serving the area within its corporate limits and certain areas outside those limits.

WHATCOM COUNTY WATER DISTRICT NO. 2 (the "District") is a water district formed under Title 57 of the Revised Code of Washington, which provides water service within its boundaries. Water District 2 is located within an area adjacent to the City of Bellingham. The District currently provides water service within a portion of its District boundary and may wish to serve additional areas within its boundaries.

WHEREAS, pursuant to the Bellingham Municipal Code 15.36, the City is willing and able to sell treated water to the District through metered connections at the common boundary between the City and the District for a limited service area and under certain terms and conditions.

WHEREFORE, in view of the above recitals and in consideration of the mutual covenants and promises set out below, the parties agree as follows:

1. Provision of water supply. The City agrees to provide to the District up to a maximum of 1100 gallons per minute of potable water service, at a minimum of 20 psi, for resale by the District to its customers residing within the District boundary as it exists as of the date hereinbelow. The City further agrees to provide fire flow as it is available from the City's system. The District boundary is shown in Exhibit "A." The District agrees to not resell water beyond the limits of the

City of Bellingham
CITY ATTORNEY
210 Lottie Street
Bellingham, Washington 98225
Telephone (360) 676-6903

district. The District further agrees to not resell said water in areas annexed to the District after January 1, 1997 without the express written approval of the City.

2. Quality of Water. The water provided to the District shall be of the same standard and quality as shall be distributed through the City's system, and the City shall comply with all State and County health regulations in regard to testing and sampling said water up to, but not beyond the District's meter.

3. The District shall pay for all water passing through the meters at the points of delivery at the rate established by the City of Bellingham for service outside the Bellingham corporate city limits. The District shall pay the City promptly when billed for all water passing through the meter.

4. Interruptions of Service. The obligation of the City to furnish water as above described may be subject to temporary interruptions of service caused by necessary repairs to the City's distribution system or other causes beyond the control of the City. In the event the City anticipates a shut down the distribution system for planned repairs, it shall notify the District at least twenty-four (24) hours in advance.

5. Hold harmless. The District shall defend, indemnify and hold harmless the City, its officers, employees, principals and agents from any and all injury or damage to the City or its property, and also from all claims, demands, causes of action, or suits of any kind that arise directly or indirectly out of, are incident to or are due to any actual or alleged negligence, intentional act, or breach of duty by the District, its agents, employees, representatives or subcontractors arising out of this Agreement. In the event of any claim against the City or against both the City and the District involving an allegation

City of Bellingham
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210 Lottie Street
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of negligence, intentional act, or breach of duty on the part of the District, the District shall be responsible for promptly providing a defense to the City. In the event of an ultimate finding of sole negligence by the City, its officers, employees, principals, or agents, the City shall reimburse the District for its defense costs and shall satisfy any judgment against it. In the event of an ultimate finding of concurrent negligence by the District and the City, the District's and the City's responsibility for defense costs and for satisfying any judgment shall be proportionate to the percentage of each party's negligence or that of its agents, employees, representatives and subcontractors. In the event of an ultimate finding of no negligence by the City, the District shall have total responsibility for defense costs and for satisfying any judgment.

The District understands, and will advise its customers as necessary, that no legal relationship exists between them and the City, and that the District is solely responsible for provision of water service to such customers and billing for same.

6. This Agreement replaces all earlier agreements between the parties and constitutes the entire agreement of the parties and shall not be altered or amended except in writing, signed by an authorized representative of each of the parties.

DATED this 1st day of December, 1997.

WHATCOM COUNTY WATER DISTRICT NO. 2

Commissioner

City of Bellingham
CITY ATTORNEY
210 Lottie Street
Bellingham, Washington 98225
Telephone (360) 676-6903

CITY OF BELLINGHAM

Mark Asmundson, Mayor

ATTEST:

Finance Director

CERTIFICATION

As Secretary of Whatcom County Water District No. 2, I certify that the above Interlocal Agreement was adopted at a regular meeting of the Commissioners held on the 25th day of December 1997, at which time a quorum of 3 was present, and was adopted by a vote of 3 FOR, 0 AGAINST, and 0 ABSTENTIONS.

Secretary
Whatcom County Water District No. 2

APPROVED AS TO FORM:
City of Bellingham

City Attorney's Office

DEPARTMENTAL APPROVAL:

Director of Public Works

City of Bellingham
CITY ATTORNEY
210 Lottie Street
Bellingham, Washington 98225
Telephone (360) 676-6903

CITY OF BELLINGHAM • WASHINGTON •

DEPARTMENT OF PUBLIC WORKS, 210 Lottie St., Bellingham, Washington 98225
Telephone (360) 676-6961 FAX (360) 676-6894

May 19, 1999

Mr. Greg Christensen
Commissioner, Water District #2
1615 Bayon Road
Bellingham WA 98225

Dear Commissioner Christensen:

When we met May 17, 1999, we discussed the need for the District to respond to issues raised by the State Department of Health during their review of your draft Comprehensive Plan. Two issues have been identified that involve the City of Bellingham's agreement to supply water to the District.

