



KING COUNTY

1200 King County Courthouse
516 Third Avenue
Seattle, WA 98104

Signature Report

Ordinance 19266

Proposed No. 2021-0043.2

Sponsors Dembowski

1 AN ORDINANCE approving the North City Water District
2 2020 Water System Plan.

3 **STATEMENT OF FACTS:**

- 4 1. King County has adopted K.C.C. chapter 13.24, which requires
5 approval of comprehensive plans for water utilities that distribute or obtain
6 water in unincorporated King County as a prerequisite for operating in
7 unincorporated King County, receiving approval for annexation proposals,
8 being granted right-of-way franchises, and being given approval for right-
9 of-way construction permits. K.C.C. 13.24.060 prescribes the
10 requirements for approval of such plans, including consistency with state
11 and local planning requirements.
- 12 2. RCW 57.16.010 requires that general comprehensive plans by special
13 purpose districts be submitted to, and be approved by, the legislative
14 authority within whose boundaries all or a portion of a utility lies.
- 15 3. North City Water District's service area is within King County and the
16 district has adopted a comprehensive water system plan ("the plan"). The
17 district's previous water system plan was prepared in 2012 and approved
18 in 2013.
- 19 4. King County has adopted a comprehensive plan that includes water

Ordinance 19266

20 supply policies in its provisions for facilities and services (policies F-101
21 through F-254) that call for consistency with other adopted plans, support
22 for regional water supply planning, pursuit of reclaimed water, water
23 conservation and protection of water resources.

24 5. K.C.C. chapter 13.24 requires the utilities technical review committee
25 to review and make a recommendation to the King County executive and
26 council on the plan and the requirements under K.C.C. chapter 13.24 and
27 consistency with the King County Comprehensive Plan. The utilities
28 technical review committee has reviewed the planning data and district's
29 operations and has found:

30 a. The plan uses population and employment forecasts developed by the
31 Puget Sound Regional Council for the district's service area;

32 b. The district's service area is in incorporated King County;

33 c. The capital facility plan is adequate to meet anticipated facility and
34 service needs;

35 d. The plan is consistent with applicable Washington state water quality
36 laws; and

37 e. The plan is consistent with other pertinent county adopted plans and
38 policies.

39 6. The Washington state Department of Health approval is pending upon
40 King County's approval of the plan.

41 7. Under the State Environmental Policy Act, the District issued a
42 determination of nonsignificance for the plan on March 17, 2020. There

Ordinance 19266

43 were no appeals.

44 8. The district's operations and facilities meet multiple existing statutory,
45 administrative and planning standards. As the district's operations,
46 facilities and planning meet the requirements of the King County Code
47 and are consistent with the King County Comprehensive Plan, the utilities
48 technical review committee has recommended approval of the plan.

49 BE IT ORDAINED BY THE COUNCIL OF KING COUNTY:

Ordinance 19266

50 SECTION 1. The North City Water District 2020 Water System Plan,
51 Attachment A to this ordinance, is hereby approved as a water system plan.
52

Ordinance 19266 was introduced on 3/2/2021 and passed by the Metropolitan King County Council on 4/6/2021, by the following vote:

Yes: 9 - Ms. Balducci, Mr. Dembowski, Mr. Dunn, Ms. Kohl-Welles,
Ms. Lambert, Mr. McDermott, Mr. Upthegrove, Mr. von Reichbauer
and Mr. Zahilay

KING COUNTY COUNCIL
KING COUNTY, WASHINGTON

DocuSigned by:

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Claudia Balducci, Chair


ATTEST:

DocuSigned by:

C267B914088E4A0...

Melani Pedroza, Clerk of the Council

APPROVED this _____ day of 4/15/2021, _____.

DocuSigned by:

4FB CAB8196AE4C6...

Dow Constantine, County Executive

Attachments: A. North City Water District 2020 Water System Plan March 2020, Amendment No. 1
October 2020



2020 Water System Plan

March 2020

AMENDMENT NO. 1
October 2020



DAVID EVANS
AND ASSOCIATES INC.



2020 WATER SYSTEM PLAN
AMENDMENT NO. 1

North City Water District
1519 NE 177th Street
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Commissioners
Charlotte Haines
Patricia Hale
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Operations Manager
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NORTH CITY WATER DISTRICT
2020 WATER SYSTEM PLAN
AMENDMENT NO. 1
PROJECT CERTIFICATION

The body of this plan was developed for Amendment No. 1 to the 2020 Water System Plan. The hydraulic model and associated capital improvement plan were prepared by BHC Consultants, LLC. All other information was prepared by David Evans and Associates, Inc. with significant input from the District. The 2020 Water System Plan was prepared by CHS Engineers, LLC. The undersigned professional engineer whose stamp is affixed hereto has continuously acted as the professional in responsible charge and prepared or directed all phases of the work to complete the 2020 Water System Plan and this Amendment No. 1.



This plan was prepared under the direction of a Registered Professional Engineer in the State of Washington.

Prepared by:

Rodney Langer

Date:

Oct 2, 2020

**AMENDMENT No. 1
to
WATER SYSTEM PLAN
NORTH CITY WATER DISTRICT**

October 2, 2020

INTRODUCTION

The North City Water District (District) 2020 Water System Plan (WSP or Plan) was completed by CHS Engineers, LLC in March 2020, and adopted by the District in March 2020. The Plan was submitted to the King County Utility Technical Review Committee (UTRC), City of Shoreline, City of Lake Forest Park, King County Department of Health, Washington State Department of Health (DOH), Lake Forest Park Water District, Seattle Public Utilities, City of Mountlake Terrace, Northshore Utility District, and Washington State Department of Social and Health Services. The only comments received by the District were provided by the UTRC, DOH and Lake Forest Park Water District. Most comments were general inquiries which are addressed in the District's response letters to these agencies, as referenced herein. The comments prompted revisions to the March 2020 Plan which are compiled in this Amendment No. 1 to the WSP.

The following are amendments to the District's 2020 WSP. Unless modified below, the 2020 WSP is unchanged.

AMENDMENTS TO SECTION 5

Remove and replace Table 5-4 with the following:

TABLE 5-4
STORAGE ANALYSIS BY GROUPED ZONES AND YEAR

Year	Zones ¹	ERUs	Grouped Zone Gross Vol. (MG)	Storage Component Volume (MG)				Effective Volume ⁸ (MG)	Storage Surplus (Deficit) ⁹ (MG)
				Dead ²	Standby ^{3,5}	Fire Suppres. ^{4,5}	Equaliz. ⁶	Operat. ⁷	
2020	590 Zone Group	10,573	3.7	0	0.73	1.08	0.05	0.60	1.96
	432 Zone Group	589	2.0	0	0.04	0.63	0.01	0.48	0.89
	Total	11,162	5.7	0	0.77	1.08	0.06	1.08	
2024	590 Zone Group	10,749	3.7	0	0.82	1.08	0.06	0.60	1.95
	432 Zone Group	593	2.0	0	0.05	0.63	0.01	0.48	0.89
	Total	11,342	5.7	0	0.86	1.08	0.07	1.08	
2029	590 Zone Group	11,234	3.7	0	1.08	1.08	0.08	0.60	0.84
	432 Zone Group	675	2.0	0	0.06	0.63	0.01	0.48	0.82
	Total	11,909	5.7	0	1.14	1.08	0.10	1.08	
2034	590 Zone Group	11,559	3.7	0	1.25	1.08	0.10	0.60	0.66
	432 Zone Group	715	2.0	0	0.08	0.63	0.01	0.48	0.81
	Total	12,274	5.7	0	1.33	1.08	0.11	1.08	
2039	590 Zone Group	11,927	3.7	0	1.44	1.08	0.12	0.60	0.45
	432 Zone Group	758	2.0	0	0.09	0.63	0.02	0.48	0.79
	Total	12,685	5.7	0	1.53	1.08	0.13	1.08	

1. Grouped Zone Gross Vol. includes total gross volume of storage facilities in grouped zone.

2. Dead Storage includes the stored volume that is not available to all customers at a minimum design pressure. The construction and operation of the North City Pump Station enabled the use of what had previously been dead storage in the 3.7 MG reservoir.

3. Standby Storage determined by the DOH-recommended minimum of 200 gallons/ERU, with a reduction based on the surplus supply available in each year.

4. Fire Suppression Storage is a volume available at a minimum pressure of 20 psi to all customers and includes the volume consisting of the highest minimum required fire flow rate and duration for the zone group.

5. District currently considers Fire Suppression and Standby Storage to be nested. As a long term plan the District desires to un- nest Fire and Standby storage in order to have more storage available for emergency needs (reflected for 2029 and later). As indicated in Section 6, the District intends to construct additional storage capacity in 2026 to provide adequate storage for the forecast period. The table does not reflect the capacity of that additional facility.

6. Equalizing Storage – refer to Section 5.3.4.

7. Operational Storage – refer to Section 5.3.5.

8. Effective Volume is the total volume of the reservoir less any dead storage.

9. Storage Surplus is the Effective Volume, less Standby, Fire Suppression, Equalizing and Operating Storage volumes. (Results are subject to rounding.)

AMENDMENTS TO APPENDICES

AMENDMENTS TO APPENDIX E

Add the following document:

- NCWD 2020 Consumer Confidence Report

AMENDMENTS TO APPENDIX H

Add the following documents:

- Calibration Memo
- NCWD System Analysis and CIP Update Technical Memorandum (September 2020)

AMENDMENTS TO APPENDIX J

Add the following documents:

- Public Hearing Minutes
 - Minutes for Public Hearing of March 17, 2020
- Reviewer Comments
 - Letter from King County Utility Technical Review Committee, July 22, 2020
 - Email from Lake Forest Park Water District, July 23, 2020
 - Letter from Washington State Department of Health, August 18, 2020
- District Responses
 - Letter to King County Utility Technical Review Committee, August 6, 2020
 - Letter to Washington State Department of Health, October 7, 2020
- District Resolution
 - Resolution 2020.10.34 Adopting Amendment No. 1 to the Water System Plan, October 6, 2020



From Our Board...

by Ron Ricker, President

These past few months have been incredibly difficult for so many of us. We understand the challenges you're facing, and are doing everything in our power to ensure your water remains safe, available, and of the highest quality. This time last year, our annual report spoke of all the growth happening in our community—all of which has come to a standstill during the COVID-19 crisis. We know it will return, but as of this publication, when will that be, and how will it look? So many developers are anxious to get started or restarted on their projects to ensure they meet our standards when connecting to our system. As your water provider for nearly 90 years, we have made all necessary adjustments to continue to serve you. We are especially proud of our staff—how quickly they reacted to the COVID-19 event, how adaptable they were to change, and how well they addressed the additional safety precautions to ensure everyone could remain safe and available for you. Despite keeping appropriate social distance, we have been able to operate in our normal fashion with only a few slight modifications. We have learned how to meet remotely using a variety of technology for our regional and board meetings. All that aside, we are looking very forward to the day that we can begin offering in-person customer service to you again.



North City Waves Newsletter ~ a publication by North City Water District

- 1) Join www.nextdoor.com for neighborhood news and notices
- 2) Follow us on www.facebook.com/NorthCityWaterDistrict
- 3) Sign up for news, alerts, free classes and more on our website at www.northcitywater.org

Three Ways to Stay in Touch

- Annual Water Quality Report for 2019
- Water Test Results Tables and Definitions
- Project Update: New Maintenance Building
- Tap Water is Better Than Bottled
- Conserving Water Together
- More About Water Quality
- Maintaining Water Safety During COVID-19

Inside This Issue

PO Box 55367
1519 NE 177th Street
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More About Water Quality

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, and can pick up substances resulting from the presence of animals or from human activity. In Seattle's surface water supplies, the potential sources of contamination include:

- Microbial contaminants, such as viruses, bacteria, and protozoa from wildlife;
- Inorganic contaminants, such as salts and metals, which are naturally occurring; and
- Organic contaminants, which result from chlorine combining with the naturally occurring organic matter.

In order to ensure that tap water is safe to drink, the Environmental Protection Agency and/or the Washington state board of health prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration and/or the Washington state department of agriculture regulations establish limits for contaminants in bottled water that must provide the same protection for public 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 a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline at 800.426.4791.

We at North City Water District encourage public interest and participation in the decisions that affect our drinking water. If you would like to learn more about our water, have questions about its quality, or would like to know what you can do to help keep our water supply clean, safe and abundant, please don't hesitate to contact us at 206.362.8100, or visit one of our Board of Commissioners meetings (every first and third Tuesday of each month at 3:00 pm) at our District office, or you can contact any one of the following organizations:

Seattle Public Utilities

Phone: 206.684.3000

Website: http://www.seattle.gov/util/MyServices/Water/Water_Quality

United States Environmental Protection Agency (EPA) and the Safe Drinking Water Hotline

Phone: 800.426.4791

Website: <http://www.epa.gov/safewater>

Washington State Department of Health (DOH):

Phone: 800.521.0323

Website: <http://www.doh.wa.gov/ehp/dw/>



Maintaining Water Safety During the COVID-19 Crisis

No need to worry... the virus that causes COVID-19 has NOT been detected in drinking water. Thanks to our process of water filtration and disinfection, Seattle's drinking water remains safe and protected against contaminants, including COVID-19 caused by the novel coronavirus.

The United States has some of the highest tap water standards in the world, and as this Annual Water Quality Report illustrates, water from North City Water District meets (or exceeds) these standards. In order to maintain this excellent record, it is of the utmost importance that all water utility personnel remain active as an essential service to keep these processes and systems operating at the highest level.

We at North City Water District are here for you 24 hours a day, 7 days a week, every day of the year, with one focus: your water.

As many of you are aware, when the COVID-19 crisis first emerged in our community, our district immediately closed our front doors to walk in traffic to reduce the potential spread of the virus, as well as access to our conference room. While it was disappointing to discontinue this resource (our board room use went from 91 events totalling 315.25 hours in 2018, to 124 events totalling 445 hours in 2019), we knew it was the right thing to do to protect our community. Going forward, our board will begin considering various alternatives and options for how the room will be used, once we get through this crisis.

In addition to our payment dropbox outside the front door, our drive up window is still being used for bill payment. Many customers (and their dogs), have loved using our drive up window for years, so we wanted to continue making this option available, with added sanitization and safety precautions.

Our customer service staff have also been helping customers learn how to use our online payment options—resulting in a >10% increase during the first three months of 2020, compared

to 2019. If you're experiencing difficulties paying your water bill due to COVID-19, please contact our office to discuss payment arrangements. We have temporarily suspended all shut-off and failure-to-pay fees until this crisis is over. For additional assistance, visit our website and click on the "Customer Support and Resources During COVID-19" link.

Our field crew is practicing appropriate distancing and safety precautions while continuing to...

- Collect water quality samples and monitor results;
- Work with customers to get their backflow devices tested; **Customers who had their backflow tests due in May and June will be due in June. Reminder notices were sent last month.**
- Investigate water quality questions that may come up;
- Provide on-site customer service including water meter turn on/off, rereads for a billing question, pressure tests, and potential leak investigations;
- Locate water lines for customers who are using this stay-at-home time for projects, or other utility providers that may have work they will be doing in the street in the near future;
- Repair, change, and investigate water meters;
- Read water meters; and
- Conduct routine inspections of our pump station, booster stations, and supply stations.

When the Stay Home, Stay Safe order is removed, we look forward to resuming our remaining activities!

The North City Waves Newsletter is brought to you by North City Water District, and its Board of Commissioners:

Ron Ricker (President), Patty Hale (Vice President), and Charlotte Haines (Secretary).

Feel free to contact us at PO Box 55367, or 1519 NE 177th Street, Shoreline, WA 98155.

206.362.8100 • www.northcitywater.org • [Facebook](https://www.facebook.com/NorthCityWaterDistrict) / NorthCityWaterDistrict

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We can help you save water!



Conserving Water Together

During 2019, North City Water District purchased 551 million gallons of water, with a distribution leakage rate of 1.6% throughout our system—significantly below the State standard of no more than 10% water loss—for which we are extremely proud.

On July 16, 2019, our Board of Commissioners adopted the following regional goals for the six-year period from 2019-2028, in connection with our Water Use Efficiency Program:

- A. North City Water District will continue to support community education about the District and water conservation issues.
- B. As one of the 18 members of the Saving Water Partnership, North City Water District supports their new regional goal of keeping the total average annual retail water use under 110 mgd through 2028, despite forecasted population growth.

During 2019, we helped meet this goal with an overall 94.0 mgd average annual retail water use through the following programs:

- Over 27,600 people visited our Water Education Booths at numerous community events throughout our area;
- 130 people learned water-wise gardening tips at our free Savvy Gardener classes held in our conference room—**find classes at www.savingwater.org/lawn-garden/gardening-classes**
- 43 classroom presentations were made about water;
- 9 single family households replaced 11 toilets with rebates; and
- 1 single family household installed a new irrigation timer and received a rebate.



Annual Water Quality Report for 2019

North City Water District continues to maintain state and federal water quality guidelines that are significantly below EPA maximum levels.

All About Your Water

Where Is Your Water From? Tolt and Cedar River Watersheds.

Who Tests Your Water? Your drinking water is regulated by the Environmental Protection Agency (EPA), who sets drinking water quality standards, establishes testing methods and monitoring requirements for water utilities, sets maximum levels for water contaminants, and requires utilities to give public notice whenever a violation occurs. Your drinking water is tested frequently both by North City Water District and Seattle Public Utilities, our supplier, to ensure that high quality water is delivered to your home.

What is Your Water Being Tested For? 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 a health risk. More information about contaminants and potential health effects is available by calling the Environmental Protection Agency's (EPA) Safe Drinking Water Hotline 800.426.4791.

When is Your Water Tested? Continuously—365 days a year.

How is Your Water Tested? Over 200 compounds are tested and not detected; most of this monitoring occurs once every several years. Tests are done before and after treatment and while your water is in the distribution system. The Tables presented on the following page list all of the contaminants detected in the most recent required water testing and compare them to the limits and goals set by the EPA and the State of Washington to ensure your tap water is safe. Not shown are more than 200 additional contaminants that were tested for, but not detected, in your drinking water. If you would like to see a list of these other compounds or if you have other water quality questions, do not hesitate to contact us. Please note: asbestos monitoring is not required for our District because all the asbestos pipe in our distribution system was replaced prior to 1991.

How Safe is Your Water? Your water falls safely within state and federal guidelines for each and every contaminant, significantly below the EPA's levels.

Lead and Copper Monitoring Results

Our regional water supply does not contain lead or copper. However it is possible that lead levels at your home may be higher than at other homes in the community as a result of materials used in your home's plumbing.

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. North City Water District is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components.

When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline at 1.800.426.4791 or at <http://www.epa.gov/safewater/lead>.

People With Special Concerns

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised 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 from infections. These people should seek advice about drinking water from their health care providers. EPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by microbial contaminants are available from the Safe Drinking Water Hotline at 1.800.426.4791.

If you would like to learn more about your water, or if you have questions about its quality, please don't hesitate to contact North City Water District at 206.362.8100.

Table 1: Water Quality Testing Results for 2019

Compounds that were not detected in 2019 are not included in these charts.

Types of Detected Compounds	Units	Primary Source	Ideal Goal (MCLG)	Max. Allowed (MCL)	Levels in the Cedar River Watershed Average Range		Levels in the Tolt Watershed Average Range		Meets EPA Stds.?
RAW WATER									
Total Organic Carbon	ppm	Naturally present in the environment	NA	TT	0.5	0.3 to 0.8	1.1	1.0 to 1.3	Yes
FINISHED WATER SOURCE									
Turbidity	NTU	Soil runoff	NA	TT	0.3	0.2 to 1.8	0.03	0.01 to 0.17	Yes
Arsenic	ppb	Erosion of natural deposits	0	10	0.4	0.4 to 0.6	0.4	0.3 to 0.4	Yes
Barium	ppb	Erosion of natural deposits	2000	2000	1.6	1.4 to 1.9	1.3	1.1 to 1.5	Yes
Bromate	ppb	Byproduct of drinking water disinfection	0	10	ND	ND	0.2	ND to 2	Yes
Chromium	ppb	Erosion of natural deposits	100	100	0.27	0.25 to 0.33	0.2	ND to 0.24	Yes
Fluoride	ppm	Water additive to promote strong teeth	4	4	0.7	0.6 to 0.8	0.7	0.6 to 0.8	Yes
Nitrate	ppm	Byproduct of drinking water disinfection	10	10	ND	One sample	0.11	One sample	Yes
SPECIFIC SAMPLES FROM NORTH CITY WATER DISTRICT'S DISTRIBUTION SYSTEM									
Total Trihalomethanes	ppb	Byproduct of drinking water disinfection	NA	80	Average: 44 Range: 27 to 66				Yes
Haloacetic Acids (5)	ppb	Byproduct of drinking water disinfection	NA	60	Average: 37 Range: 18 to 46				Yes
Chlorine	ppm	Water additive to control microbes	MRDLG =4	MRDL =4	Highest Monthly Average: 0.84 Range: 0.09 to 1.34				Yes

Table 2: Lead and Copper Monitoring Results for the Tolt Watershed in 2017

Samples are taken every three years. Five of the 51 samples in the Tolt Watershed were taken in NCWD's service area. None of the samples for the Cedar River Watershed were from NCWD's service area.

Lead and Copper Sampling Program and Units	Ideal Goal MCLG	Action Level ¹	Results of 2017 Samplings ²	# Homes Exceeding Action Level	Typical Sources in Drinking Water
Lead, ppb	0	15	4.0	0 of 51	Corrosion of household plumbing systems. Samples collected in homes within the Tolt water service area.
Copper, ppm	1.3	1.3	0.15	0 of 51	

¹ The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

² 90th percentile: 90 percent of the samples were less than the values shown.

Table 3: UCMR4 Monitoring for 2019

Analyte	Units	MRL	Minimum	Maximum	Average
Manganese	ppb	0.4	ND	1.5	0.75
Quinoline	ppb	0.0	0.026	0.15	0.09
Bromochloroacetic Acid	ppb	0.3	0.4	0.91	0.6
Bromodichloroacetic Acid	ppb	0.5	0.93	1.5	1.1
Dibromoacetic Acid	ppb	0.3	ND	0.32	0.04
Dichloroacetic Acid	ppb	0.2	4.4	15.0	8.3
Monochloroacetic Acid	ppb	2.0	ND	2.1	0.26
Trichloroacetic Acid	ppb	0.5	12	17	14.4

UCMR4 data is reported to let you know about new contaminants that may be regulated in the future. The EPA requires us to monitor contaminants that do not have defined health-based standards. The EPA uses this information to determine the occurrence of contaminants in drinking water systems, which may lead to future regulations. The contaminants monitored were selected through a data-driven process that considered adverse health effects (potency and severity) and occurrence (prevalence and magnitude), but additional health information is needed to know whether the contaminants pose a health risk. For more information about the program, visit EPA's website:

www.epa.gov/dwucmr/fourth-unregulated-contaminant-monitoring-rule

Table Definitions

MCLG: Maximum Contaminant Level Goal

The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

MCL: Maximum Contaminant Level

The highest level of a contaminant allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

MRDL: Maximum Residual Disinfectant Level

The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG: Maximum Residual Disinfectant Level Goal

The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

TT: Treatment Technique

A required process intended to reduce the level of a contaminant in drinking water.

NTU: Nephelometric Turbidity Unit

Nephelometric Turbidity Unit - Turbidity is a measure of how clear the water looks. The turbidity MCL that applied to the Cedar supply in 2019 is 5 NTU, and for the Tolt supply it was 0.3 NTU for at least 95% of the samples in a month. 100% of Tolt samples in 2019 were below 0.3 NTU.

NA: Not applicable.

ND: Not detected.

ppm: 1 part per million = 1 mg/L = 1 milligram per liter.

ppb: 1 part per billion = 1 ug/L = 1 microgram per liter

1 ppm: = 1000 ppb.



Project Update: New Maintenance Building


Progress is still underway at our new Maintenance Building. The metal portion of the Vehicle Facility is being erected, and its roof will be installed soon, along with a roof on the Decant Facility. Although higher than expected bids caused us to eliminate both the Wash Facility and final build out of the Vehicle Facility, we were still able to construct the Vehicle Facility's concrete pad. We expect to enclose the final bays of this facility as soon as our finances allow for it. Meanwhile an old structure located on the northeast corner of the property have been removed to make way for the crews' parking lot.

Why Tap Water is Better than Bottled (and not just in an emergency)

Four Reasons to Stop Buying Bottled Water:

1. The COVID-19 virus has not been detected in tap water. Standard procedures for tap water filtration, disinfection, and treatment removes or inactivates the virus.
2. Each year, 17 million barrels of oil are used to produce the plastic for bottled water (equivalent to 340 million gallons of gasoline).
3. Only 1 in 5 of these plastic water bottles gets recycled.
4. Bottled water is much more expensive than tap water.

Tap water is the safest, least expensive, and most environmentally sound way to remain hydrated.



Rebates Available

Planning to replace or install a new toilet, or upgrade your sprinkler system? How about commercial kitchen equipment, laundry equipment, medical equipment, or industrial refrigeration? Saving Water Partnership has an abundance of rebates for homeowners, apartment and condo owners, as well as institutions, and commercial/industrial businesses. For more information, visit: www.savingwater.org/rebates



MEMORANDUM

Date: June 28, 2018
To: Denny Clouse, Operations Manager
From: Dave Harms
Subject: Hydraulic Modeling, System Analysis & CIP Update
Model Calibration

Introduction

This memorandum describes the calibration update performed for the North City Water District distribution system hydraulic model. Periodic calibration of the model is recommended to verify/update model accuracy. The previous calibration was performed in 2009. This calibration effort includes the following tasks:

- Identify field hydrant flow tests, including test locations, recommendations for operational settings and preparation of working maps for each test. Identify hydrants for flow and pressure monitoring.
- Assist District staff with collection of field data during the flow tests.
- Obtain District telemetry data for the period covering each hydrant flow test. Create individual model scenarios, with unique operational settings matching telemetry data.
- Perform model simulations of each hydrant flow test and adjust model parameters so that simulation results provide an acceptable match to the test data recorded in the field.

The intent of the hydrant flow tests is to identify Hazen-Williams roughness coefficients, or 'C' values, for the different pipe materials that comprise the District's distribution system. 'C' values are an indication of pipe wall roughness and vary based on pipe material and age. The primary method used to calibrate the computer model is by adjusting 'C' values, until simulated pressure drops match pressure drops observed in the field, for each hydrant test performed. Other factors however, can affect the ability of the model to accurately simulate flow and pressure in the distribution system, including:

- Magnitude and distribution of system demands present during field testing
- Facility and model node elevations



- Minor losses
- Pump discharge rate and pressure
- Pressure Reducing Station elevations and pressure settings
- Anomalies such as partially closed valves

Existing 'C' Values

Existing 'C' values for the model are summarized in Table 1. These 'C' values resulted from the 2009 calibration effort. Table 1 also summarizes the quantity of piping and age ranges for each material type in the distribution system.

Table 1 Previous Hydraulic Model 'C' Value Summary				
Material	% District Total	'C' Value	Pipe Length	Pipe Age
Cast Iron	78.7%	130 - 138	392,040	1950 – 1989
Ductile Iron	19.7%	134 – 140	97,977	1966 – 2017
Galv	0.3%	130	1,706	1948 - 1985
PVC	0.4%	140	1,972	1966 - 1990
Unknown	0.8%	130 – 140	4,065	1963 – 1999??

As shown in the table, over 98% of the distribution system piping is either cast- or ductile iron. Therefore, 'C' values for these two materials have by far, the biggest impact on pressure loss through pipe friction. The minimum 'C' value for ductile iron pipe was 134, for pipe dating to 1966. The minimum 'C' value for cast iron pipe was 130, since that pipe material dates to 1950.

An independent study conducted by the Ductile Iron Pipe Research Association (DIPRA) indicates that lined pipe maintains its 'C' value exceptionally well over long periods of time. The study indicates that a minimum value of 130 is appropriate for lined pipe up to 70 years old. To be consistent with this data, 'C' values in the previous calibration were set to range from 140 for newer pipe and gradually degrade to a minimum value of 130, for the oldest pipe in the District.



Collection of Hydrant Flow Test Data

Calibration of the hydraulic model is based on matching hydrant flow and related pressure drops simulated in the model, to corresponding data collected in the field. Field hydrant flow tests were performed at eight locations in the District's distribution system. Locations of the hydrant flow tests were selected to identify flow and pressure drop relationships under a variety of conditions, including pipe material and age and varying supply conditions, such as those represented with separate pressure zones. The hydrant flow tests were performed by District Operations staff, using District equipment. Hydrant flow was not recorded using pitots attached to hydrant ports. Flow was determined by review SCADA data corresponding to the time of each hydrant test. The flow tests were performed overnight to minimize system demands, so that flow from each hydrant test was more easily identifiable from SCADA. An additional benefit to overnight hydrant testing is the ability to perform follow up water quality flushing to remove any sediment that may have been disturbed by flow testing, while system demands are at a minimum and to minimize traffic impacts from water flowing in streets.

A primary goal in locating and performing hydrant flow tests is the ability to achieve a pressure drop of at least 10 psi. Inaccuracies in field data collection are often on the order of several psi. At pressure drops less than 10 psi, these inaccuracies become a significant portion of the overall pressure drop, decreasing the ability to calibrate the model. Preliminary model simulations were performed to identify test locations with the potential for larger pressure drops. Supply sources were also investigated in the model, to weigh the benefits of achieving larger drops in system pressure against the potential disadvantages of shutting supply sources off during hydrant flow testing. A total of thirteen test locations were initially identified and six of those were performed. The attached figures identify the locations of each hydrant flow test along with corresponding locations for monitoring pressure. Hydrant flow test forms are also attached, summarizing pertinent test data. Flow tests are labeled "A" through "M". Each map also identifies operational settings during the associated tests. Two additional hydrant test locations ("X" and "Y") were subsequently identified and tests performed, due to inconsistent data identified in the initial test identified for that area.

Model Simulation of Hydrant Flow Tests

Screenshots of SCADA telemetry data were obtained for the date and time associated with each hydrant test, including pump status, reservoir levels, and SPU supply station flow and pressure data.



Separate model scenarios were then created for each test and model settings (reservoir levels, pump status, etc.) were adjusted for each scenario, to match facility field settings identified from SCADA. Overall system demand was also estimated for each test and input to the model, based on SCADA system supply and reservoir inflow/outflow data. After reviewing and updating 'C' value data in the model, simulations were performed to replicate each hydrant test, and field-recorded versus simulated pressure drops were compared.

Results of hydrant flow simulations in the model are summarized in Table 2. These results are compared to corresponding field hydrant flow test data.

Table 2 Field vs Model Hydrant Test Comparison							
Hydrant Flow Test	Pressure Zone	Flow Rate (gpm)	Field Static/Dynamic ¹ Pressure (psi)	Field Pressure Drop (psi)	Model Static/Dynamic ¹ Pressure (psi)	Model Pressure Drop (psi)	Variance (Model-Field)
A	502	510	(B1-15) 56/46	10	53.7/44.8	8.9	-1.1
			(B1-21) 56/46	10	55.4/45.6	9.8	-0.2
			(B1-24) 48/39	9	47.2/37.7	9.5	0.5
F ²	615	520 + 550	(A7-29) 82/67	15	82.3/67.9	14.4	-0.6
(A7-34) 84/68			16	86.2/70.7	15.5	-0.5	
H ²		400	(A8-34) 59/46	13	59.7/47.3	12.4	-0.6
			(A9-21) 79/67	12	86.2/71.6	14.6	2.6
J ³	237	395	(E9-38) 82/58	24	76.6/62.1	14.5	-9.5
			(E9-46) 91/70	21	89.2/75.0	14.2	-6.8
K	590	570 + 570	(A11-5) 87/73	14	87.7/77.1	10.6	-3.4
			(A11-16) 104/89	15	107.6/95.3	12.3	-2.7
M ³	590	805	(A6-26) 83/68	15	84.3/50.8	33.5	18.5
			(A6-20) 74/68	6	77.8/62.1	15.7	9.7
X	237	320	(F8-08) 91/80	11	90.9/79.2	11.7	0.7
			(F8-13) 90/80	10	90.0/78.3	11.7	1.7
Y	237	570	(E7-44) 80/72	8	82.2/75.5	6.7	-1.3
			(E8-40) 81/72	9	83.9/76.0	7.9	-1.1
Notes: 1) Static – prior to hydrant flow test/Dynamic – during hydrant flow test 2) Tests ‘F’ and ‘H’ were performed simultaneously 3) See text regarding discrepancy between field data and model simulation results							



Model results for tests 'J' and 'M' show the biggest differences between model results and field-recorded pressure drops. Trial simulations indicate that pressure drops from these hydrant tests are inconsistent with the other hydrant tests. A reduction in 'C' values necessary to match the pressure drop at test 'J' would result in a significant overestimation of pressure drops at the other hydrant tests. Additional hydrant tests ('X' and 'Y') were performed in the 237 Zone, since the test data from 'J' appeared to be inconsistent with results from the other hydrant tests. The model produced a good match with pressure drops recorded in the field at the 'X' and 'Y' locations. Although the reason for inconsistent test results at 'J' are unknown, it is concluded to rely instead on tests results for 'X' and 'Y', since they are in the same pressure zone as 'J' and test the same pipe material and age.

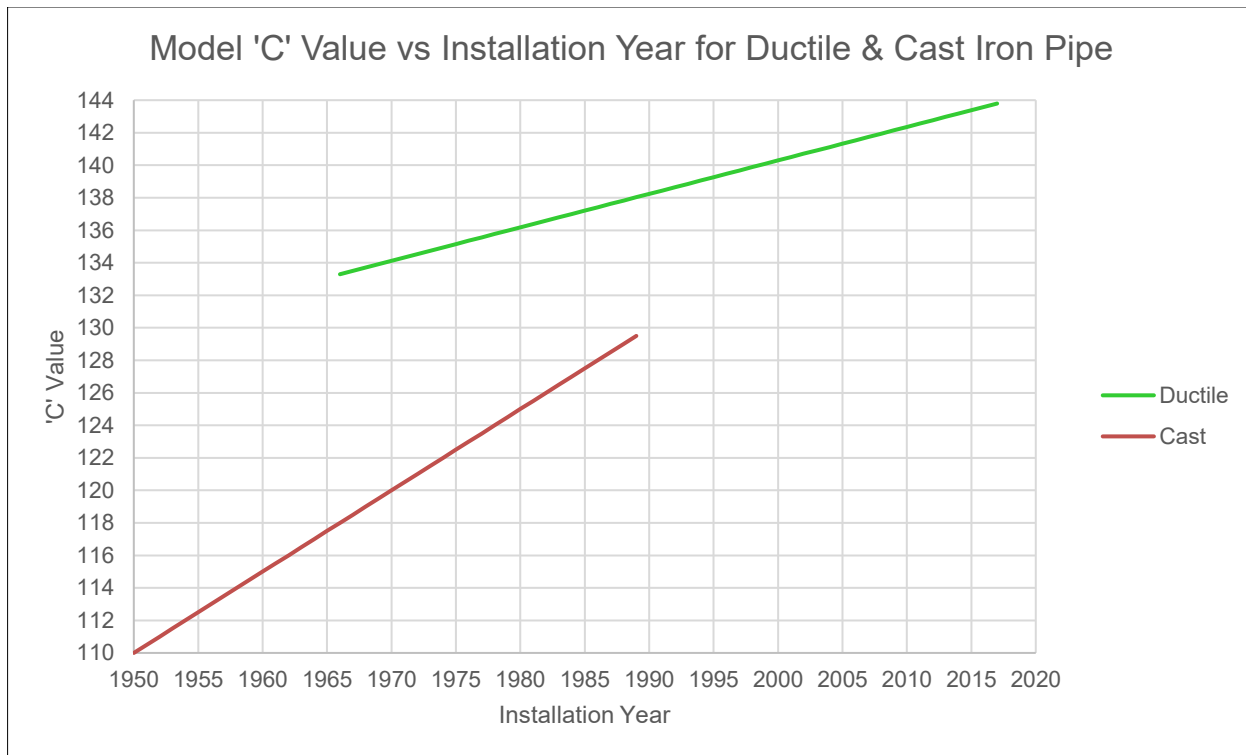
Model results for test 'M' produced over twice the pressure drops as those recorded in the field. In this case, 'C' values would have to be increased to unreasonable levels, attempting to reduce the simulated pressure drop enough to approach a reasonable match with field results. An increase in 'C' values of this magnitude would result in the model significantly underestimating pressure drops for the other hydrant tests.

Tests 'F' and 'H' were performed simultaneously in the 615 boosted pressure zone. Simulation of these hydrant tests results in a close match with field data. One contributing factor may be that system demand into this closed zone is known to a higher degree of accuracy, based on pump station flow data. The model tends to over-simulate the pressure drop at the southern-most pressure monitoring location, for these tests. Although the overall pressure drop match is good, it is conceivable that the dual check valves located at BS-1 opened slightly during the test and provided a modest amount of backflow, thereby minimizing the pressure drop at the southern end of the 615 West zone. It is not possible to verify the check valves opened in the field during the hydrant test, however model output indicates that the pressure differential between the 615 and 590 zones is small at the check valve location during the hydrant test.

Summary and Conclusions

The graphic below illustrates 'C' value versus age for ductile and cast iron pipe, resulting from the model calibration update. The oldest (cast iron) pipe is assigned a value of 110. The District does not have physical samples available of the oldest cast iron pipe, however it is presumably unlined, since the resulting minimum 'C' values are considerably lower than the 130 minimum value identified in the studies referenced above.

Between 1977 and 1987, pipe material installed in the District transitioned from cast to ductile iron. All ductile iron pipe is presumably cement-mortar lined and the 'C' values are correspondingly higher, due to the lining and to the newer installation dates, compared to cast iron piping. 'C' values for Ductile Iron pipe range from 133 to a maximum of 144 (DIPRA) for the newest pipe.





Although over 98% of the District's piping is cast- and ductile iron, there are minor amounts of other piping materials. A minor amount of the District's piping also lacks either pipe material or installation year data. 'C' values for these categories have been assigned as follows:

- PVC = 150
- Galvanized pipes are assigned 'C' values based on a unique value versus age relationship that is similar to cast iron pipe. The minimum 'C' value for the oldest (1948) pipe = 100. The value for the newest (1985) pipe is 121.
- There are two pipes identified as copper in the model. They are assigned the same 'C' value versus age relationship as galvanized piping, but are relatively newer, with correspondingly higher 'C' values of 124 (1990) and 137 (2013).
- Unknown pipe materials are assigned 'C' values based on their age. The relationship is a rate representing an average of cast- and ductile iron 'C' value versus age.
- Unknown installation years are assigned a 'C' value of 135.

In general, calibration results indicate a reasonably accurate simulation of the hydrant flow tests. Model simulation of two of the hydrant tests ('J' and 'M') do not produce acceptable levels of accuracy, however field data from these two tests conflict with each other. 'C' values currently producing acceptable results for the other six hydrant tests would have to be altered to unreasonable values to match results from either of these two tests. It is concluded that an acceptable calibration of the model has been achieved.



Attachments

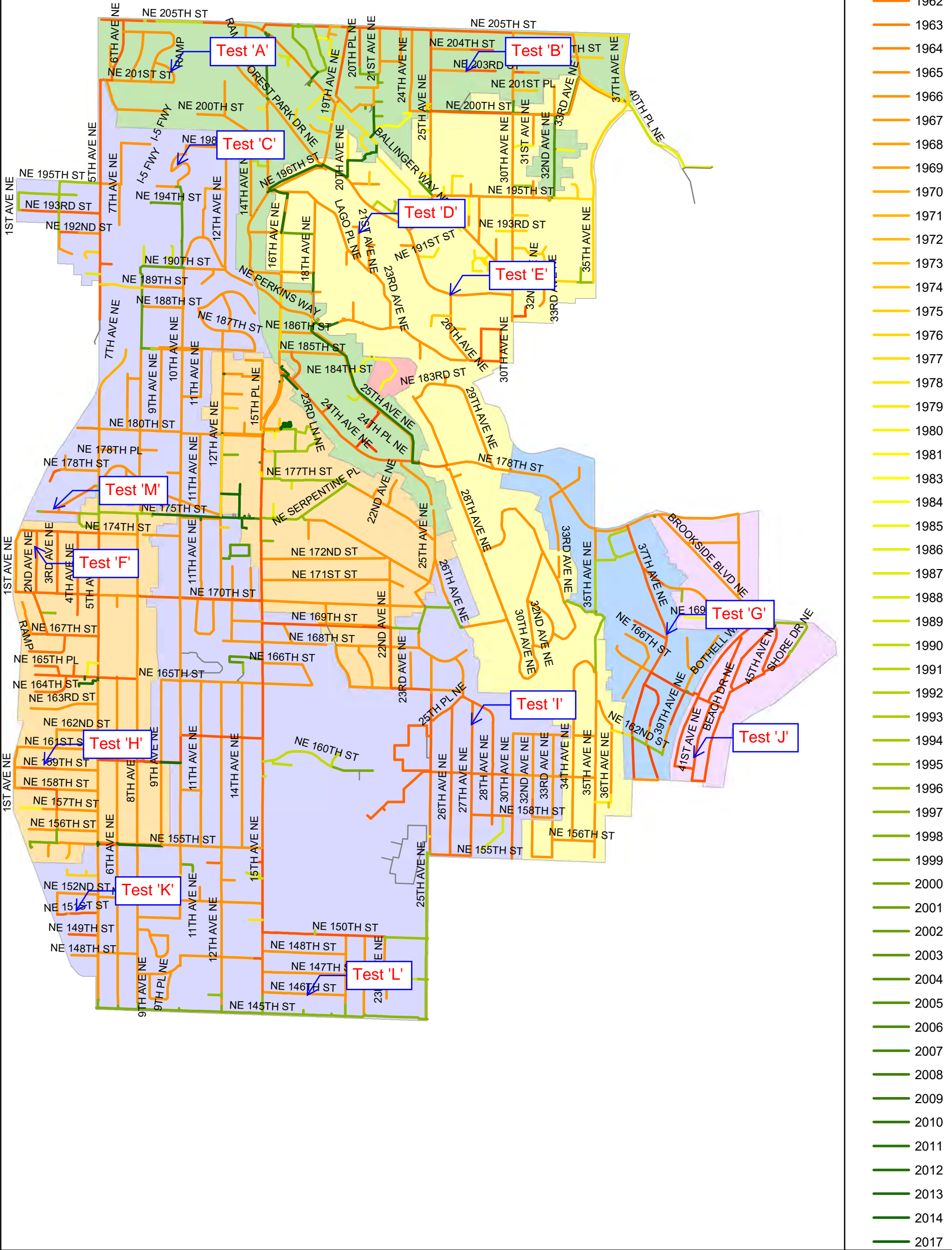


Hydrant Flow Testing Locations

North City Water District

Hydrant Flow Test Locations

Figure 1





Test 'A'

Jan 18th

9:10 PM

9:20 PM

Test 'A'

RAMP

0 gpm

~~510~~ gpm

B1-20

NE 204TH ST

7TH AVE NE

(500') 56psi
HGL 46psi

B1-21

NE 202ND ST

8TH AVE NE

B1-15

56psi

46psi

NE 201ST ST

B1-24

(501') 48psi

39psi

SS-1 = 347 gpm @ 103psi

~~857~~ gpm @ 102.5psi

Test 'A'

Historical Trends Supply Station 1

HMI02

Zone 432 Flow

0.00 0.00

Zone 432 Press

65.61 65.29

Zone 502 Flow

376.72 321.72

Zone 502 Press

102.81 102.83

Inlet Pressure

120.69 120.43

Chlorine Residual

0.80 0.78

1 Hour 2 Hours 4 Hours 6 Hours 12 Hours 24 Hours 2 Days 3 Days 7 Days 14 Days 30 Days 60 Days

30%

Expand

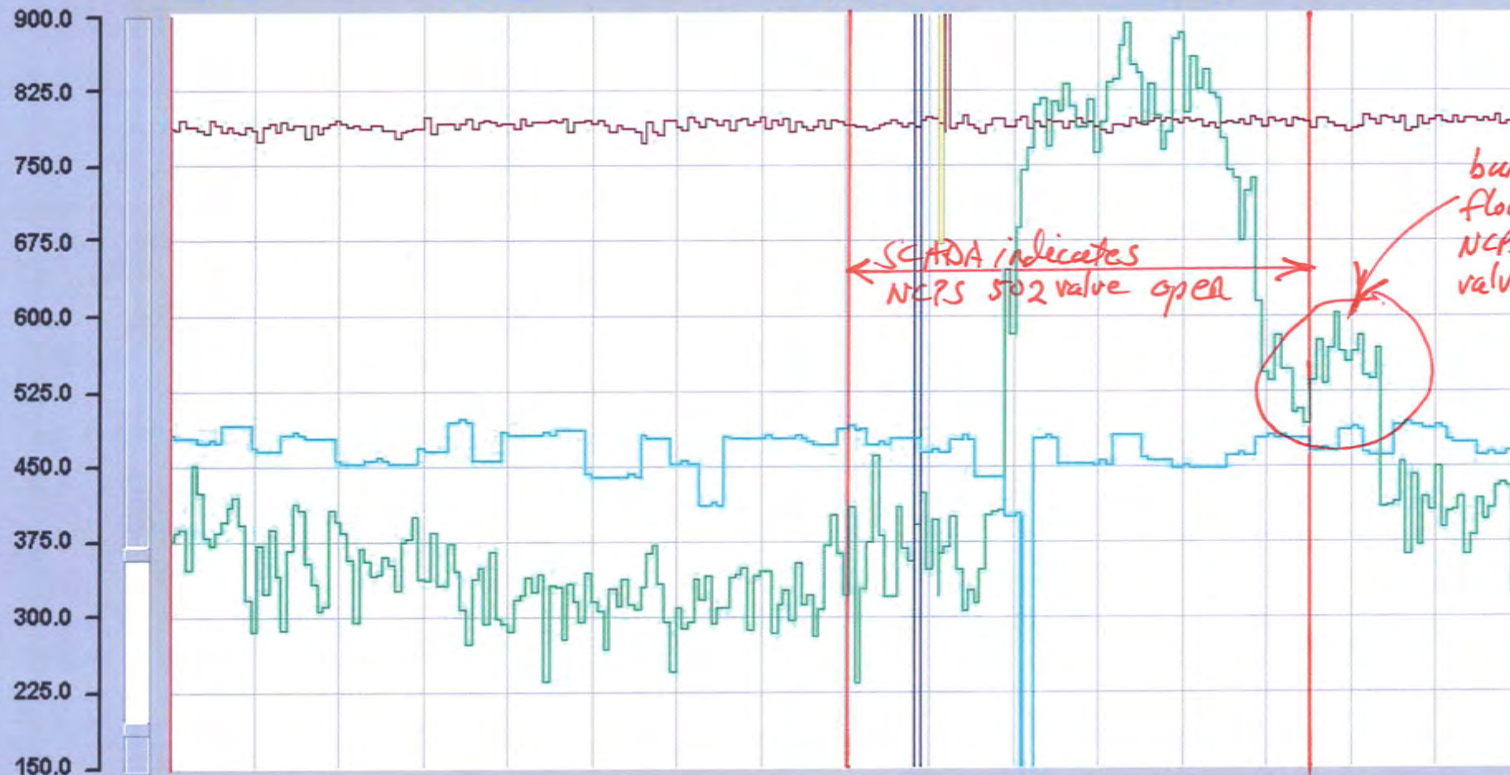
Jan 18
20:00:00

Jan 18
20:30:00

Jan 18
21:00:00

Jan 18
21:30:00

Jan 18
22:00:00



5%

20:00:00

22:00:00

Current Trend Time Span

20:00:00

Zoom In

2h

Zoom Out

22:00:00

4 hours

1 hour

Minutes

30 minutes

10 minutes

Save to
File Setup

Booster 1

Booster 2

17th Intertie

19th Intertie

Pump Station - 1

Pump Station - 2

Supply Station 1

Supply Station 3

2 MG Reservoir

Supply Station 4

Seattle Flows

Reservoir Levels

Reservoir Flows

CL2 Levels

SEA Flow TOT

SS/BS Totalizers

Custom

Test 4

Historical Trends Supply Station 1

HMI02

Zone 432 Flow

0.00 0.00

Zone 432 Press

65.66 65.21

Zone 502 Flow

140.00 143.13

Zone 502 Press

102.99 102.36

Inlet Pressure

121.23 121.26

Chlorine Residual

0.72 0.82

☐ 1 Hour ☐ 2 Hours ☐ 4 Hours ☐ 6 Hours ☐ 12 Hours ☐ 24 Hours ☐ 2 Days ☐ 3 Days ☒ 7 Days ☐ 14 Days ☐ 30 Days ☐ 60 Days