First is the concern over the availability of storage for treated water. The City has 29.4 million gallons of storage including the 2.9 million gallon Foster Reservoir in close proximity to the District. This storage is more than adequate to allow the City to provide the District's storage needs. While the current contract between the City and District does not specifically address the issue of storage, the City's system was designed and is intended to provide for all storage requirements of the District.

The second issue concerns the supply of fire flow by the City. We have previously supplied your engineers with the flow data available from our system at the District meters. These flow volumes are sufficient for all but the most extreme fire flow requirements. Both the City and the District have portions of our service areas that are not able to provide sufficient fire flow for high-demand facilities such as heavy industrial uses. We have both taken the policy level position that we will not be financially responsible for the system upgrades that could be necessary to meet fire flow demands for new developments. These new developments will be responsible for paying the costs necessary for system upgrades or, in the alternative, reducing the demand for fire flows through building design. I expect that the documented capability of our system added to your policy of providing system improvements when financed by developers will be sufficient to meet the concerns of the Health Department.

If something further is required, please let me know. We value the District's role as a partner in providing safe drinking water to the greater Bellingham community.

Sincerely,

J M. Garner (shh)

John M. Garner, P.E.
Public Works Director

JMG/shh
Wd2.doc

cc: Tony Freeland, Reichhardt & Ebe✓
Tom Rosenberg
Rory Routhe
Geoff Smyth

CITY OF BELLINGHAM WASHINGTON

DEPARTMENT OF PUBLIC WORKS 2221 Pacific Street Bellingham, WA 98226-5898
Telephone (360) 676-6850 ◆ FAX (360) 676-7799

June 24, 1996

Erik Fairchild
Washington State Department of Health
Post Office Box 47822
Olympia, Washington 98504-7822

Dear Mr. Fairchild:

The City of Bellingham is requesting that 10 interties be "grandfathered" under our existing water rights. All systems were being served prior to the January 1, 1991, cutoff date. I have enclosed the information you requested to qualify.

If you have any questions or comments, please contact me at (360) 676-6850.

Sincerely,

William P. McCourt
Public Works Superintendent
Operations

WPM:dlk

enclosures

Appendix "D"

INTERTIES

Question 1

1) Lummi Water and Sewer District
Located at 1801 Marine Drive (T-38N/R-2E/S-09/Q-03). Identified as #1 on the attached maps.

2) Water District #2
Three separate interties exist with the district all serving the same distribution system. Item #2 on the map is located in the 4500 block of Curtis Road (T-38N/R-2E/S-09/Q-01). Item #3 on the map is located at 3701 Williamson Way (T-38N/R-2E/S-15/Q-02). Item #4 on the map is located at 740 Marine Drive (T-38N/R-2E/S-28/Q-02).

3) Baker James Water Association
Identified as #5 on the map. It is located at 3790 James Street Road (T-38N/R-3E/S-17/Q-04).

4) Water District #10
Two interties exist serving different distribution systems. Item #G on the map is located at 3900 Lakeway Drive (T-38N/R-3E/S-26/Q-02). Item #9 on the map is located at 2117 North Shore Road (T-38N/R-3E/S-27/Q-04).

5) Glen Cove Water Co-op
Identified as #7 on the map. The intertie is located at 1615 Euclid Avenue (T-38N/R-3E/S-27/Q-04).

6) Montgomery Road Water Association

7) Water District #7
Identified as #8 on the map. The intertie is located at 3608 Britton Road (T-38N/R-3E/S-22/Q-01).

D

APPENDIX J

Appendix J

This Appendix includes the District's Water Use Efficiency Program

WHATCOM COUNTY WATER DISTRICT #2
WATER USE EFFICENCY (WUE) PROGRAM

1. Current Water Conservation Program

The 2009 Water System Plan adopted by the District included a conservation element. This included the following steps:

a. Customer Assistance (provides water conservation information to customers)
b. Unaccountable Water Leak Detection (ongoing process)
c. Lawn Watering (adopted odd-even watering schedule)
d. Plumbing Code (support conservation oriented code revisions)
e. Metering (meters 100% of customers)
f. Landscape Management and Play Fields (encourages low water use landscaping)
g. Master Meters (works with Bellingham to maintain master meter accuracy)

2. Water Use Efficiency Goals

The District notified the public through an ad in the Bellingham Herald that a public meeting would be held on March 20, 2023 for public input on the District's proposed Water System Plan and Water Use Efficiency plan. The goals proposed at this meeting and adopted by the commissioners included reducing system wide Average Day Demand per ERU to 170 gallons per day (demand side goal) and keeping leakage to under 5% (supply side goal). These goals are to be achieved by use of rates and continued use of the measures listed in Section 1.