30%

Expand

Jan 18

00:00:00

Jan 18

12:00:00

Jan 19

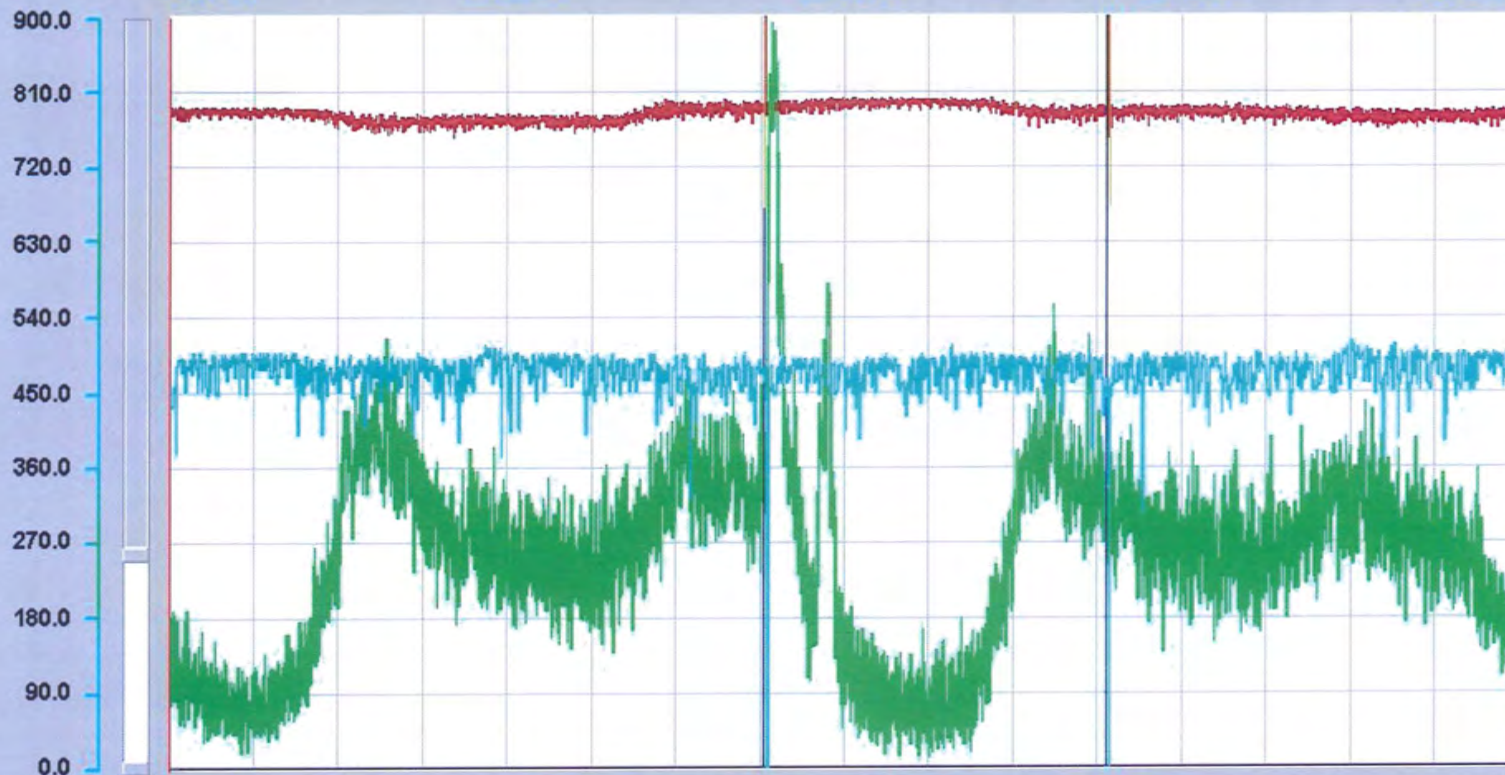
00:00:00

Jan 19

12:00:00

Jan 20

00:00:00



0%



00:00:00



00:00:00



Current Trend Time Span



00:00:00



Zoom In

2d

Zoom Out



00:00:00



Save to
File Setup

4 hours

1 hour



Minutes



30 minutes

10 minutes



SS/BS Totalizers

Custom

Booster 1

Booster 2

17th Intertie

19th Intertie

Pump Station - 1

Pump Station - 2

Supply Station 1

Supply Station 3

2 MG Reservoir

Supply Station 4

Seattle Flows

Reservoir Levels

Reservoir Flows

CL2 Levels

SEA Flow TOT

Historical Trends Supply Station 1

HMI02

Zone 432 Flow

0.00 0.00

Zone 432 Press

65.83 65.29

Zone 502 Flow

321.72 321.72

Zone 502 Press

101.76 102.83

Inlet Pressure

120.39 120.43

Chlorine Residual

0.81 0.78

1 Hour 2 Hours 4 Hours 6 Hours 12 Hours 24 Hours 2 Days 3 Days 7 Days 14 Days 30 Days 60 Days

30%

Expand

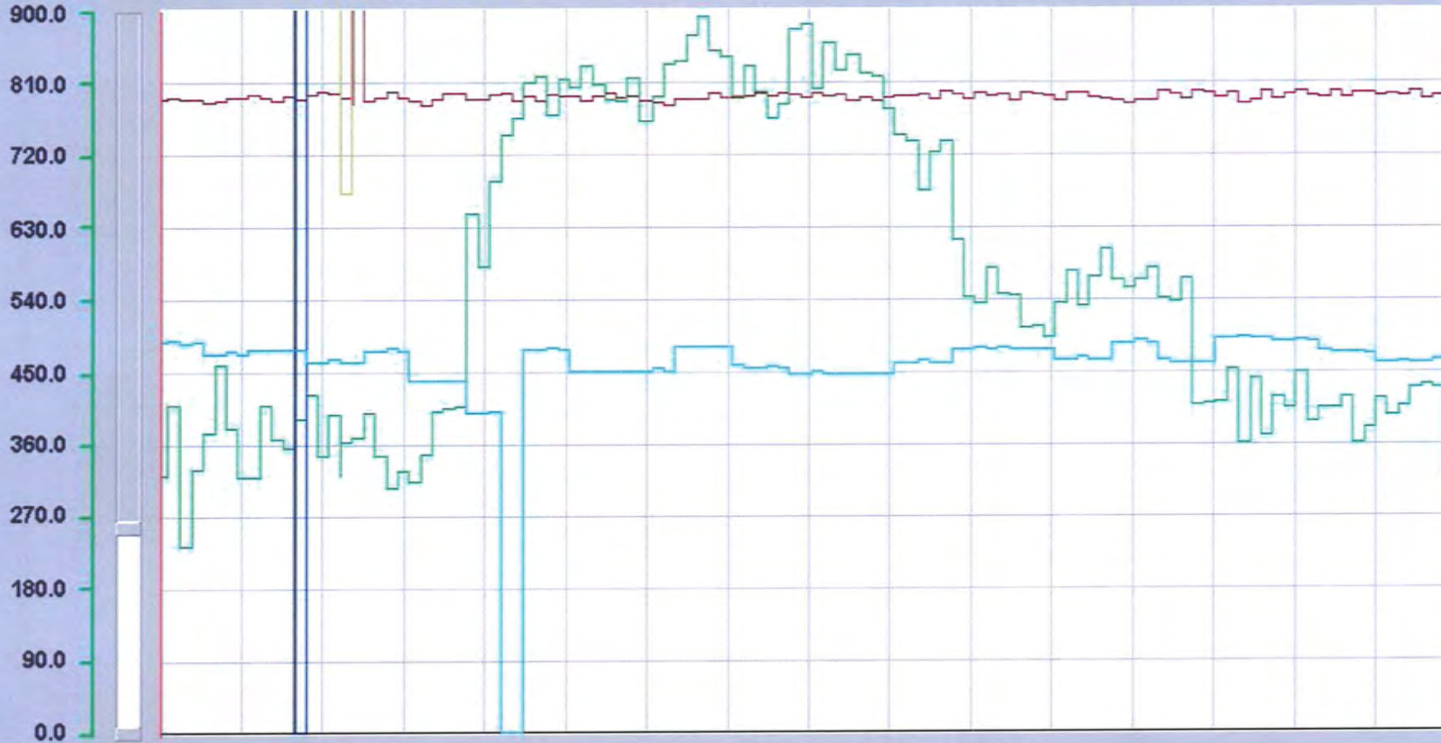
Jan 18
21:00:00

Jan 18
21:15:00

Jan 18
21:30:00

Jan 18
21:45:00

Jan 18
22:00:00



0%

21:00:00

22:00:00

Current Trend Time Span

21:00:00

Zoom In

1h

Zoom Out

22:00:00

Save to
File Setup

4 hours

1 hour

Minutes

30 minutes

10 minutes

Custom

Booster 1

Booster 2

17th Intertie

19th Intertie

Pump Station - 1

Pump Station - 2

Supply Station 1

Supply Station 3

2 MG Reservoir

Supply Station 4

Seattle Flows

Reservoir Levels

Reservoir Flows

CL2 Levels

SEA Flow TOT

SS/BS Totalizers

OVERVIEW
SCREENS

SUPPLY
STATIONS

BOOSTER
STATIONS

615
PUMPS

PUMP STATION
OVERVIEW

SETPOINTS

None
Access = 0

PRINT
SCREEN

ALARMS
ACTIVE

ALARM
HISTORY

EVENT
HISTORY

MLT 17 & 19
INTERTIES

FLOW
TOTALS

2/13/2018
4:26:05 PM

Test A'

North City / Denny Clouse Pump Station

TEST "A"

502 Zone / Information From SS # 1

1

18/2018

TIME	No Flow 9:10pm	9:15pm	9:20pm
HYD B1-15 (TB)	56 psi	47 psi	46 psi
HYD B1-24 (HB)	48 psi	39 psi	39 psi
HYD B1-21 (MO)	56 psi	46 psi	46 psi
Flow Hyd B1-20	0	236 GPM	471 GPM
Supply Station # 1	347 GPM 103 psi	583 GPM 102.8 psi	818 GPM 102.5 psi

SCADA:

- "Zone 590 Flow" ≈ 800 gpm
- NCPS flow ≈ 310 gpm (51 psi)
- SS-1 ≈ 890 gpm (340 gpm just prior)
 \rightarrow pressure ≈ 102.5 psi
- SS-3 = 0 gpm

- NCPS 502 PRV flow (unknown rate) before & during hydrant test
- flow thru PRV-1? NO-PRV-1 did not open during hydrant test (as expected)
- 1 1/2 hours flushing for w/o afterwards & there were calls about cloudy water
(note: the test was started an hour earlier than the previous record of tests)

SCADA:

- 3.7 Tank level = 83.7'
- 2.0 Tank level = 26.44'
- BS-1 = 1240 gpm (disch. press. ≈ 84 psi)
- BS-2 = 0 gpm
- NCPS ≈ 250 gpm (pressure = 51 psi)
- SS-4 = 0
- MLT = 0
- no flow thru PRV-1, for this test, per Denny



Tests 'F' & 'H'

Tests F, H

Dec 15th

12:38 AM
1:08 AM

0 gpm
550 gpm

84 psi
68 psi

A7-30
0 gpm
520 gpm

A7-29
82 psi
67 psi

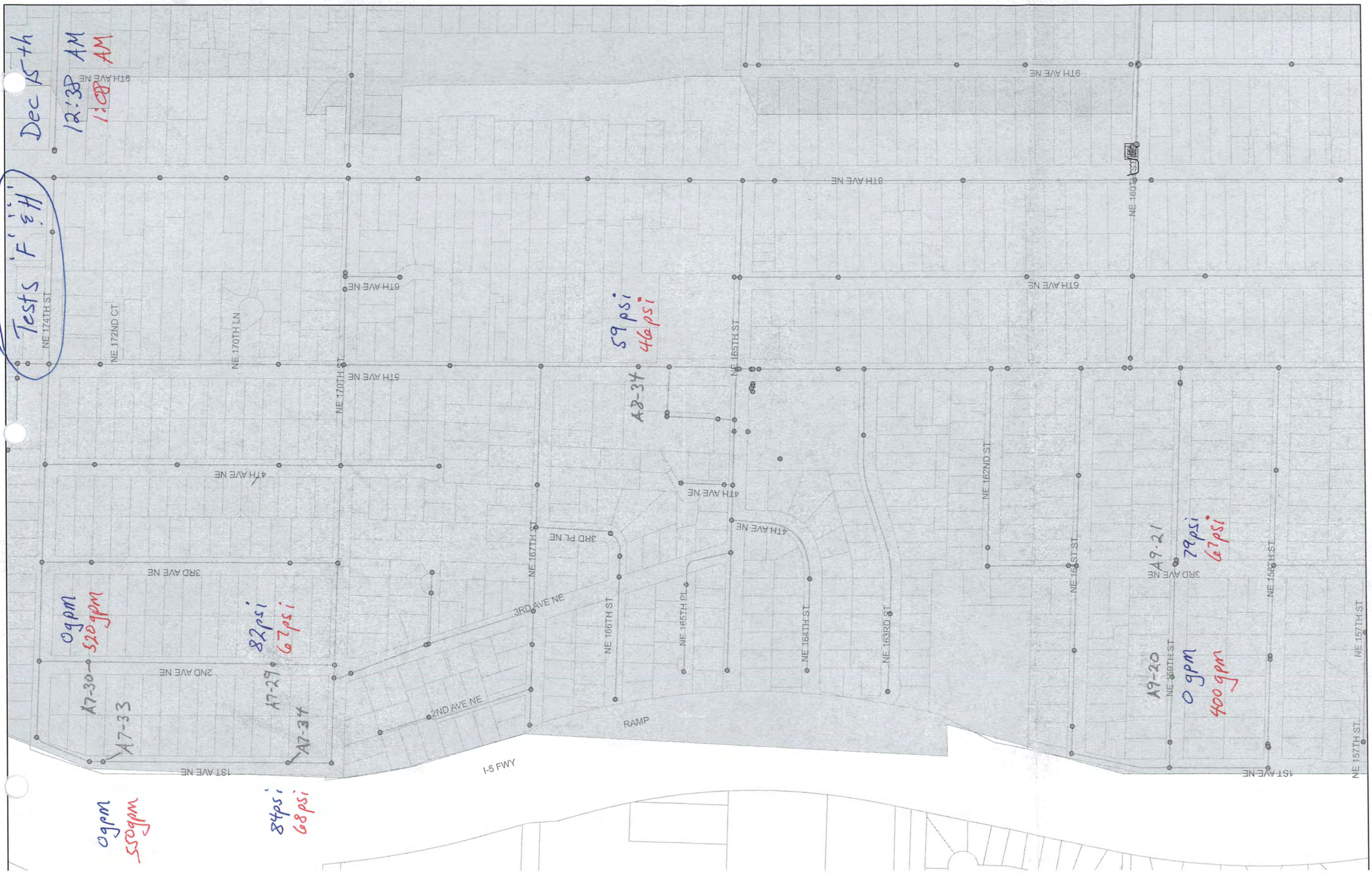
A7-34

59 psi
46 psi

A8-34

A9-20
0 gpm
400 gpm

A9-21
79 psi
67 psi



Tests \bar{H}

Historical Trends North City Pump Station

HMI02

Zone 615 Flow

172.41

132.26

ter Pump Discharge Pressure A Zone 502 Flow

51.06

51.08

0.00

0.00

☐ 1 Hour ☐ 2 Hours ☐ 4 Hours ☐ 6 Hours ☐ 12 Hours ☐ 24 Hours ☐ 2 Days ☐ 3 Days ☒ 7 Days ☐ 14 Days ☐ 30 Days ☐ 60 Days

40%

Expand

Dec 15
00:00:00

Dec 15
00:30:00

Dec 15
01:00:00

Dec 15
01:30:00

Dec 15
02:00:00



0%

00:00:00

02:00:00

Current Trend Time Span

00:00:00

Zoom In

2h

Zoom Out

02:00:00

Save to
File Setup

4 hours

1 hour

Minutes

30 minutes

10 minutes

Booster 1

Booster 2

17th Intertie

19th Intertie

Pump Station - 1

Pump Station - 2

Supply Station 1

Supply Station 3

2 MG Reservoir

Supply Station 4

Seattle Flows

Reservoir Levels

Reservoir Flows

CL2 Levels

SEA Flow TOT

SS/BS Totalizers

Custom

Tests 104

Historical Trends North City Pump Station

HMI02

Zone 615 Flow		ter Pump Discharge Pressure A		Zone 502 Flow	
172.41	132.26	51.06	51.08	0.00	0.00

☐ 1 Hour ☐ 2 Hours ☐ 4 Hours ☐ 6 Hours ☐ 12 Hours ☐ 24 Hours ☐ 2 Days ☐ 3 Days ☒ 7 Days ☐ 14 Days ☐ 30 Days ☐ 60 Days

10%

Expand

Dec 15 00:00:00 Dec 15 00:30:00 Dec 15 01:00:00 Dec 15 01:30:00 Dec 15 02:00:00



0%

00:00:00

02:00:00

Current Trend Time Span

2h

02:00:00

Save to
File Setup

00:00:00

Zoom In

Zoom Out

4 hours

1 hour

Minutes

30 minutes

10 minutes

Booster 1

Booster 2

17th Intertie

19th Intertie

Pump Station - 1

Pump Station - 2

Supply Station 1

Supply Station 3

2 MG Reservoir

Supply Station 4

Seattle Flows

Reservoir Levels

Reservoir Flows

CL2 Levels

SEA Flow TOT

SS/BS Totalizers

Custom

Dec 15

North City / Denny Clouse Pump Station

TEST "F & H"

3.7 Tank Level 85.2 85.14 84.5 83.8

TIME 12:38am 12:50am 12:55am 1:08am

✓ BS-1 Q = 0

BS-2 Q = 0

SS-4 Q ≈ 105 gpm

615 Pressure	51	51	51	51
615 Flow in GPM	165	665	1246	1603
590 Suction Pressure	36	36	36	36

590 Pressure
590 Flow in GPM

Supply Station # 4 - 590 Flow
Supply Station # 4 Pressure (District Side)



Test 'J'

Jan 18th

Test 'J'

11:00 PM

11:20 PM

82psi
58psi

→ E9-38

91psi
70psi

→ E9-46

E9-40

0 gpm

~~200~~ gpm

395

NE 161ST ST

NE 160TH ST

BEACH DR NE

39TH AVE NE

BOTHELL WAY NE

41ST AVE NE

North City / Denny Clouse Pump Station

502 Zone / Information From SS # 1

TEST "J"

1/18/2018

TIME	No Flow 11:00pm	11:05pm	11:20pm
Flow Hyd E9-40 (TB)	0 GPM	181 GPM	365 GPM
HYD E9-46 (HB)	91 psi	85 psi	70 psi
HYD E9-38 (MO)	82 psi	73 psi	58 psi
Supply Station # 1	216 GPM	397 GPM	581 GPM

395 estimated from SCADA

Denny will verify PRV 2 settings
~~probably came from me originally~~

- 25th Ave Closed (pipeline)

- let Denny know about model results
- when I have them @ this location
- much less flow than anticipated produced pressure drop
- pressure @ "the knob" ? (not monitored)
- closed PRV (#12) did not open
- NCRS 502 PRV flow = 0

PRV 11 @ 58 psi ~ constant
PRV status during flow tests

10 opened

11 opened

12 did not open

5 did not open

4 did not open

2 opened (primary supply to hydromet test)

Historical Trends Supply Station 1

HM102

Zone 432 Flow

0.00 0.00

Zone 432 Press

66.47 66.71

Zone 502 Flow

230.00 94.38

Zone 502 Press

104.04 104.49

Inlet Pressure

120.77 120.30

Chlorine Residual

0.81 0.81

☐ 1 Hour
 ☐ 2 Hours
 ☐ 4 Hours
 ☐ 6 Hours
 ☐ 12 Hours
 ☐ 24 Hours
 ☐ 2 Days
 ☐ 3 Days
 ☒ 7 Days
 ☐ 14 Days
 ☐ 30 Days
 ☐ 60 Days

20%

Expand

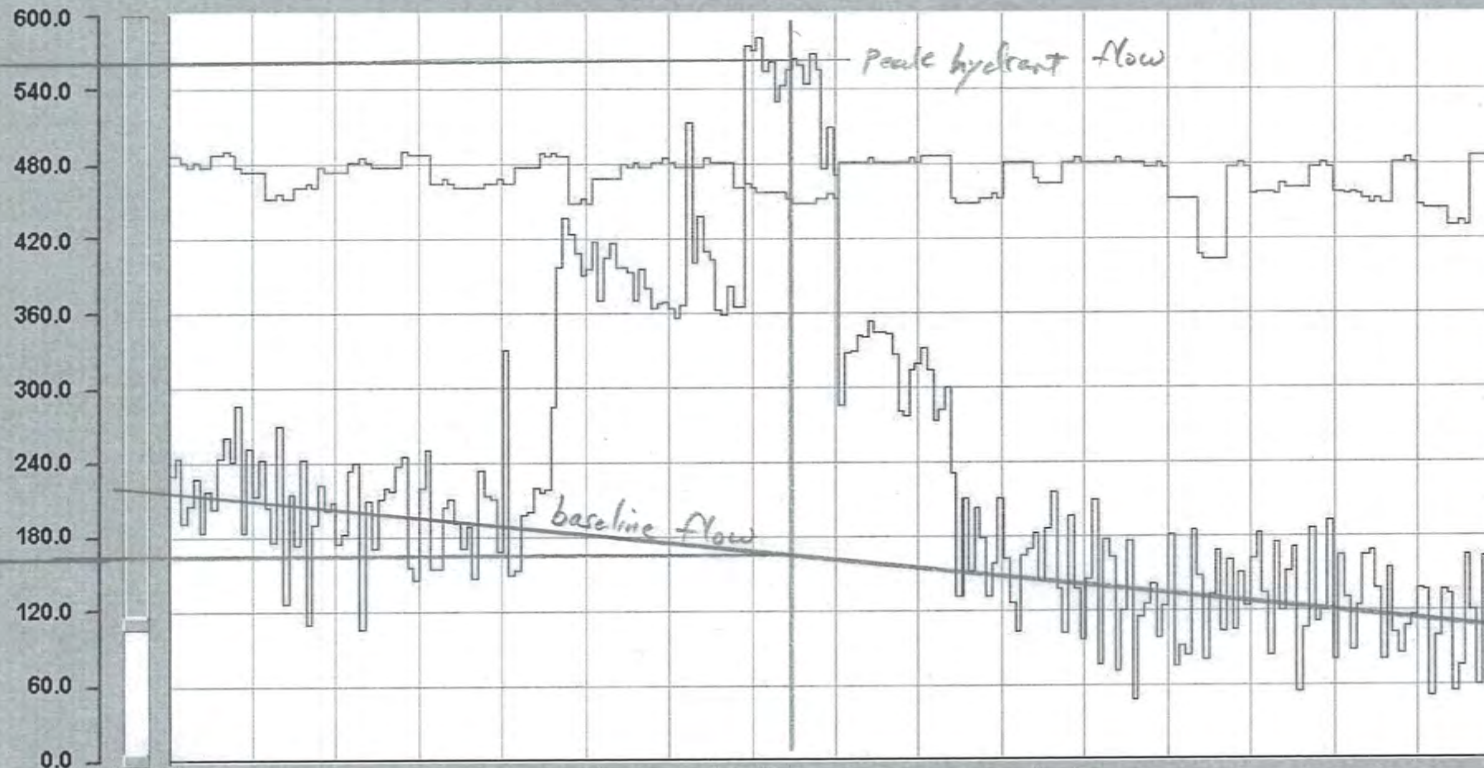
Jan 18
22:30:00

Jan 18
23:00:00

Jan 18
23:30:00

Jan 19
00:00:00

Jan 19
00:30:00



0%

22:30:00

00:30:00

Current Trend Time Span

2h

00:30:00

Save to
File Setup

22:30:00

Zoom In

Zoom Out

4 hours

1 hour

Minutes

30 minutes

10 minutes

Booster 1

Booster 2

17th Intertie

19th Intertie

Pump Station - 1

Pump Station - 2

Supply Station 1

Supply Station 3

2 MG Reservoir

Supply Station 4

Seattle Flows

Reservoir Levels

Reservoir Flows

CL2 Levels

SEA Flow TOT

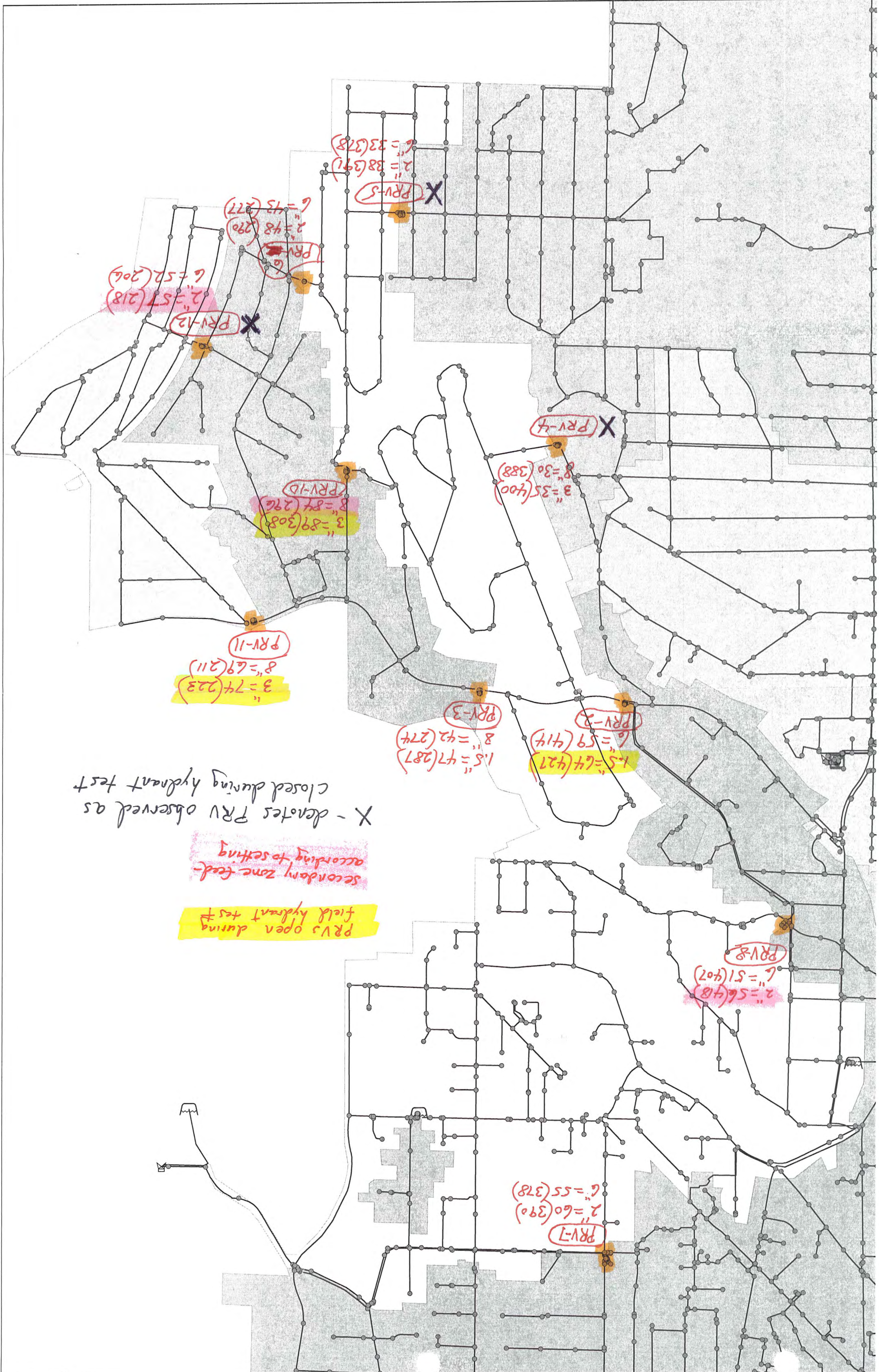
SS/BS Totalizers

Custom

X - denotes PRV observed as closed during hydrant test

secondary zone feed according to setting

PRVs open during field hydrant test





Test 'K'

Test K

Dec 14th

9:45 PM

10:03 PM

3RD AVE NE

3RD AVE NE

5TH AVE NE

NE 153RD ST

NE 152ND ST

NE 152ND ST

NE 151ST ST

NE 149TH ST

A11-5 87psi
73psi

A11-12
0gpm

~~0gpm~~
~~0gpm~~
520

~~0gpm~~

A11-14 0gpm

~~0gpm~~
~~0gpm~~
570

104psi
89psi
A11-16

Test K

Historical Trends North City Pump Station

HM102

3.7MG Tank Level

87.78 86.81

Suction Head CL2

0.79 0.80

Zone 590 Flow

1359.75 373.50

590 Zone Pressure

39.03 33.95

1 Hour 2 Hours 4 Hours 6 Hours 12 Hours 24 Hours 2 Days 3 Days 7 Days 14 Days 30 Days 60 Days

40%

Expand

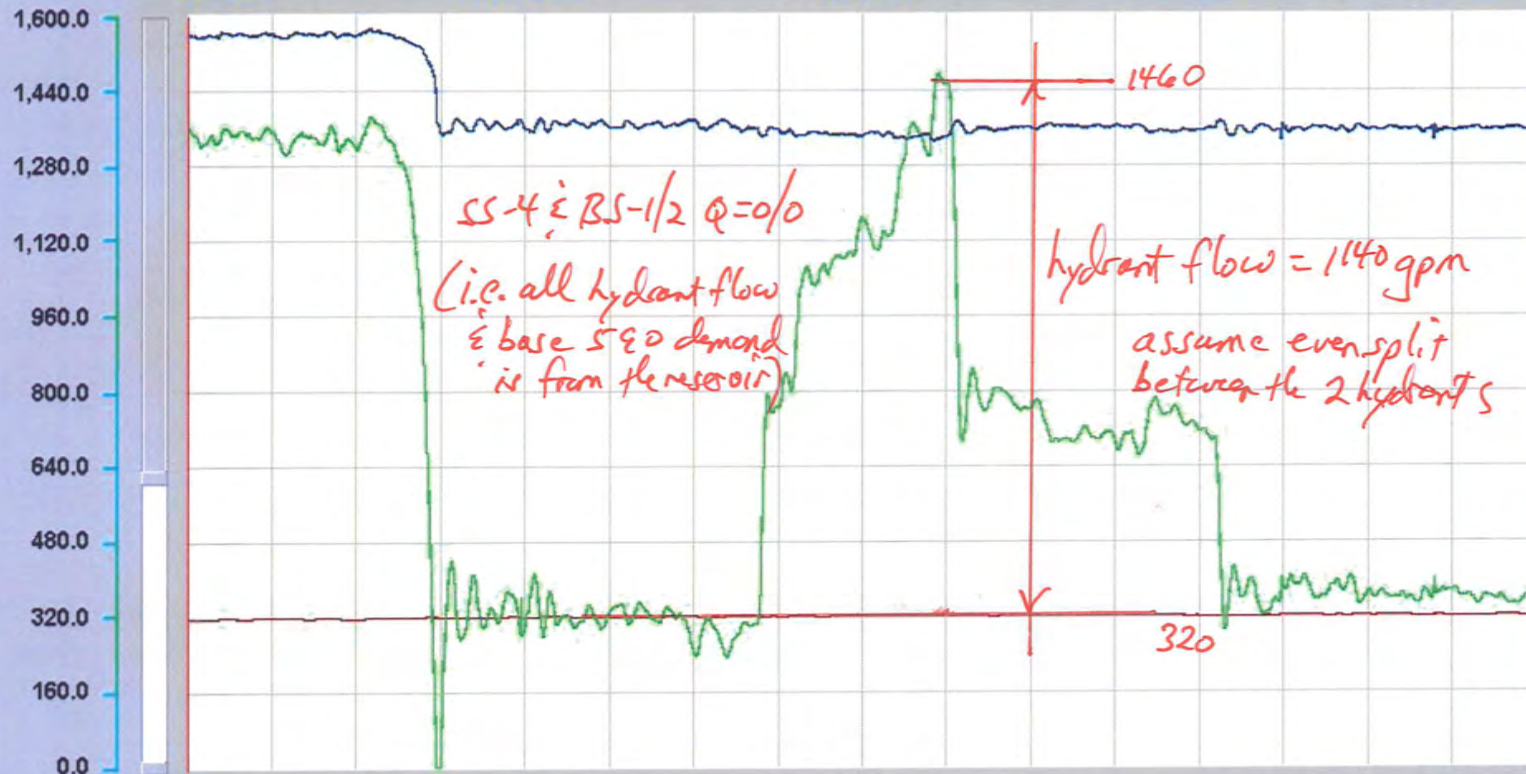
Dec 14
21:30:00

Dec 14
21:45:00

Dec 14
22:00:00

Dec 14
22:15:00

Dec 14
22:30:00



0%

21:30:00

22:30:00

Current Trend Time Span

21:30:00

Zoom In

1h

Zoom Out

22:30:00

Save to
File Setup

4 hours

1 hour

Minutes

30 minutes

10 minutes

Custom

Booster 1

Booster 2

17th Intertie

19th Intertie

Pump Station - 1

Pump Station - 2

Supply Station 1

Supply Station 3

2 MG Reservoir

Supply Station 4

Seattle Flows

Reservoir Levels

Reservoir Flows

CL2 Levels

SEA Flow TOT

SS/BS Totalizers

Test

Historical Trends Booster 1

HMI02

Station Flow

0.00 0.00

Inlet Press

64.33 57.55

Discharge Press

65.88 58.72

Zone Press

66.52 59.47

☐ 1 Hour ☐ 2 Hours ☐ 4 Hours ☐ 6 Hours ☐ 12 Hours ☐ 24 Hours ☐ 2 Days ☒ 3 Days ☐ 7 Days ☐ 14 Days ☐ 30 Days ☐ 60 Days

28%

Expand

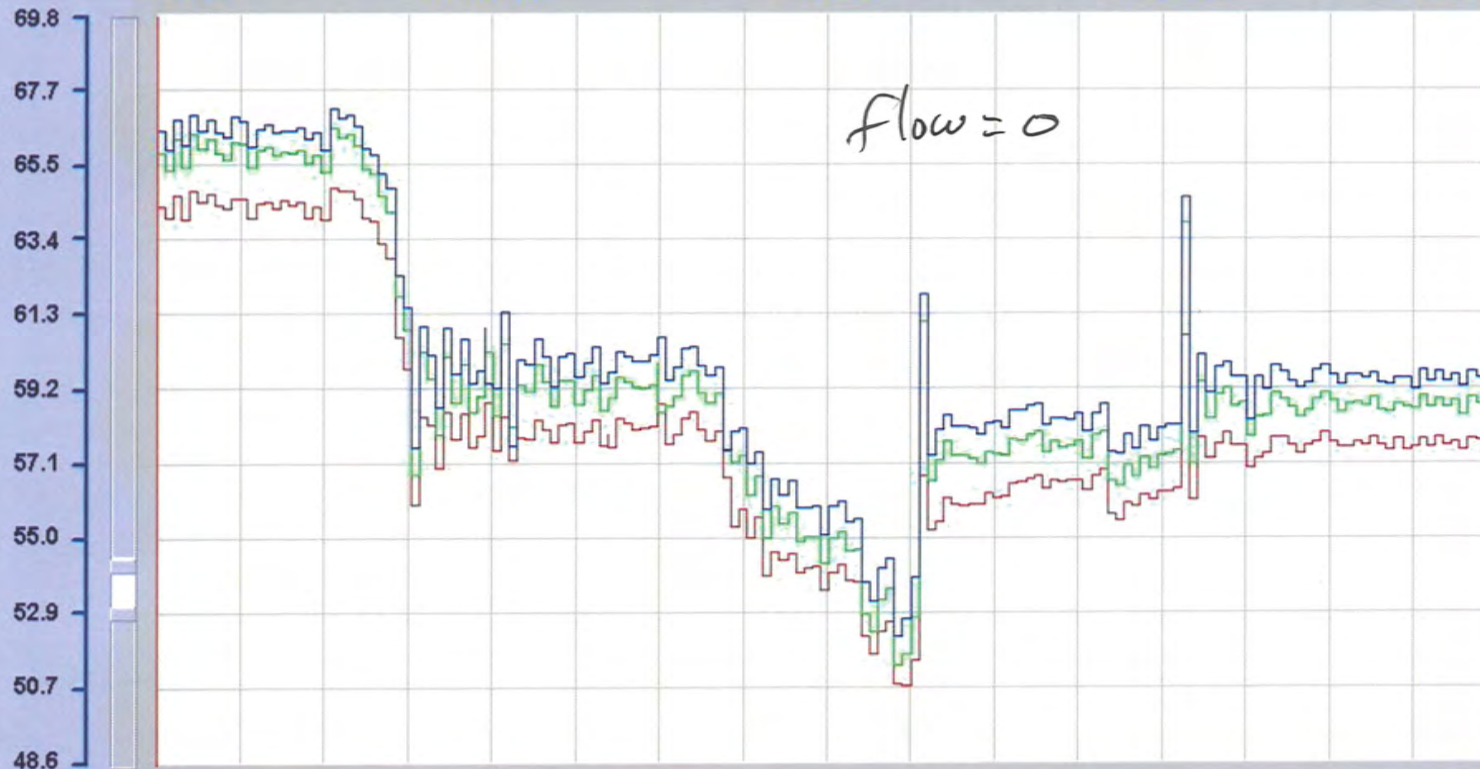
Dec 14
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Dec 14
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Current Trend Time Span

21:30:00

Zoom In

1h

Zoom Out

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Save to
File Setup

4 hours

1 hour

Minutes

30 minutes

10 minutes

Custom

Booster 1

Booster 2

17th Intertie

19th Intertie

Pump Station - 1

Pump Station - 2

Supply Station 1

Supply Station 3

2 MG Reservoir

Supply Station 4

Seattle Flows

Reservoir Levels

Reservoir Flows

CL2 Levels

SEA Flow TOT

SS/BS Totalizers

North City / Denny Clouse Pump Station

TEST "K"

3.7 Tank Level

88' 86.6 86.4 86.3

Dec 14

TIME

21:45 22:00 22:03 22:08

615 Pressure

51 51 51 51

615 Flow in GPM

300 341.2 365.7 239.91

590 Pressure

34 33.7 33.5 34.1

590 Flow in GPM

300 1090 1475 693.6

Supply Station # 4 - 590 Flow

0 0 0 73

Supply Station # 4 Pressure (District Side)

72.5 72 71.5 71.09

BS-1 = 0

BS-2 = 0



Test 'M'

NE 178TH ST

Dec 14th
11:26 PM
11:50 PM

Test 'M'

2ND PL NE

AG-20

74 psi
68 psi

5TH AVE NE

NE SERPENTINE PL

NE 175TH ST

AG-26

83 psi
68 psi

AG-27

0 gpm
~~805~~ gpm
805

3RD AVE NE

Test 4

SS-4 outflow

Historical Trends Supply Station 4



HMI02



SPU Flow In

101.43 124.53

SPU Inlet Pressure

72.81 75.08

Outlet Pressure

71.40 73.41

Chlorine Residual

0.70 0.71

1 Hour 2 Hours 4 Hours 6 Hours 12 Hours 24 Hours 2 Days 3 Days 7 Days 14 Days 30 Days 60 Days

8%

Expand

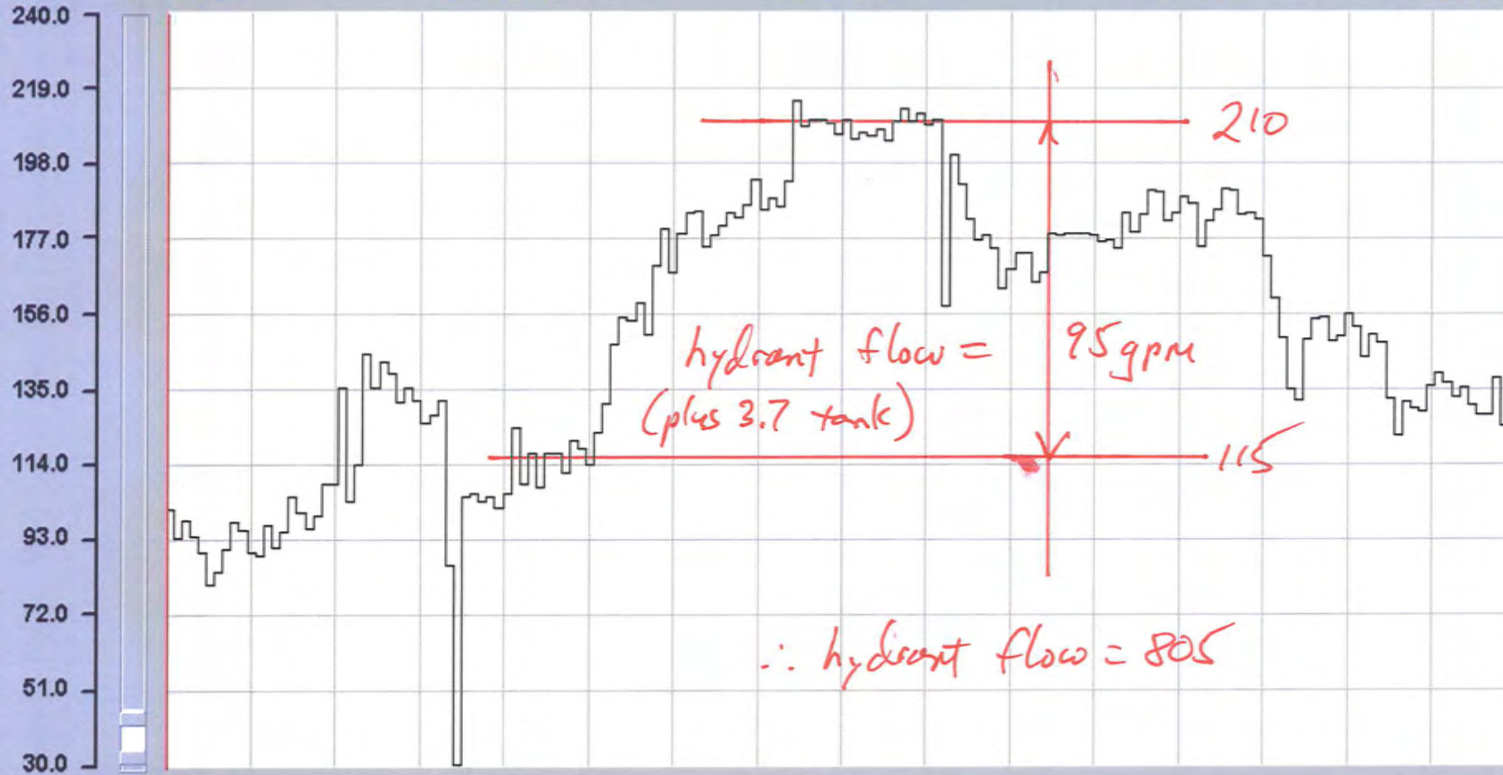
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Dec 14
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Dec 14
23:50:00

Dec 15
00:05:00

Dec 15
00:20:00



1%

23:20:00

00:20:00

Current Trend Time Span

23:20:00

Zoom In

1h

Zoom Out

00:20:00

Save to
File Setup

4 hours

1 hour

Minutes

30 minutes

10 minutes

Custom

Booster 1

Booster 2

17th Intertie

19th Intertie

Pump Station - 1

Pump Station - 2

Supply Station 1

Supply Station 3

2 MG Reservoir

Supply Station 4

Seattle Flows

Reservoir Levels

Reservoir Flows

CL2 Levels

SEA Flow TOT

SS/BS Totalizers

Test 4

3.7 Tank outflow

Historical Trends Reservoir Flows

HMI02

3.7MG Tank Flow In

0.00 0.00

3.7MG Tank Flow Out

107.25 0.00

0.4MG FLOW IN

0.00 0.00

0.4MG FLOW OUT

0.00 0.00

2.0MG FLOW IN

1.12 1.01

2.0MG FLOW OUT

49.07 47.31

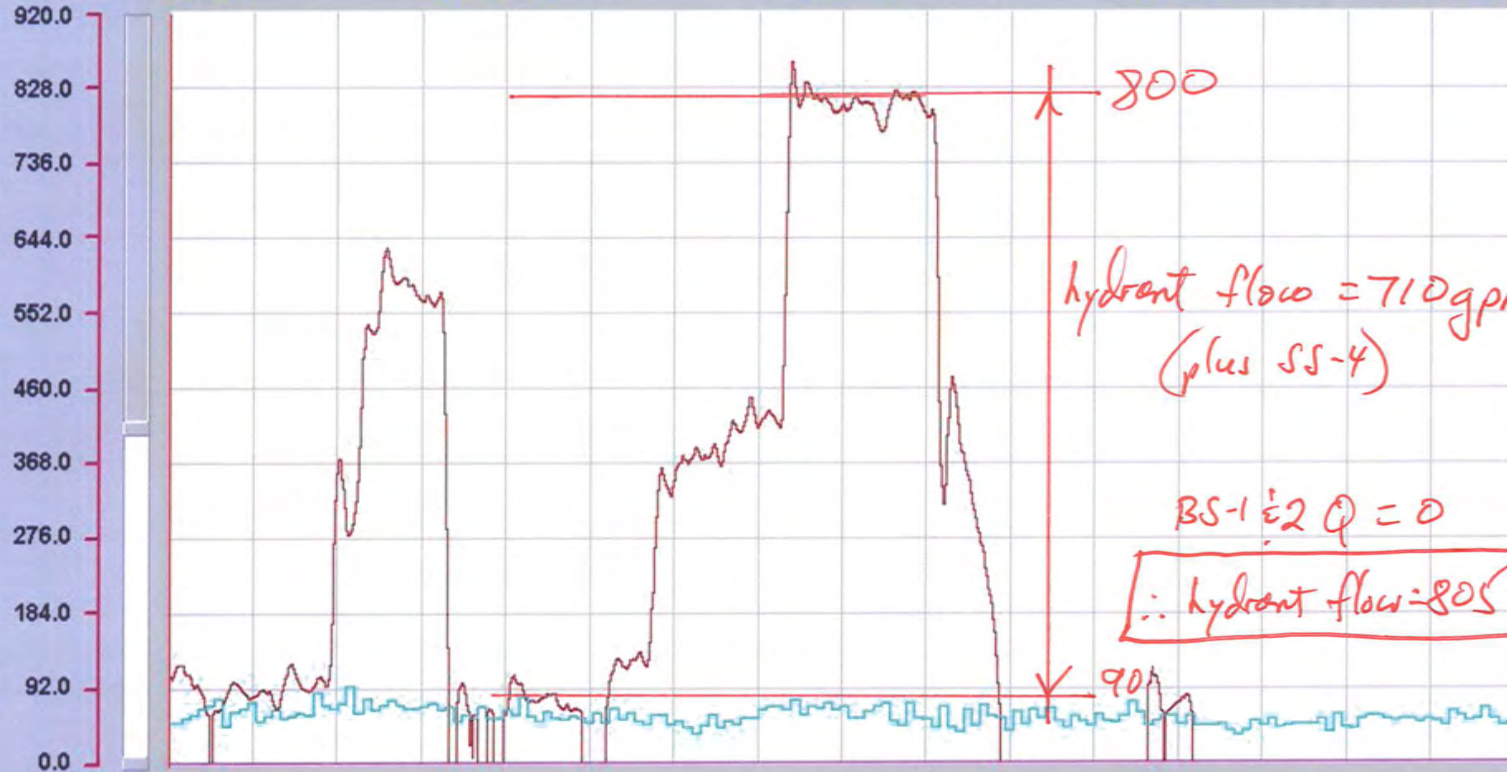
2.0MG FLOW OUT REV

0.00 0.00

☐ 1 Hour ☐ 2 Hours ☐ 4 Hours ☐ 6 Hours ☐ 12 Hours ☐ 24 Hours ☐ 2 Days ☐ 3 Days ☒ 7 Days ☐ 14 Days ☐ 30 Days ☐ 60 Days