3. Evaluation of Proposed Water Use Efficiency Measures

The District is required to evaluate four Water Use Efficiency measures. The following measures were evaluated and all of them are to be implemented:

a. Conservation Rate Structure
b. Voluntary Odd-Even Watering Schedule in warm weather
c. Use of radio read meters to help with customer leak detection
d. Student Education Program (Member of Whatcom Water Alliance)
e. Rain Barrel Program
f. Continue applicable Conservation Measures listed in Section 1 above

4. Description of Water Use Efficiency Measures Implemented

a. **Conservation Rate Structure:** The District has determined that keeping rates high for all users is a valuable conservation tool. As cost for water increases water use decreases. Water use and rates are analyzed annually to ensure that the rates are kept high enough to keep water use within the goals set.
b. **Customer Leak Detection:** The District will utilize the leak detection capabilities of the radio read meters to assist in locating service leaks.

c. **Voluntary Odd-Even Watering Schedule:** The District has adopted a voluntary Odd-Even watering schedule to reduce peak flows during July and August. The District will continue to encourage conservative water usage during the summer months.
d. **Student Education Program:** This project is conducted as part of the Whatcom Water Alliance. It consists of a program of education in local schools and the community about the importance of water conservation.
e. **Rain Barrel Program:** The District promotes the use of rain barrels. Rain barrels are connected into a downspout system in order to capture and store rain water. The use of rain barrels will allow rainwater to supplement tap water and reduce water consumption. Water collected in the rain barrels can be used for purposes such as gardening and lawn watering.

5. Describe Customer Education Plan

The District communicates the importance of using water efficiently directly to customers in the annual Consumer Confidence Report. At times conservation letters may also be included with water bills.

6. Estimated Water Savings from the Water Use Efficiency Plan

The projections of water demand with and without conservation are shown in Tables 2-09 and 2-10 of the Water System Plan. The saving realized by reducing the average system wide customer ADD without conservation (185 gpd/ERU) to the goal with conservation of 170 gpd/ERU is projected over a 10-year period. At an average of 15 gpd for 780 ERUs, savings will amount to over 4.27 million gallons per year. At a purchase cost of $3.28 per 100 CF the annual savings will be approximately $18,700 per year.

7. Evaluation of Effectiveness of the Water Use Efficiency Program

Water use will be analyzed annually, using source and customer meter readings to determine leakage and overall water use. Individual ERU water use will be tracked on the District's water use database. This information will be used to determine the overall reduction in both leaks and water use by customers. Modifications to the WUE program can be made to increase the effectiveness, if needed. Typical modifications can include adjusting rates, additional education, or adding additional WUE measures.

8. System Leakage Evaluation

Distribution System Loss is tracked by the District on an annual basis and is shown in Table 2-2 and discussed in Section 2.1.4 of the Water System Plan. Leakage for the most recent 4 years that did not include system wide flushing was 3.3%. The amount of water used for flushing was not tracked, and as a result showed up as leakage. Before conducting a flushing program in the future, the District will set up a procedure to estimate the amount of flushing water actually used, which will then show up as accounted for water and give a more reliable account of leakage.

The District plans on a program to replace defective pipe in the system and will prioritize replacement of the most leak prone sections first.

9. Rate Structure

The District adopted a conservation rate in 2007. This has been an effective tool in promoting conservation, as the single family ADD of water sold (not including unaccounted for water) dropped from 176.9 gpd/ERU in 2006 to 155.1 gpd/ERU in 2020. The rate is adjusted annually to reflect the water purchase price from Bellingham and as needed to control water use. The higher rates also allow the District to accumulate funds to replace leaking water mains and services.

10. Water Supply Characteristics

a. **Source Description:** The District obtains all of its water from the City of Bellingham. This water comes from Lake Whatcom, and is treated by filtration and disinfection.
b. **Production Capacity:** The District is limited to 1,100 gpm plus fire flow by the Interlocal Agreement for water with the City of Bellingham. There is no annual limit to amount of water that can be purchased. Projections in the Water System Plan indicate that this amount will not be required for many years. The PHD without conservation or fire flow for the year 2043 per Table 2-9 of the WSP is estimated to be 453 gpm.
c. **Water Rights:** The District does not have water rights. They rely on their supplier, the City of Bellingham. The Bellingham Water System Plan indicates that Bellingham has adequate water rights and supply for the next 20 years.
d. **Legal Constraints:** The Interlocal Agreement with the City of Bellingham allows the District to resell water within the District boundary only. If the District were to expand, the City of Bellingham would need to approve any resale of water by the District to those areas.