46%

Expand

Dec 14
23:20:00Dec 14
23:35:00Dec 14
23:50:00Dec 15
00:05:00Dec 15
00:20:00

0%

23:20:00

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Current Trend Time Span

23:20:00

Zoom In

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Zoom Out

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Save to
File Setup

4 hours

1 hour

Minutes

30 minutes

10 minutes

Custom

Booster 1

Booster 2

17th Intertie

19th Intertie

Pump Station - 1

Pump Station - 2

Supply Station 1

Supply Station 3

2 MG Reservoir

Supply Station 4

Seattle Flows

Reservoir Levels

Reservoir Flows

CL2 Levels

SEA Flow TOT

SS/BS Totalizers

Test M

Historical Trends North City Pump Station

HMI02

3.7MG Tank Level

86.15 85.60

Suction Head CL2

0.80 0.79

Zone 590 Flow

106.50 0.00

590 Zone Pressure

33.73 35.51

1 Hour 2 Hours 4 Hours 6 Hours 12 Hours 24 Hours 2 Days 3 Days 7 Days 14 Days 30 Days 60 Days

25%

Expand

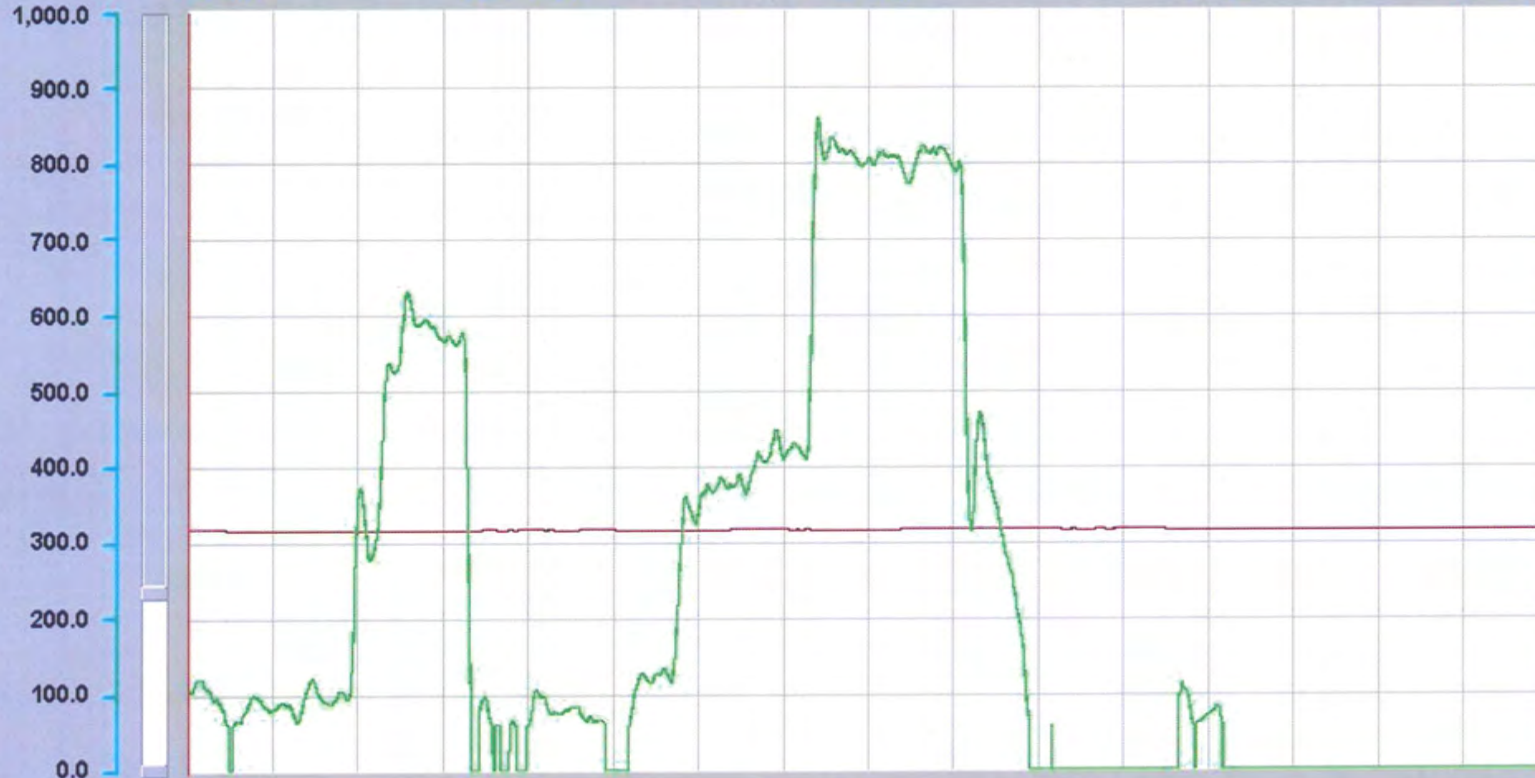
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Current Trend Time Span

23:20:00

Zoom In

1h

Zoom Out

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Save to
File Setup

4 hours

1 hour

Minutes

30 minutes

10 minutes

Custom

Booster 1

Booster 2

17th Intertie

19th Intertie

Pump Station - 1

Pump Station - 2

Supply Station 1

Supply Station 3

2 MG Reservoir

Supply Station 4

Seattle Flows

Reservoir Levels

Reservoir Flows

CL2 Levels

SEA Flow TOT

SS/BS Totalizers

Test M NCPS - 615 Q

Historical Trends North City Pump Station

HMI02

Zone 615 Flow

206.86 155.81

ter Pump Discharge Pressure AZone 502 Flow

51.01 51.21 0.00 0.00

1 Hour 2 Hours 4 Hours 6 Hours 12 Hours 24 Hours 2 Days 3 Days 7 Days 14 Days 30 Days 60 Days

6%

Expand

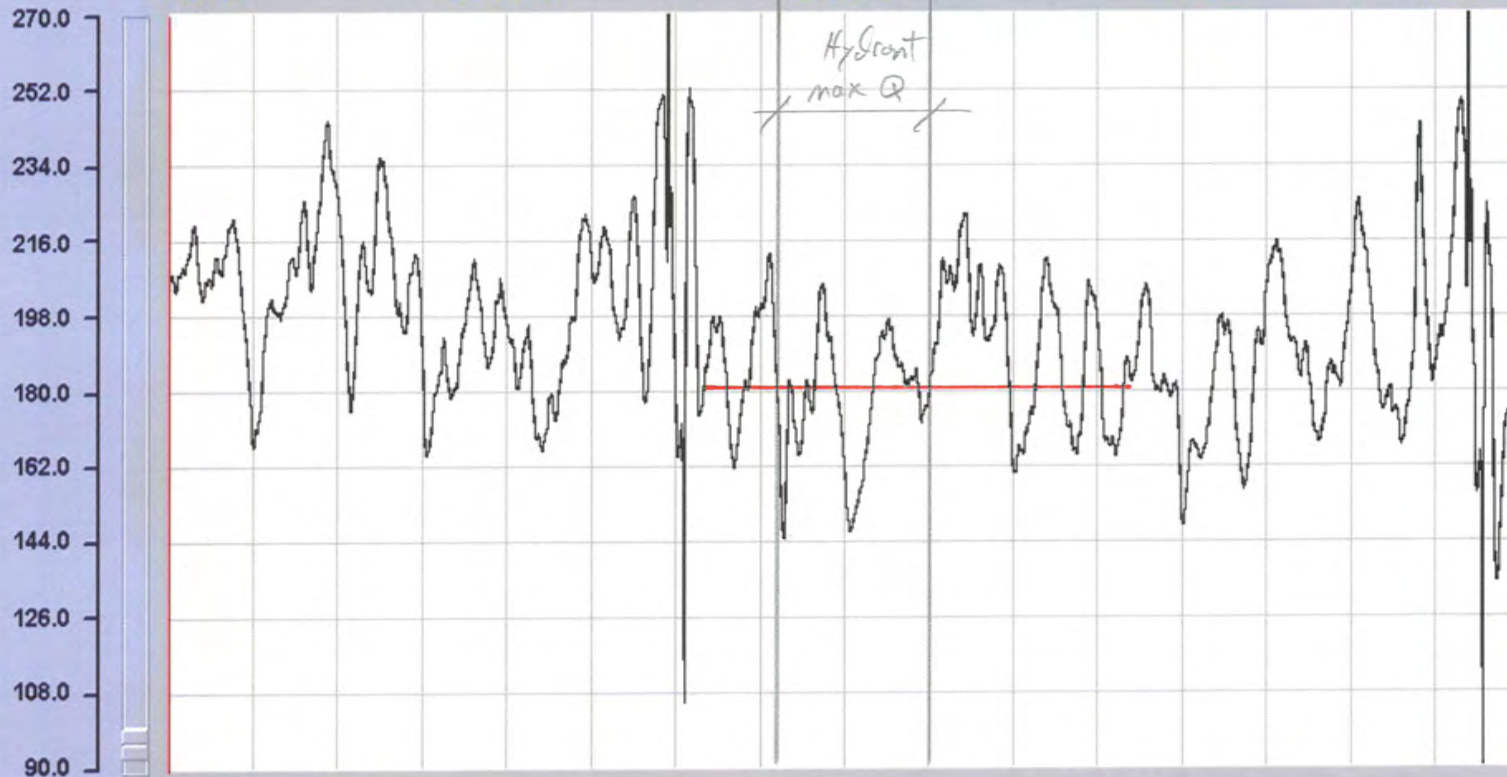
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Dec 15
00:20:00



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Current Trend Time Span

23:20:00

Zoom In

1h

Zoom Out

00:20:00

Save to
File Setup

4 hours

1 hour

Minutes

30 minutes

10 minutes

SS/BS Totalizers

Custom

Booster 1

Booster 2

17th Intertie

19th Intertie

Pump Station - 1

Pump Station - 2

Supply Station 1

Supply Station 3

2 MG Reservoir

Supply Station 4

Seattle Flows

Reservoir Levels

Reservoir Flows

CL2 Levels

SEA Flow TOT

North City / Denny Clouse Pump Station

TEST "M"

3.7 Tank Level	85.8	85.76	85.6	85.5
TIME	23:26	23:40	23:45	23:50
615 Pressure	50.7	50.7	50.8	50.9
615 Flow in GPM	210	223.45	195.89	155.11
590 Pressure	33.5	33.4	33.2	33.2
590 Flow in GPM	88	127	450	814.5
Supply Station # 4 - 590 Flow	100	150	194	210
Supply Station # 4 Pressure (District Side)	71.5	70.4	70.4	70.4



Tests 'X' & 'Y'

HYDRANT FLOW TEST
LOCATION 'X'

4/15/18

~ 11:04 PM

F8-13

monitor
pressure: P2

NE 170TH ST 469'

flow hydrant:
Q1

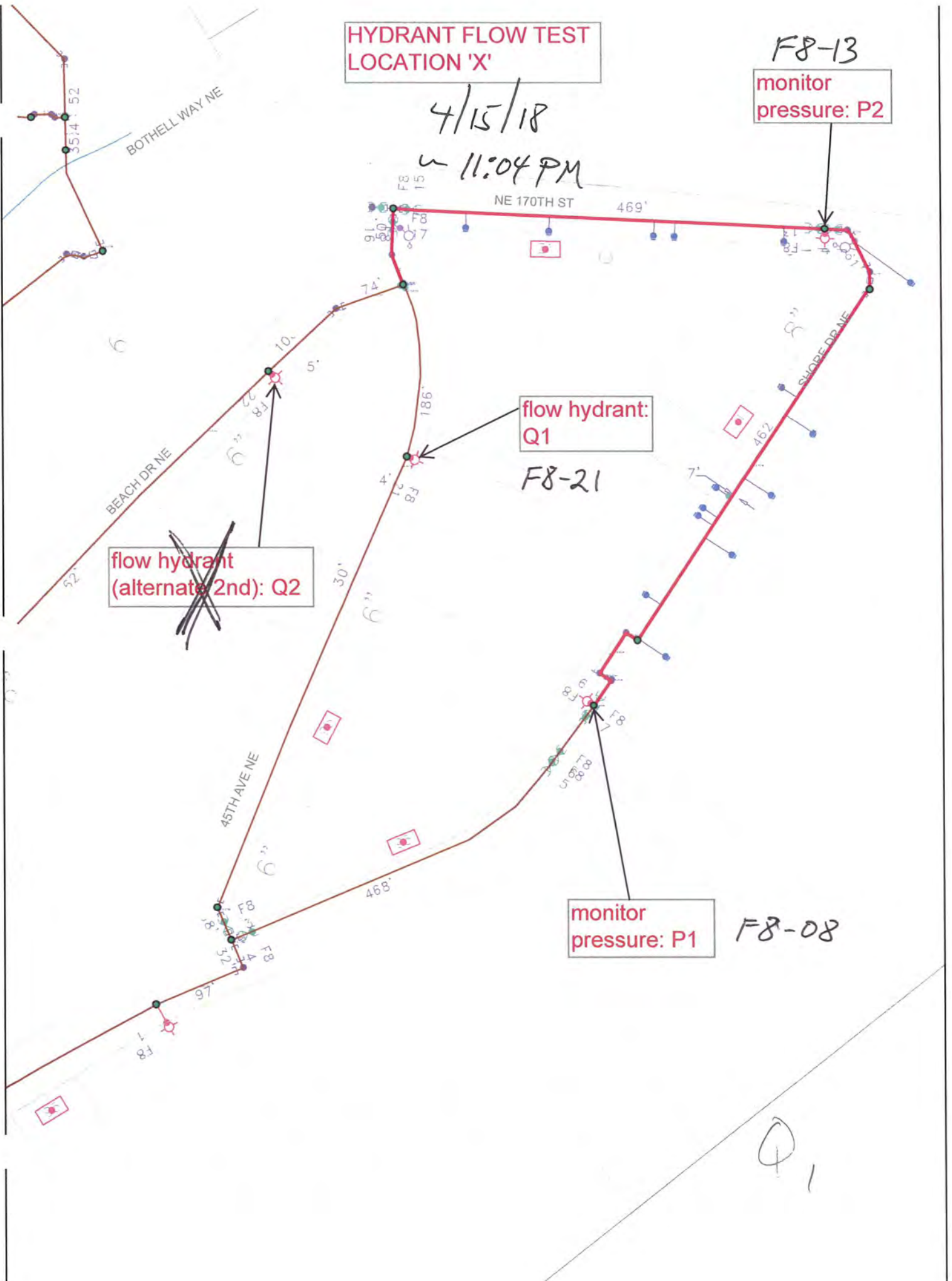
F8-21

~~flow hydrant
(alternate 2nd): Q2~~

monitor
pressure: P1

F8-08

Q1



4/5/18

North City / Denny Clouse Pump Station

TEST "X"

Q₁ flowed
per Denny 4/23/18

TIME	22:51	22:54	22:56	22:58	23:00	23:04	23:14
3.7 Tank Level	83.81	83.73	83.73	83.73	83.49	83.49	83.47
615 Pressure	51	51	51	51	51	51	51
615 Flow in GPM	253.8	221.8	226.3	207.7	216	183.2	210.6
590 Pressure	34	33.7	33.5	34.1	34	34	34
590 Flow in GPM	217	210	220	306	227	235	152
Supply Station # 1	187	332	370	432	458	475	263
Supply Station # 2	88	101	106	80	72	71	65
Supply Station # 4 - 590 Flow	0	0	0	0	0	0	0
Supply Station # 4 Pressure (District Side)	72.5	72	71.5	71.09			
P-1 = F8-07 X 08	91	88	85	80	81	81	81
P-2 = F8-13	90	88	85	80	81	80	80

BS-1 = off
BS-2 = off
SS-3 flow = 0

Denny - Hydrant G in 342 gpm
(Q₁ was flowed, per Denny 4/23/18)

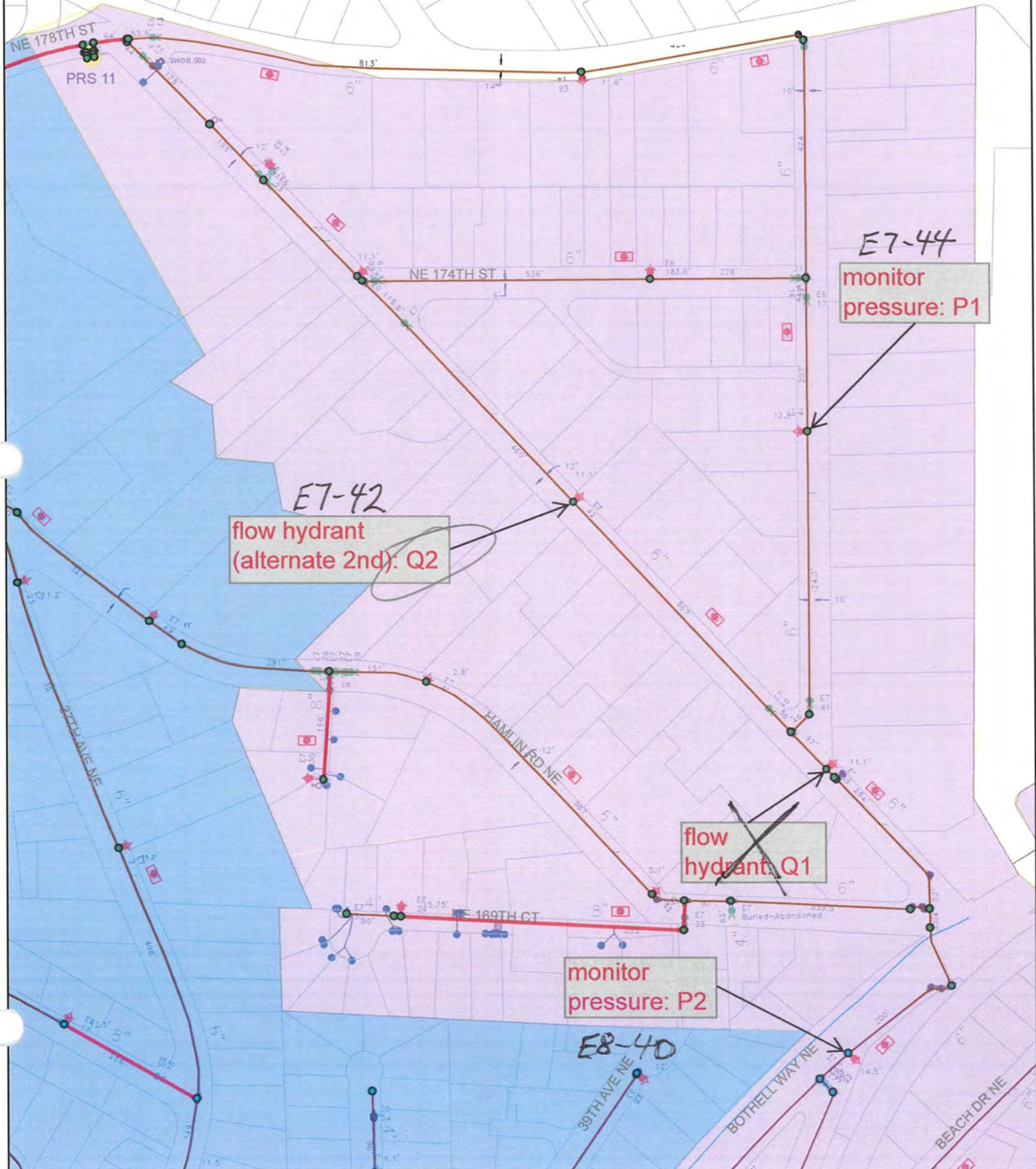
DCH estimated flow from SCADA = $(465 - 205) + (250 - 210) = 300 \text{ gpm}$
SS-1 590 → PRV5

Hydrant flow: say 320 gpm

HYDRANT FLOW TEST LOCATION 'Y'

4/15/18

~ 10:20 PM



4/5/18

North City / Denny Clouse Pump Station

TEST "Y"

PRV 12 gpm

TIME	21:46	21:51	22:12	22:21	22:26
3.7 Tank Level	84.63	84.63	84.2	84.19	84
615 Pressure	51	51	51	51	51
615 Flow in GPM	280.74	280.97	301.76	242.32	255.88
590 Pressure	34	33.7	33.5	34.1	
590 Flow in GPM	200	288	480	500	238
Supply Station # 1	349	507	625	608	365
Supply Station # 2	111	104	84	109	94
Supply Station # 4 - 590 Flow	0	0	0	0	0
Supply Station # 4 Pressure (District Side)	72.5	72	71.5	71.09	
P-1 = E7-44	80	79	80	73	72
P-2 = E8-40	81	80	81	74	72

Denny - hydrant Q = 560 gpm

(Q₂ was flowed, per Denny 4/23/18)

DCH estimated flow from SCADA = $(628 - 270)_{SS-1} + (465 - 250)_{590 \rightarrow PRVS} = 573$

SS-3 flow = 0

hydrant flow: say 570 gpm

Test Y : > 10:00 pm April 5

3.7 Tank $Q = 250$ gpm out base

2.0 Tank $Q = 100$ gpm out

BS-1 = off

BS-2 = off

SS-1 = 270 (base)

SS-3 = 0

SS-4 = 0

\therefore Test Y base demand = 620 gpm
(615 Zre demand = 270 gpm) 380 gpm balance
(-30 bypass)

Test X : > 11:00 pm April 5

- 3.7 Tank $Q = 200$ gpm out

- 2.0 Tank $Q = 30$ gpm out (outflow = 432 tank demand in model)

BS1 & 2 = off

SS-1 = 205 gpm (base)

SS-3 = 0

SS-4 = 0

Hydrant flow = 320

\therefore Test X base demand = 485 gpm 272.75
(615 Zre demand = 210 gpm) 305 balance
(-30 gpm bypass)

Historical Trends Supply Station 1

Zone 432 Flow

0.00 0.00

Zone 432 Press

64.76 65.46

Zone 502 Flow

376.72 155.16

Zone 502 Press

103.86 102.68

Inlet Pressure

121.09 121.13

Chlorine Residual

0.91 0.92

☐ 1 Hour
 ☐ 2 Hours
 ☒ 4 Hours
 ☐ 6 Hours
 ☐ 12 Hours
 ☐ 24 Hours
 ☐ 2 Days
 ☐ 3 Days
 ☐ 7 Days
 ☐ 14 Days
 ☐ 30 Days
 ☐ 60 Days

22%

Expand

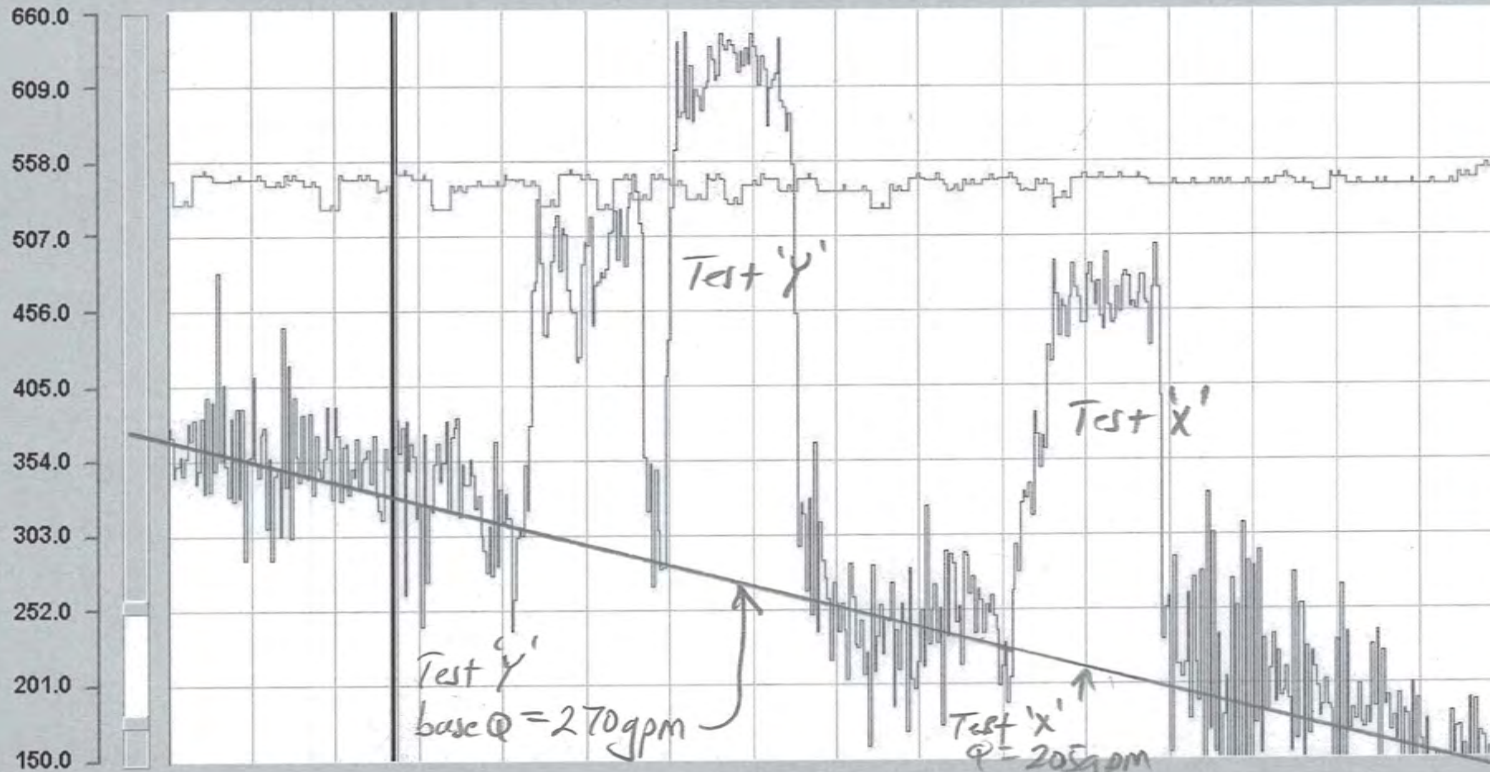
Apr 05
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Apr 05
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Apr 05
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Apr 05
23:15:00

Apr 06
00:00:00



5%

21:00:00

00:00:00

Current Trend Time Span

21:00:00

Zoom In

3h

Zoom Out

00:00:00

Save to
File Setup

4 hours

1 hour

Minutes

30 minutes

10 minutes

Booster 1

Booster 2

17th Intertie

19th Intertie

Pump Station - 1

Pump Station - 2

Supply Station 1

Supply Station 3

2 MG Reservoir

Supply Station 4

Seattle Flows

Reservoir Levels

Reservoir Flows

CL2 Levels

SEA Flow TOT

SS/BS Totalizers

Custom

Historical Trends Supply Station 1

Zone 432 Flow

0.00 0.00

Zone 432 Press

65.25 65.46

Zone 502 Flow

524.84 155.16

Zone 502 Press

102.41 102.68

Inlet Pressure

120.83 121.13

Chlorine Residual

0.91 0.92

☐ 1 Hour ☐ 2 Hours ☒ 4 Hours ☐ 6 Hours ☐ 12 Hours ☐ 24 Hours ☐ 2 Days ☐ 3 Days ☐ 7 Days ☐ 14 Days ☐ 30 Days ☐ 60 Days

25%

Expand

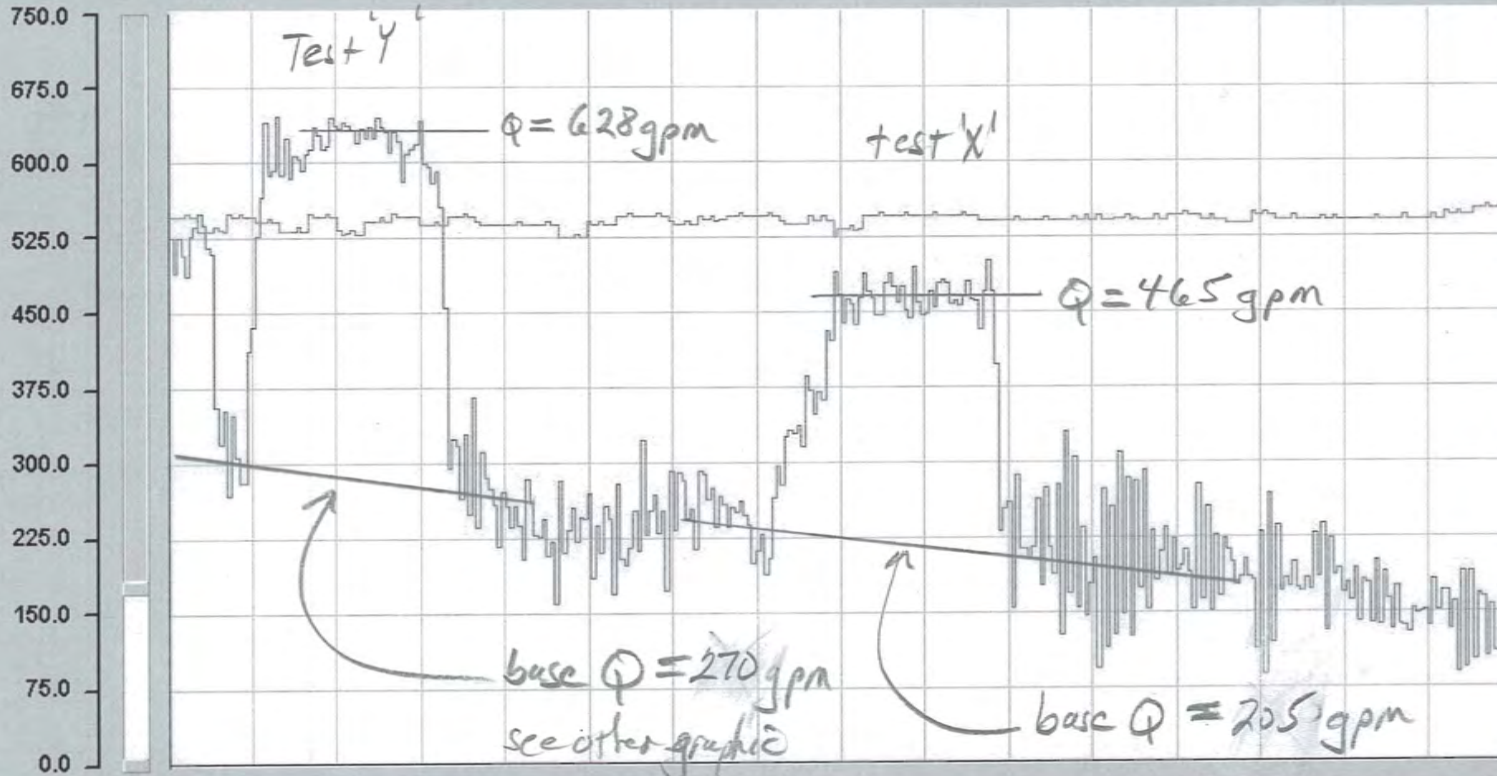
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Apr 05
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Apr 05
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Apr 05
23:30:00

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Current Trend Time Span

22:00:00

Zoom In

2h

Zoom Out

00:00:00

Save to
File Setup

4 hours

1 hour

Minutes

30 minutes

10 minutes

Custom

Booster 1

Booster 2

17th Intertie

19th Intertie

Pump Station - 1

Pump Station - 2

Supply Station 1

Supply Station 3

2 MG Reservoir

Supply Station 4

Seattle Flows

Reservoir Levels

Reservoir Flows

CL2 Levels

SEA Flow TOT

SS/BS Totalizers

3.7 Tank Flow

Historical Trends Reservoir Flows

3.7MG Tank Flow In		3.7MG Tank Flow Out		0.4MG FLOW IN		0.4MG FLOW OUT		2.0MG FLOW IN		2.0MG FLOW OUT		2.0MG FLOW OUT REV	
0.00	0.00	277.75	191.00	0.00	0.00	0.00	0.00	0.67	0.78	91.53	40.64	0.00	0.00

☐ 1 Hour
 ☐ 2 Hours
 ☒ 4 Hours
 ☐ 6 Hours
 ☐ 12 Hours
 ☐ 24 Hours
 ☐ 2 Days
 ☐ 3 Days
 ☐ 7 Days
 ☐ 14 Days
 ☐ 30 Days
 ☐ 60 Days

30%

Expand

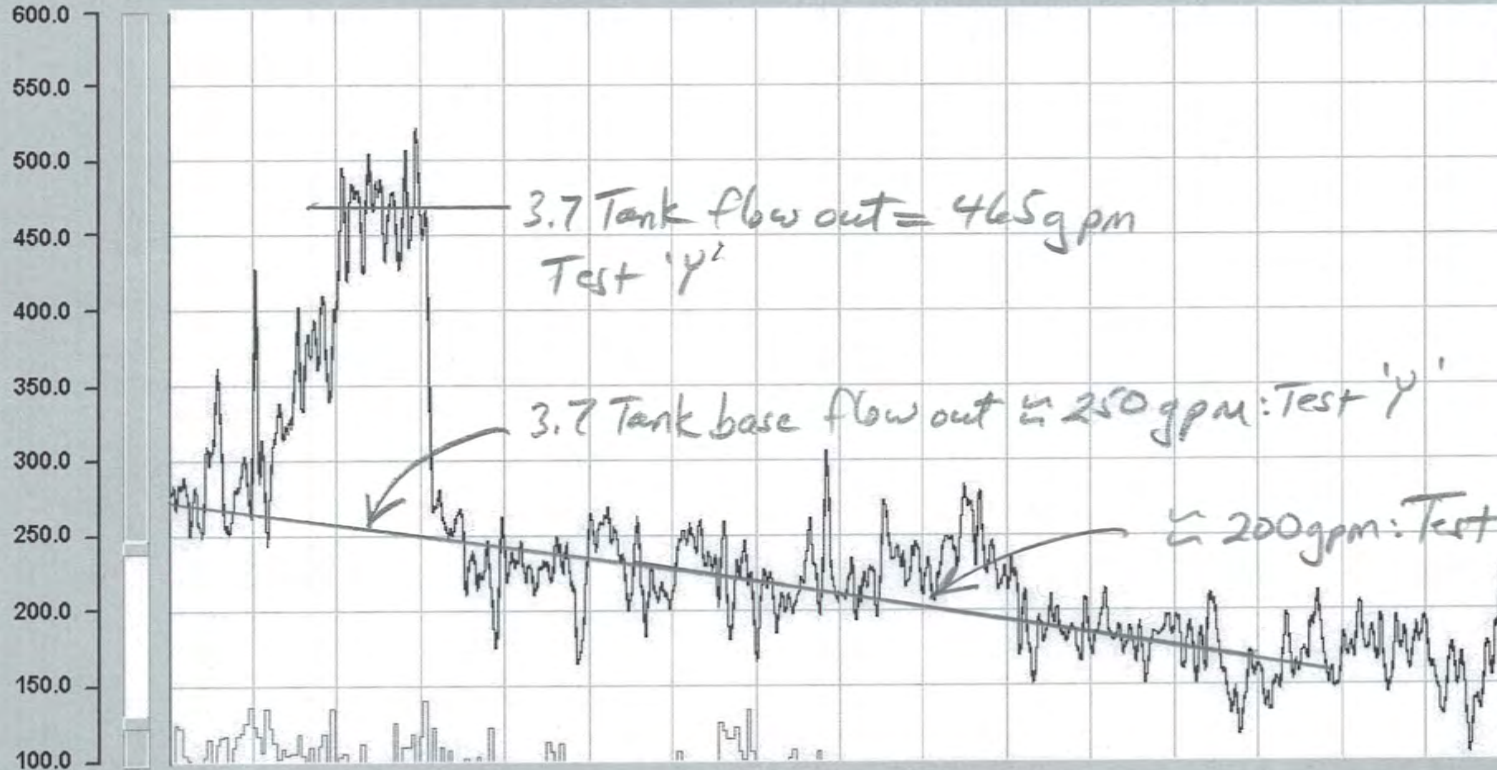
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Current Trend Time Span

22:00:00

Zoom In

2h

Zoom Out

00:00:00

Save to
File Setup

4 hours

1 hour

Minutes

30 minutes

10 minutes

Booster 1

Booster 2

17th Intertie

19th Intertie

Pump Station - 1

Pump Station - 2

Supply Station 1

Supply Station 3

2 MG Reservoir

Supply Station 4

Seattle Flows

Reservoir Levels

Reservoir Flows

CL2 Levels

SEA Flow TOT

SS/BS Totalizers

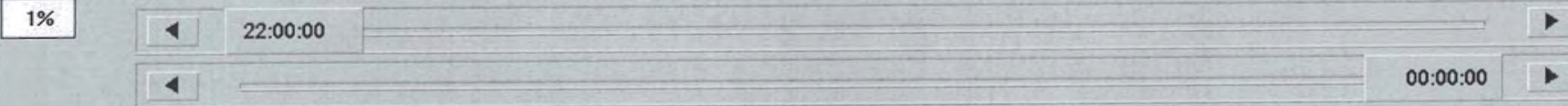
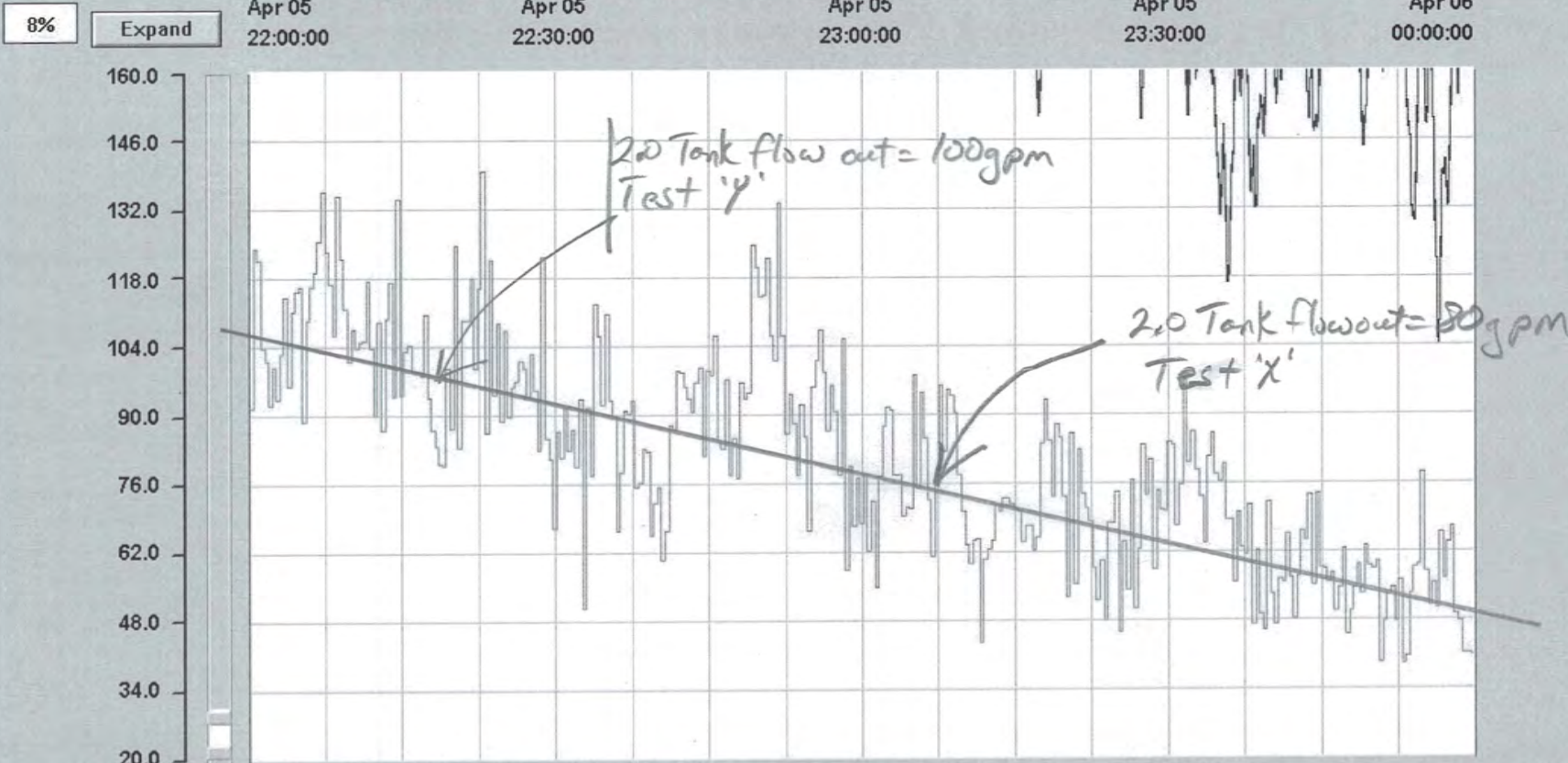
Custom

2.0 Tank Flow

Historical Trends Reservoir Flows

3.7MG Tank Flow In	3.7MG Tank Flow Out	0.4MG FLOW IN	0.4MG FLOW OUT	2.0MG FLOW IN	2.0MG FLOW OUT	2.0MG FLOW OUT REV
0.00	0.00	277.75	191.00	0.00	0.00	0.00
0.00		0.00	0.00	0.00	0.00	0.00
		0.00	0.00	0.67	0.78	91.53
						40.64
						0.00
						0.00

☐ 1 Hour
 ☐ 2 Hours
 ☒ 4 Hours
 ☐ 6 Hours
 ☐ 12 Hours
 ☐ 24 Hours
 ☐ 2 Days
 ☐ 3 Days
 ☐ 7 Days
 ☐ 14 Days
 ☐ 30 Days
 ☐ 60 Days



Current Trend Time Span

Save to File Setup

22:00:00 2h 00:00:00
 4 hours 1 hour Minutes 30 minutes 10 minutes

- Booster 1
- Booster 2
- 17th Intertie
- 19th Intertie
- Pump Station - 1
- Pump Station - 2
- Supply Station 1
- Supply Station 3
- 2 MG Reservoir
- Supply Station 4
- Seattle Flows
- Reservoir Levels
- Reservoir Flows
- CL2 Levels
- SEA Flow TOT
- SS/BS Totalizers
- Custom

Historical Trends North City Pump Station

Zone 615 Flow		ter Pump Discharge Pressure A		Zone 502 Flow	
263.11	184.22	51.06	50.99	0.00	0.00

☐ 1 Hour ☐ 2 Hours ☒ 4 Hours ☐ 6 Hours ☐ 12 Hours ☐ 24 Hours ☐ 2 Days ☐ 3 Days ☐ 7 Days ☐ 14 Days ☐ 30 Days ☐ 60 Days

8%

Expand

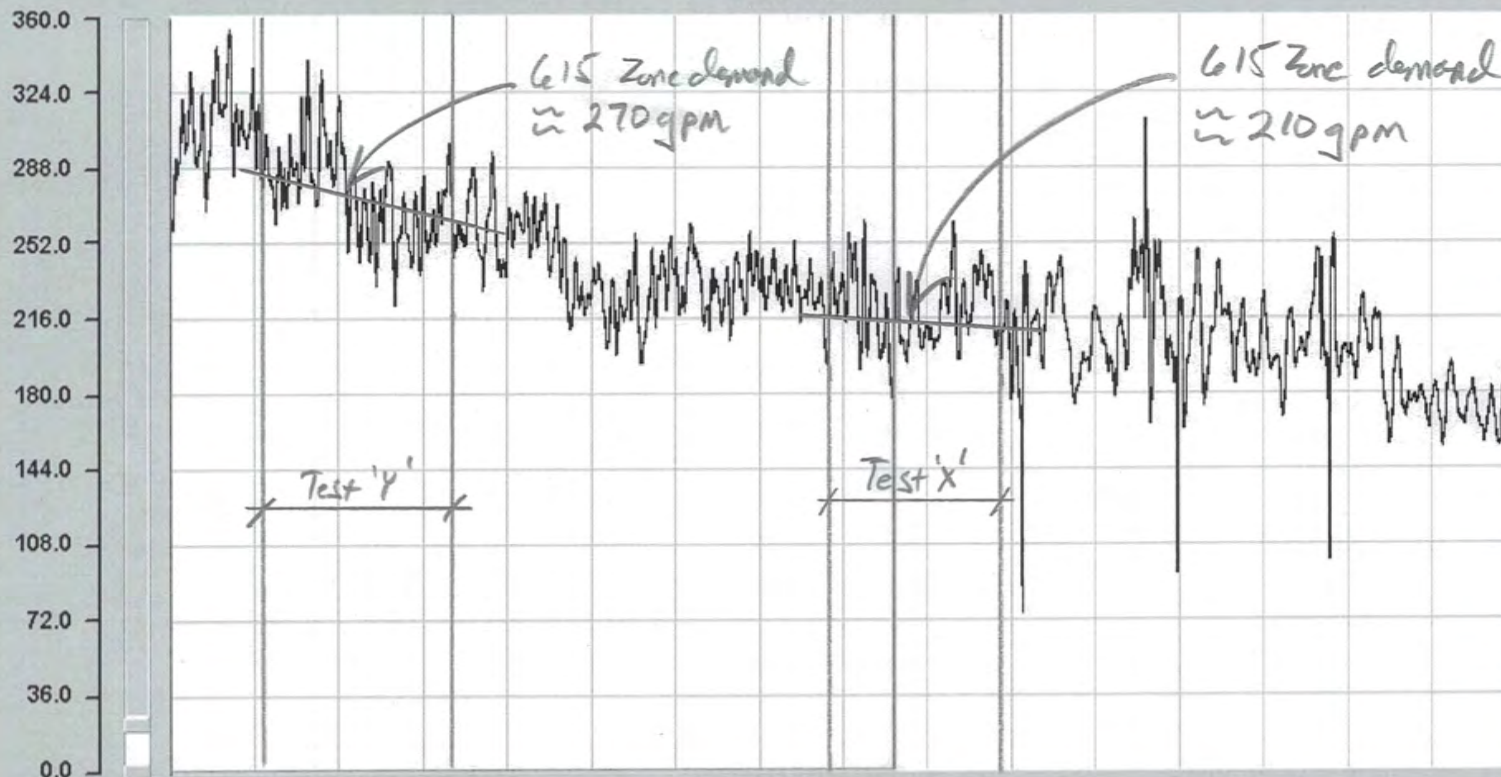
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Current Trend Time Span

Save to
File Setup

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Zoom In

2h

Zoom Out

00:00:00

4 hours

1 hour

Minutes

30 minutes

10 minutes

SS/BS Totalizers

Custom

Booster 1

Booster 2

17th Intertie

19th Intertie

Pump Station - 1

Pump Station - 2

Supply Station 1

Supply Station 3

2 MG Reservoir

Supply Station 4

Seattle Flows

Reservoir Levels

Reservoir Flows

CL2 Levels

SEA Flow TOT

590 Zone Flow

Historical Trends North City Pump Station

3.7MG Tank Level

84.75 83.16

Suction Head CL2

0.69 0.68

Zone 590 Flow

277.67 191.00

590 Zone Pressure

32.95 32.34

1 Hour 2 Hours 4 Hours 6 Hours 12 Hours 24 Hours 2 Days 3 Days 7 Days 14 Days 30 Days 60 Days

14%

Expand

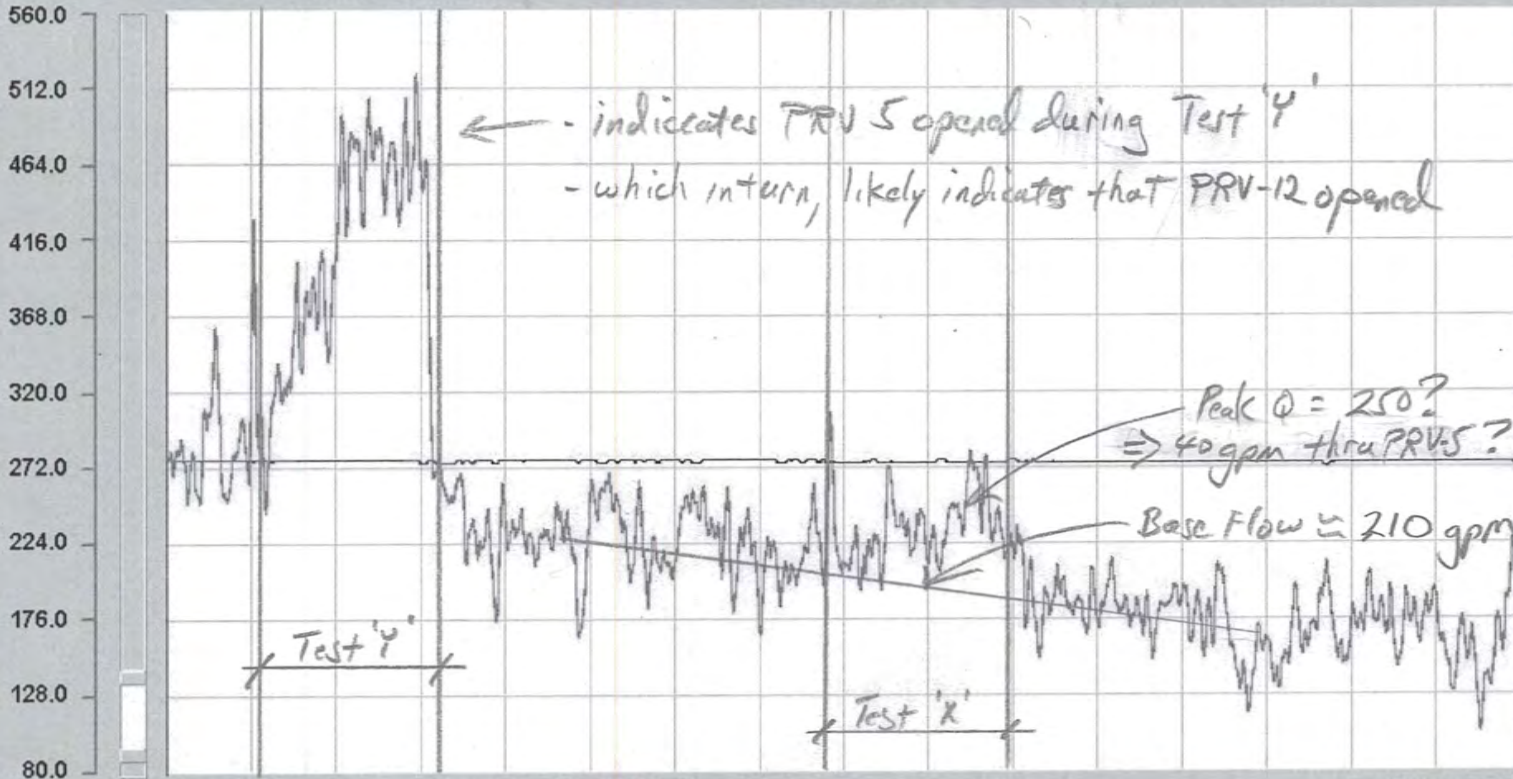
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Apr 05
23:30:00

Apr 06
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22:00:00

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Current Trend Time Span

22:00:00

Zoom In

2h

Zoom Out

00:00:00

Save to
File Setup

4 hours

1 hour

Minutes

30 minutes

10 minutes

Custom

Booster 1

Booster 2

17th Intertie

19th Intertie

Pump Station - 1

Pump Station - 2

Supply Station 1

Supply Station 3

2 MG Reservoir

Supply Station 4

Seattle Flows

Reservoir Levels

Reservoir Flows

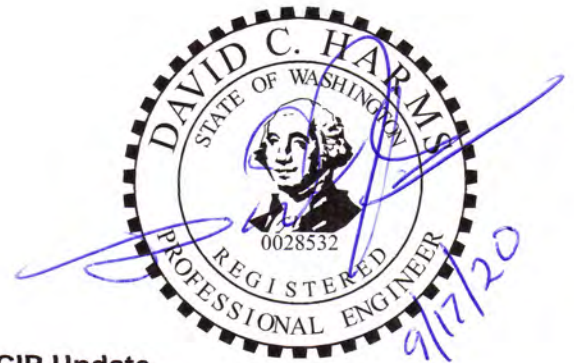
CL2 Levels

SEA Flow TOT

SS/BS Totalizers

TECHNICAL MEMORANDUM

Date: September 17, 2020
To: Diane Pottinger, P.E., District Manager
Denny Clouse, Operations Manager
From: Dave Harms, P.E.
Subject: Hydraulic Modeling, System Analysis and CIP Update



1. Introduction

This technical memorandum (tech memo) summarizes the hydraulic model (model) update and calibration, system analysis and CIP update performed by BHC Consultants, in support of the District's Comprehensive Water System Plan (Plan) update. The purpose of this effort was twofold:

- Update piping, operational settings, system demands and diurnal demand variations in the District's model and perform an update to the model calibration.
- Utilize the updated model to perform a system-wide analysis and identify Capital Improvement Plan (CIP) projects for the 10- and 20-year planning cycles.

The hydraulic analysis resulted in a prioritized set of capital projects to be included in the District Plan. These projects included a significant reconfiguration of the District's existing pressure zones, increasing the level of service and providing operational redundancy, as described later in this tech memo. A water age analysis was also performed, comparing water age for the reconfigured pressure zones and related improvements to existing-baseline water age.

System improvements identified in the system analysis resolve deficiencies in meeting current District performance criteria. These improvements form the foundation for the updated CIP, which is documented in the District's Plan. A significant effort in performing model iterations and collaborating with the District on alternative improvements, resulted in an efficient, cost-effective and justifiable CIP. The CIP also includes additional District-identified projects, such as replacement of aging pipeline and completion of piping loops to improve water age and distribution system redundancy.



Figure 1 illustrates the existing system configuration as it is represented in the existing model. The hydraulic analysis was performed using InfoWater software, by Innovyze. The software is developed specifically for modeling pressurized flow in water distribution systems and runs interactively with ArcMap.

2. Model Update and Calibration

2.1 Model Update

The model is based on physical data (pipes, storage tanks, pumps, valves, etc.) that define the distribution system. The most recent significant update to the model was performed during the previous Water System Plan. At that time, piping updates were input to the model, operational settings were verified/updated, system demands were updated, and a model calibration was performed. Periodic minor updates to the model have occurred since then, as important system piping updates have occurred, or for specific interim analyses.

2.1.1 Piping

Multiple updates to system piping were input to the model for this analysis, including:

- Supply Station 4 was constructed to add a secondary source to the 590 Zone and additional supply (CIP 2010-07)
- Input of 8-inch piping creating additional looping in the commercial area, just northwest of the intersection between Ballinger Way and 19th Avenue NE (WSEA 2017.09.16)
- Replacement of a segment of existing 6-inch cast-iron (CI) piping with 12-inch ductile-iron (DI) piping at NE 165th Street and 5th Avenue NE (WSEA 2012.05.32)
- Extending the 615 Zone to the northwest, adding several residential parcels at the intersection of 15th Avenue and 24th Avenue NE (CIP 2011.06)
- Updating the piping configuration for Kellogg Middle School (WSEA 2018.09.26).
- Piping updates were input to the model, representing the final configuration of improvements at the North City/Denny Clouse pump station (CIP 2011.06)
- Piping updates were removed from the model, to exclude an extension of the 615 Zone to the south. That portion of the zone expansion project was not constructed.
- Additional piping updates



2.1.2 Operational Settings

The following updates to operational settings were input to the model:

- The operating range for the 3.7 MG Tank was changed from 68-feet minimum water depth to 70-feet, to provide additional emergency storage and increase fire flow residual pressures.
- Minor adjustments to PRV settings were made.

2.1.3 System Demands

The spatial distribution of system demands was updated for the 2015 water age analysis performed for the District. Consumption from billing data was geo-located to achieve the spatial distribution. The same distribution of demands was preserved for this analysis and globally factored to match current (2017) total system demand. Large individual customer demands were reviewed and updated in the model as appropriate.

Diurnal demand patterns were based in part on District SCADA data, and adjusted as necessary to match peaking factors provided by the District. Demand projections were updated for the analysis, based on population projections and per capita rates provided by the District. Future scenario diurnal demand patterns and peaking factors are unchanged from the 2017 demand scenario.

2.2 Calibration

Model calibration was performed after completion of the updates described above. Model simulations were initially performed to identify candidate hydrant locations for flow tests. Pressure gauges were attached to hydrants adjacent to selected flow test hydrants and pressure readings were recorded before, during and after the hydrant flow tests. Flow rates from the hydrants were identified using telemetry data from the District's SCADA system. Model simulations were then performed in an iterative manner, adjusting Hazen Williams 'C' values until simulated pressure drops matched field-recorded pressure drops within an acceptable tolerance. Model calibration is described in detail in the June 28, 2018 calibration memo to the District.

3. Analysis Assumptions and Criteria

3.1.1 Supply

- The District obtains all its water from SPU, through multiple connections to separate pressure zones. These supply connections (not including emergency/fire flow supply) are described in detail in the Plan and summarized herein:
 - Supply Station 4 (SS-4) is the primary 590 Zone supply. Booster Stations 1 and 2 (BS-1, BS-2) are secondary supplies to the 590 Zone.
 - The 615 Zone is supplied from the 590 Zone, through the North City/Denny Clouse Pump Station (NC/DCPS).
 - Supply Station 1 (SS-1) is the primary supply to the 502 Zone. Supply Station 3 (SS-3) is the secondary supply. The 502 Zone can also be supplied through a PRV from the 590 Zone, located in the NC/DCPS.
 - Supply Station 2 (SS-2) is the primary supply to the 432 Zone. It supplies water directly to the 2.0 Tank, which provides a free water surface to the 432 Zone that establishes pressures in the zone. The 432 Zone also receives water from the 590 Zone, through PRVs-4, 5, 7 and 8 and from the 502 Zone through PRVs-2 and 13.
 - The 307 Zone is supplied directly from the 432 Zone, through PRVs.
 - The 237 Zone is supplied directly from the 307 Zone (indirectly from the 432 Zone) through PRVs.

3.1.2 Analysis Criteria

- The minimum system pressure requirement is 30 psi, during the Peak Hour Demand (PHD) scenario and with storage tanks at the bottom of their respective equalizing ranges (30 ft below overflow in the 3.7 Res and 10 ft below overflow in the 2.0 Res), per State Department of Health (DOH) and District criteria.
 - Minimum transmission piping pressure must be at least 5 psi, except when adjacent to a storage tank.
- Maximum system pressures are based on minimum system demand and with storage tanks full. The District requires installation of service line PRVs if the maximum system pressure exceeds 80 psi.
- Fire flows are superimposed over existing Maximum Day Demand (MDD) conditions, assuming operational, equalizing and fire flow storage volumes have been depleted, in



accordance with (DOH) criteria. Minimum residual pressures during fire flow simulations must be greater than 20 psi at all locations in the distribution system.

- Fire flow simulation in the 615 Pressure Zone occurs with one of the fire pumps out of service, in accordance with Department of Health requirements.
- Fire flow simulation in the 590 Zone is performed alternatively, with BS-1 operating, then BS-2.
- Maximum allowed velocity in the distribution system is 10 feet per second for existing mains and 8 feet per second for new mains, for peak domestic and fire flow demand scenarios (District design standard criteria, Section 4 of the Plan)
- Baseline pump operations are consistent with reservoir level-based controls. Separate modeling scenarios were simulated, with 590 Zone supply provided individually by BS-1, then BS-2.
- PRVs are at their current set points.

4. Analysis Results and Recommendations

4.1 Existing Conditions

Maximum and minimum system domestic pressures and fire flow availability were initially analyzed for the existing distribution system configuration, operational settings and system demands. Note that the analysis was originally performed assuming the southern portion of the east 615 Zone extended further south, to NE 165th Street (from the 2010 CIP). The following figures are based on this assumption (2018), which was updated prior to completing the final analysis and identifying system improvements.

4.1.1 Minimum Pressures

Figure 2 illustrates minimum domestic pressures in the existing system configuration, during PHD and with storage tanks at the bottom of their equalizing ranges (30 ft below overflow in the 3.7 Res and 10 ft below overflow in the 2.0 Res). Model results indicate minimum pressure is below criteria (27 psi) at one location in the southern 432 Zone ("Nob"), on 32nd Avenue NE. Note that with the 2.0 Tank at the bottom of its operating level during PHD, the primary supply into the southern 432 Zone becomes PRV 2, even with the 25th Avenue pipeline open.



4.1.2 Maximum Pressures

Figure 3 illustrates existing maximum system pressures, during minimum system demand and with storage tanks full. All maximum system pressures exceed the 30 psi minimum pressure criteria and range to greater than 110 psi in a few areas. Areas experiencing these maximum pressures are primarily located in the southern portion of the District's service area.

4.1.3 Fire Flows

Systemwide fire flow simulations were performed individually, for each Land Use Category. Fire flow rates are assigned based on local land use/ zoning codes. The minimum required fire flow rate is 1,000 gpm for single-family residential zoned areas (Figures 4 and 5). The District considered a minimum fire flow rate in single family to be 1,500 gpm (Figures 6 and 7). Fire flow requirements increase with the density of residential developments and include 1,750 gpm (Figures 8 and 9) and 2,500 gpm (Figures 10 and 11) rates. Commercially zoned areas require a 3,000 gpm (Figures 12 and 13) rate. Fire flow rates for schools and churches are individually assigned a 3,500 gpm (Figures 14 and 15) rate. The fire flow modeling results shown in Figures 4 through 15 represent the model results only for nodes where the fire flow rate indicated is required. For example, Figures 14 and 15 show the results for the fire flow locations where 3,500 gpm is the required fire flow. Figures 14 and 15 do not show the results where 3,500 gpm fire flows are not required.

In accordance with the stated analysis criteria, each systemwide fire flow simulation was performed alternatively, with BS-1, then BS-2 operational. Figures 4 and 5 illustrate simulation results for the 1,000 gpm residential fire flow rate. Only two differences in fire flow deficiencies occur between the two alternative booster station operating scenarios. These differences are located along 10th Avenue, in the central 590 Zone. Most of the fire flow deficiencies are located on dead-end 6-inch or 4-inch pipelines, which cannot convey the required fire flow without exceeding the velocity criteria.

Although the District does not have a 1,500 gpm fire flow requirement, there was interest in determining deficiencies associated with this fire flow rate, for comparison with the 1,000 gpm residential rate. Figures 6 and 7 illustrate results for the 1,500 gpm rate. Model results indicate that 6-inch looped pipe typically does not support a 1,500 gpm rate due to excessive velocities. Nearly all deficiencies are limited by excessive velocity, except for one location in the southern



432 Zone, where the relatively higher elevation and smaller distribution piping results in residual pressures falling below the 20 psi criteria.

Medium density zoned residential developments require a 1,750 gpm fire flow rate. Results for this requirement are illustrated in Figures 8 and 9. High density zoned residential developments require 2,500 gpm. Results for this fire flow requirement are illustrated in Figures 10 and 11. Commercially zoned developments require 3,000 gpm. Figures 12 and 13 illustrate results for this requirement.

The District also requires 3,500 gpm for schools and churches. Schools and churches have been individually identified and assigned this fire flow requirement in the model. Figures 14 and 15 illustrate results for this requirement.

4.2 Future Scenario Analyses with Improvements

Improvements identified to resolve existing conditions deficiencies were then simulated for future (10- and 20-year) scenarios. Analysis results verified the adequacy of existing improvements, and any additional improvements necessary to meet performance criteria for the future scenarios. Figure 16 illustrates system improvements input to the model to resolve deficiencies. These improvements form the foundation for the CIP identified in the Plan.

The projects identified to resolve deficiencies using 2019 District design standards included a significant reconfiguration of the District's existing pressure zones. The existing 502 Zone has been expanded to encompass the southern portion of the 432 and 590 Zones. The HGL for this reconfigured zone was set at 520 feet. This pressure zone reconfiguration accomplishes several purposes:

- Resolves minimum domestic pressure deficiencies on 32nd Avenue NE, in the southern 432 Zone. These deficiencies are caused by a combination of relatively high elevation, compared to the 432 Zone HGL, distance from the 2.0 Tank supply source and older, smaller sized piping that experiences higher pressure loss. Figures 17 and 18 illustrate resulting minimum system pressures for the 10- and 20-year PHD scenarios, with CIP improvements in place. Model results indicate minimum service pressures are above 40 psi throughout the system, for both the 10- and 20-year scenarios. Locations where results indicate pressures below 30 psi are in transmission piping, which is acceptable.



- Resolves multiple fire flow deficiencies in the 432, 307, and 237 Zones caused primarily by residual pressure dropping below the 20 psi criteria at the same location in 32nd Avenue NE.
- Decreases high domestic pressures in the relatively lower elevation southern 590 Zone.
- Provides operational redundancy. The reconfigured zone can be supplied by:
 - SS-1
 - PRVs recommended to be installed at the southern 590 Zone boundary
 - A new supply station proposed to be located at the southern 590 Zone boundary
 - The NC/DCPS 590 to 520 PRV, reconfigured from the 502 HGL
 - The check valve installation at the PRV-13 location, for fire flows
 - PRV 1, for fire flows
- Analysis results indicate that the improved operational redundancy provides additional opportunities to manage (decrease) water age.
 - When the SS-1 & PRVs proposed for the 590-520 boundary are set at the same HGL, flow direction reverses as demand increases.
 - During minimum demand conditions, SS-1 supply travels south & mixes with PRV-supplied flow in the southern 590 Zone, at approximately 17th Avenue NE.
 - For PHD demand conditions, PRV-supplied flow travels east then north & mixes with SS-1 supply at approximately the location of PRV-10.

Another significant project is relocation of BS-1 to the District's new maintenance facility site, located on 15th Avenue adjacent to Hamlin Park. This project will include:

- 12-inch diameter suction line piping from the existing BS-1 site to the new pump station location.
- New pump station with approximately 2,000 gpm capacity duplex pumps.
- 1.5 MG concrete storage tank.
- New gravity feed supply station (SS-5) from SPU to the 520 Zone.
- 590 to 520 Zone PRV station.

With completion of the booster station relocation project, the District will have a new maintenance facility, booster station, supply station, storage tank and PRV station all located at one site.



The 615 Zone will be expanded to encompass a non-contiguous area surrounding the newly reconstructed Kellogg Middle School. This zone expansion will increase residual pressures to meet the 20 psi criteria for the increased fire flow requirement associated with the reconstructed school. The expanded pressure zone will also increase domestic and residual fire flow pressures for this relatively higher elevation area. It will also improve fire flow availability in the 590 Zone, by removing and relocating areas with limiting residual pressures to the expanded 615 Zone.

The rest of the CIP projects are identified primarily to resolve excessive velocity occurring during fire flow conditions. Prioritization of CIP projects between the 10- and 20-year planning periods was accomplished through coordination with the District.

Several operational adjustments were identified in the hydraulic analysis. These adjustments assist with establishment of the 520 Zone, but also mitigate fire flow deficiencies without the need for additional piping improvements. The operational adjustments identified below will occur after the entire 520 Zone is created:

- Adjust NC/DCPS 590 – 520 PRV to a setting of 6 psi, equivalent to a 510-foot HGL. With this adjustment, the PRV will serve as a secondary/fire flow supply to the new 520 Zone.
- Adjust PRV-4 to 81 psi (506-foot HGL; 3-inch valve) and 76 psi (495-foot HGL; 8-inch valve), to serve the new 520 Zone.
- PRV-2 will be relocated further down the hill in NE 178th Street, to the intersection with 28th Avenue NE. The PRV should be adjusted to provide a 432-foot HGL. Actual pressure settings will depend on the elevation of the relocated PRV.
- Adjust PRV-1 to a setting of 64 psi, equivalent to a 486-foot HGL. This new setting will allow PRV-1 to supplement fire flows to the new 520 Zone, west of I-5.
- Adjust PRVs 6, 3 and 10, serving the 307 Zone. The recommended PRV settings will change the lead PRV from PRV-10 to PRV-6. These changes mitigate the need for piping improvements associated with fire flows.
 - Set PRV-6 to 56 psi (308-foot HGL; 2-inch valve) and 51 psi (296-foot HGL; 6-inch valve).

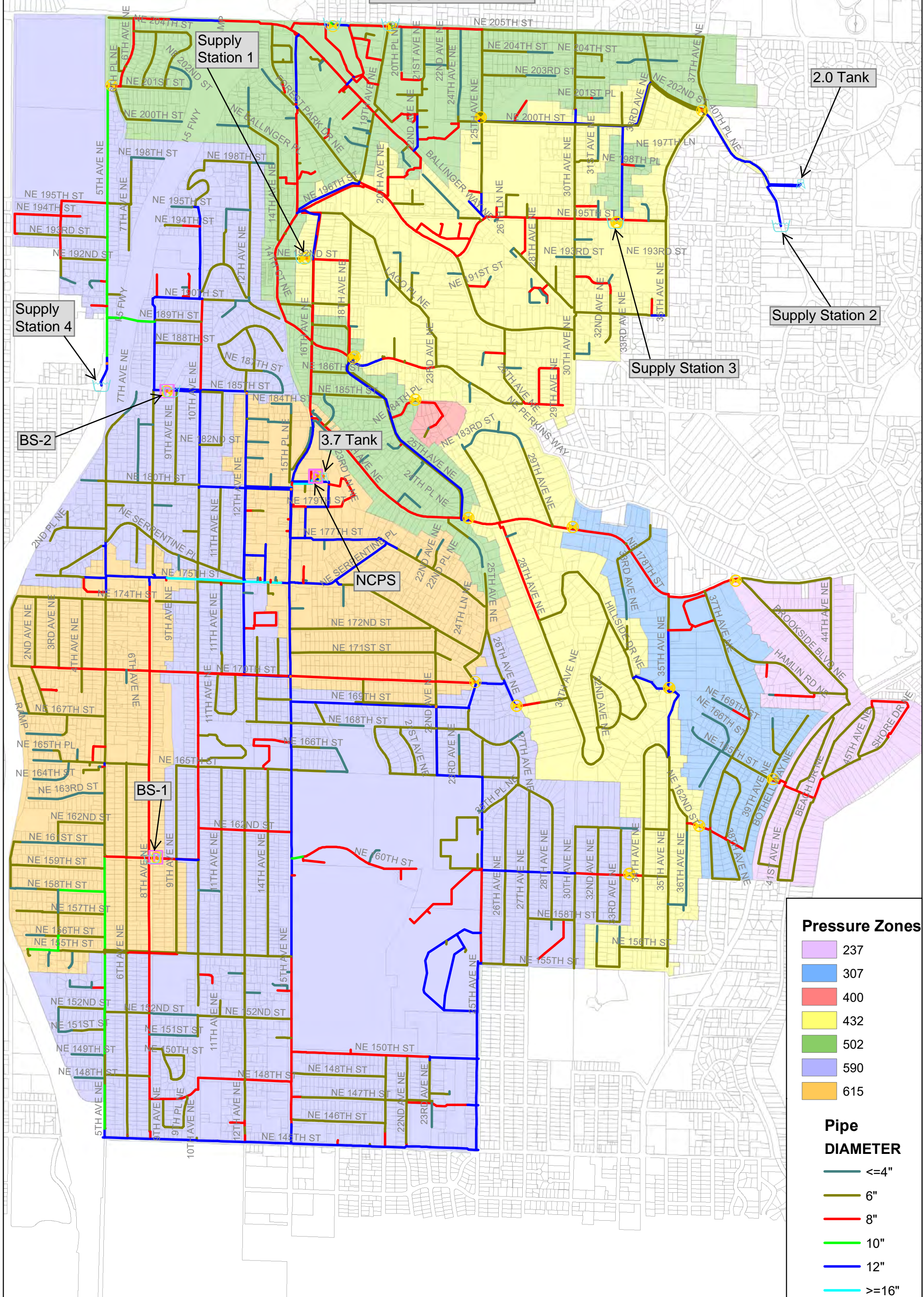


- Set PRV-10 to 59 psi (238-foot HGL; 3-inch valve) and 54 psi (227-foot HGL; 8-inch valve).
- Set PRV-3 to 43 psi (283-foot HGL; 1.5-inch valve) and 38 psi (271-foot HGL; 8-inch valve).
- Adjust PRV-12 to a setting of 45 psi (190-foot HGL; 2-inch valve) and 40 psi (178-foot HGL; 6-inch valve). The recommended PRV settings will rebalance fire flow distribution for the 1,750 gpm requirement and mitigate a velocity deficiency. Settings for the lead PRV (#11) to the 237 Zone are recommended to remain unchanged.
- Adjust the SS-1 432 Zone PRV to a setting of 59 psi (399-foot HGL) to provide additional flow for large 432 Zone fire flows. At the recommended setting, SS-1 will remain closed to the 432 Zone during normal/domestic supply conditions.

Attachments

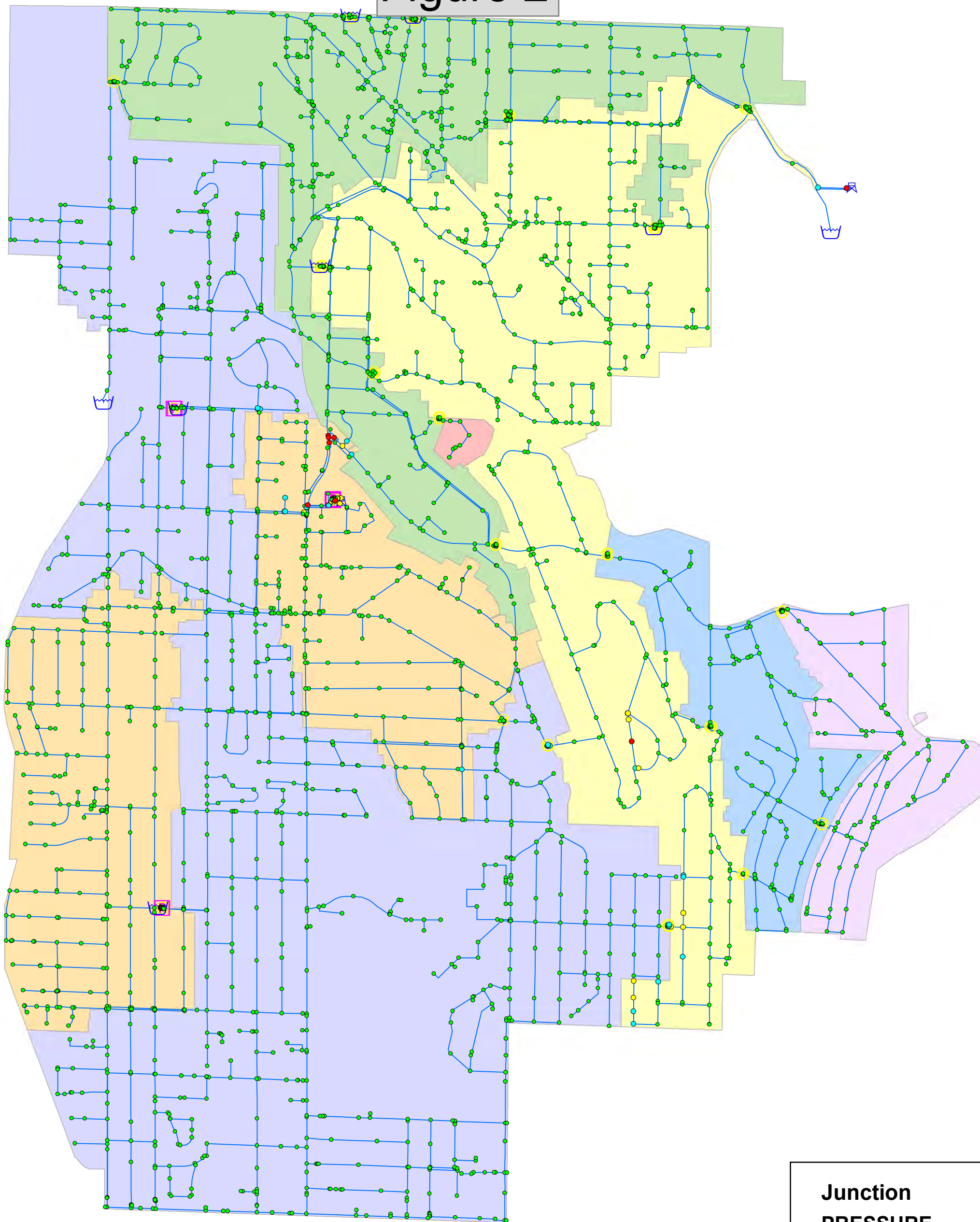
- Figure 1 – Existing Model
- Figure 2 – 2017 Minimum System Pressures
- Figure 3 – 2017 Maximum System Pressures
- Figure 4 – Existing 1,000 gpm Fire Flow: BS-1 on
- Figure 5 – Existing 1,000 gpm Fire Flow: BS-2 on
- Figure 6 – Existing 1,500 gpm Fire Flow: BS-1 on
- Figure 7 – Existing 1,500 gpm Fire Flow: BS-2 on
- Figure 8 – Existing 1,750 gpm Fire Flow: BS-1 on
- Figure 9 – Existing 1,750 gpm Fire Flow: BS-2 on
- Figure 10 – Existing 2,500 gpm Fire Flow: BS-1 on
- Figure 11 – Existing 2,500 gpm Fire Flow: BS-2 on
- Figure 12 – Existing 3,000 gpm Fire Flow: BS-1 on
- Figure 13 – Existing 3,000 gpm Fire Flow: BS-2 on
- Figure 14 – Existing 3,500 gpm Fire Flow: BS-1 on
- Figure 15 – Existing 3,500 gpm Fire Flow: BS-2 on
- Figure 16 – Future CIP Model
- Figure 17 – 2026 Minimum System Pressures
- Figure 18 – 2036 Minimum System Pressures

Figure 1



North City Water District 2017 Minimum System Pressures

Figure 2



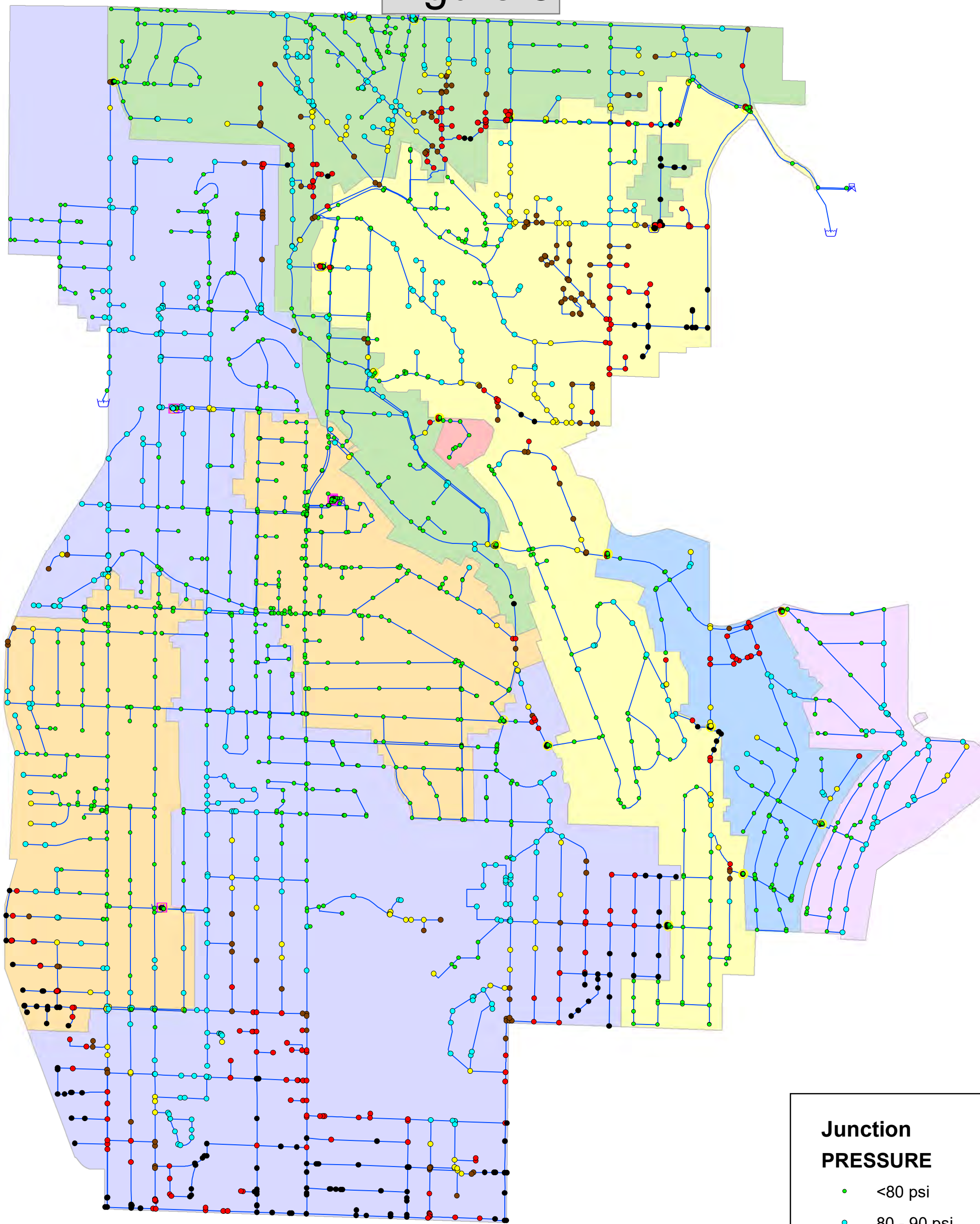
Minimum system pressures occur during Peak Hour Demand conditions and with the storage tanks at the bottom of their respective equalizing ranges

Junction PRESSURE

- < 30 psi
- 30 - 35 psi
- 35 - 40 psi
- > 40 psi

North City Water District 2017 Maximum System Pressures

Figure 3



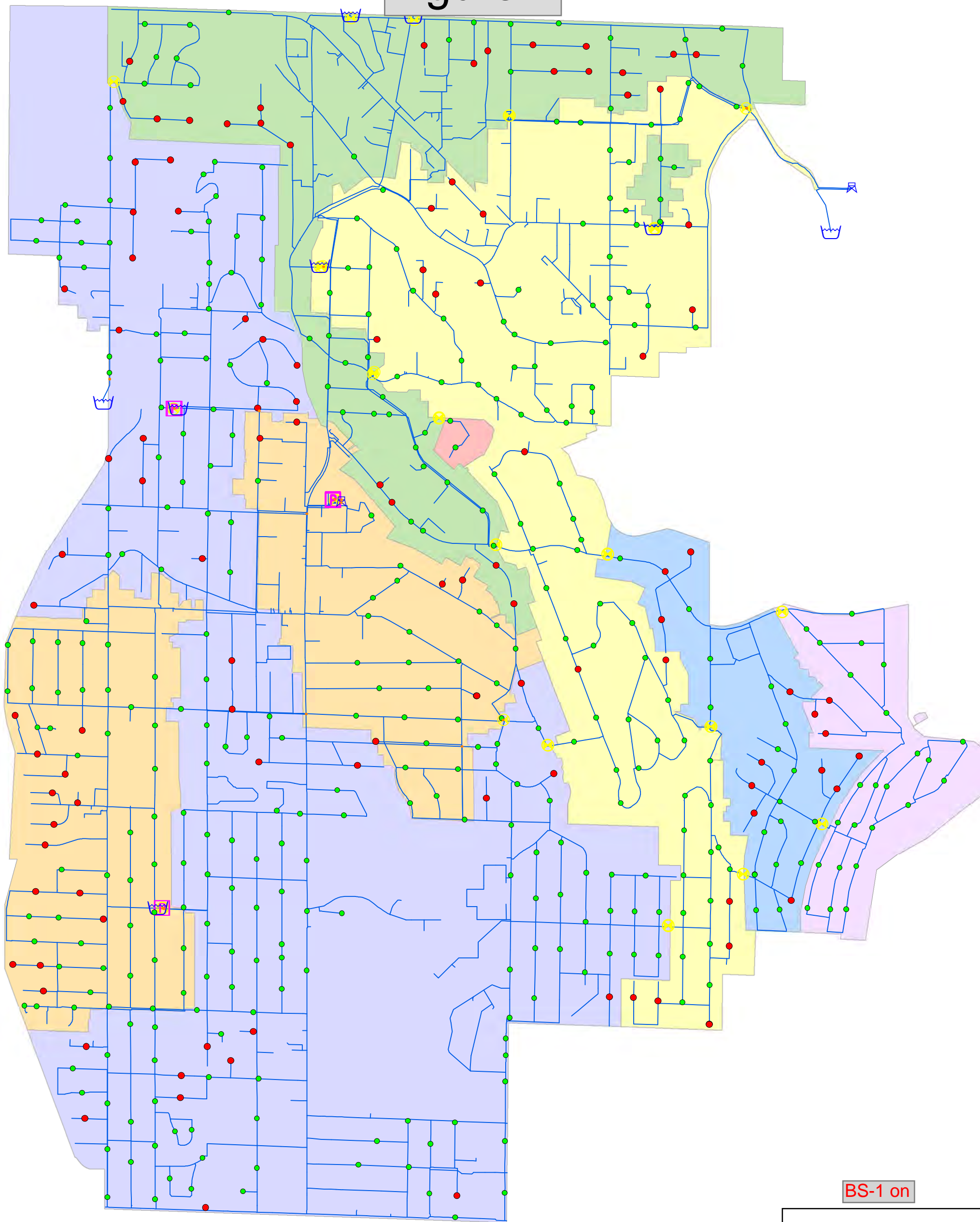
Maximum system pressures occur during periods of minimum demand and with the storage tanks full

Junction PRESSURE

- <80 psi
- 80 - 90 psi
- 90 - 95 psi
- 95 - 100 psi
- 100 - 110 psi
- > 110 psi

*North City Water District
Existing 1,000 gpm Fire Flow*

Figure 4



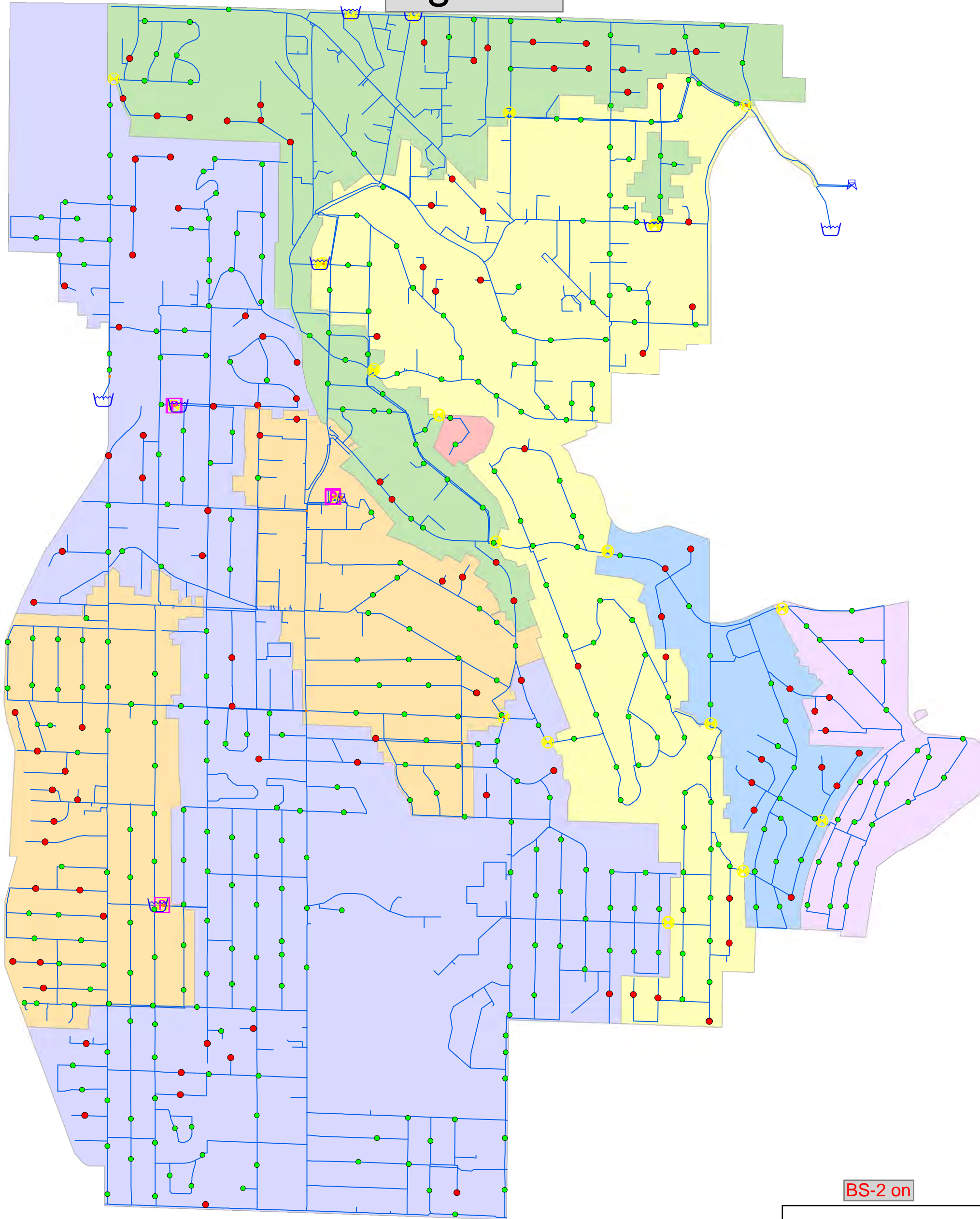
BS-1 on

**Junction
AVAIL_FLOW**

- < 1000 gpm
- > 1000 gpm

North City Water District Existing 1,000 gpm Fire Flow

Figure 5



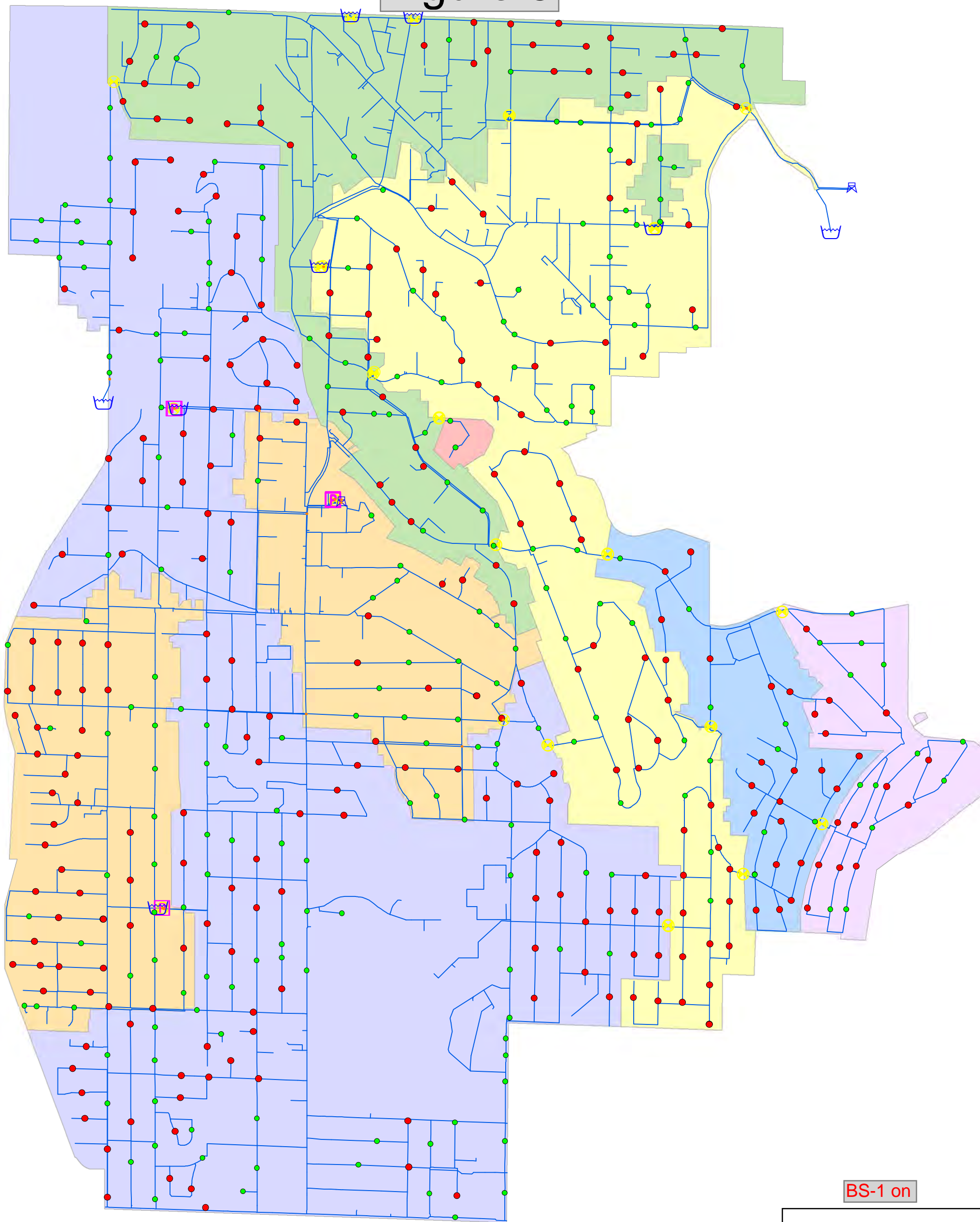
BS-2 on

Junction AVAIL_FLOW

- < 1000 gpm
- > 1000 gpm

North City Water District Existing 1,500 gpm Fire Flow

Figure 6



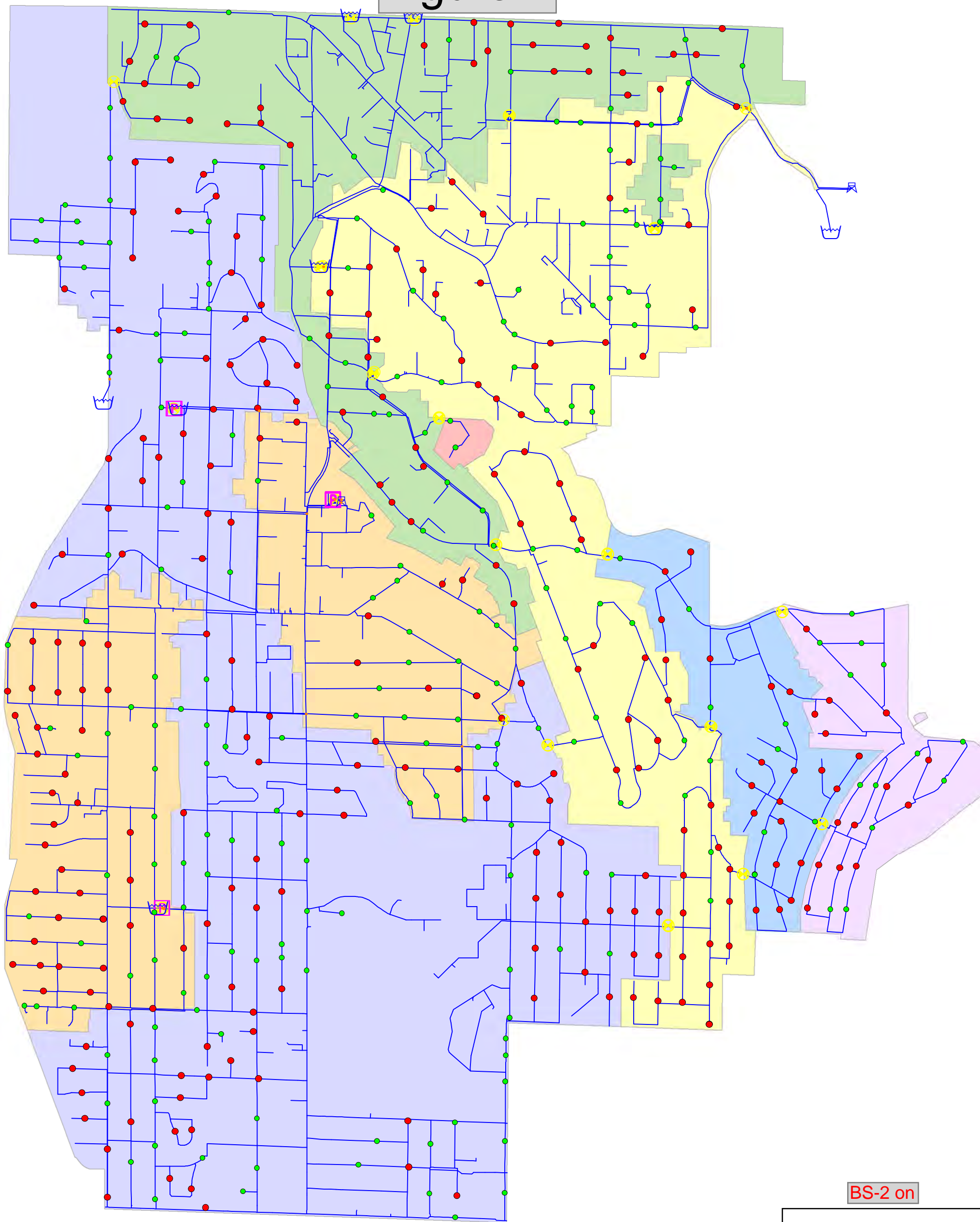
BS-1 on

Junction AVAIL_FLOW

- < 1500 gpm
- > 1500 gpm

*North City Water District
Existing 1,500 gpm Fire Flow*

Figure 7



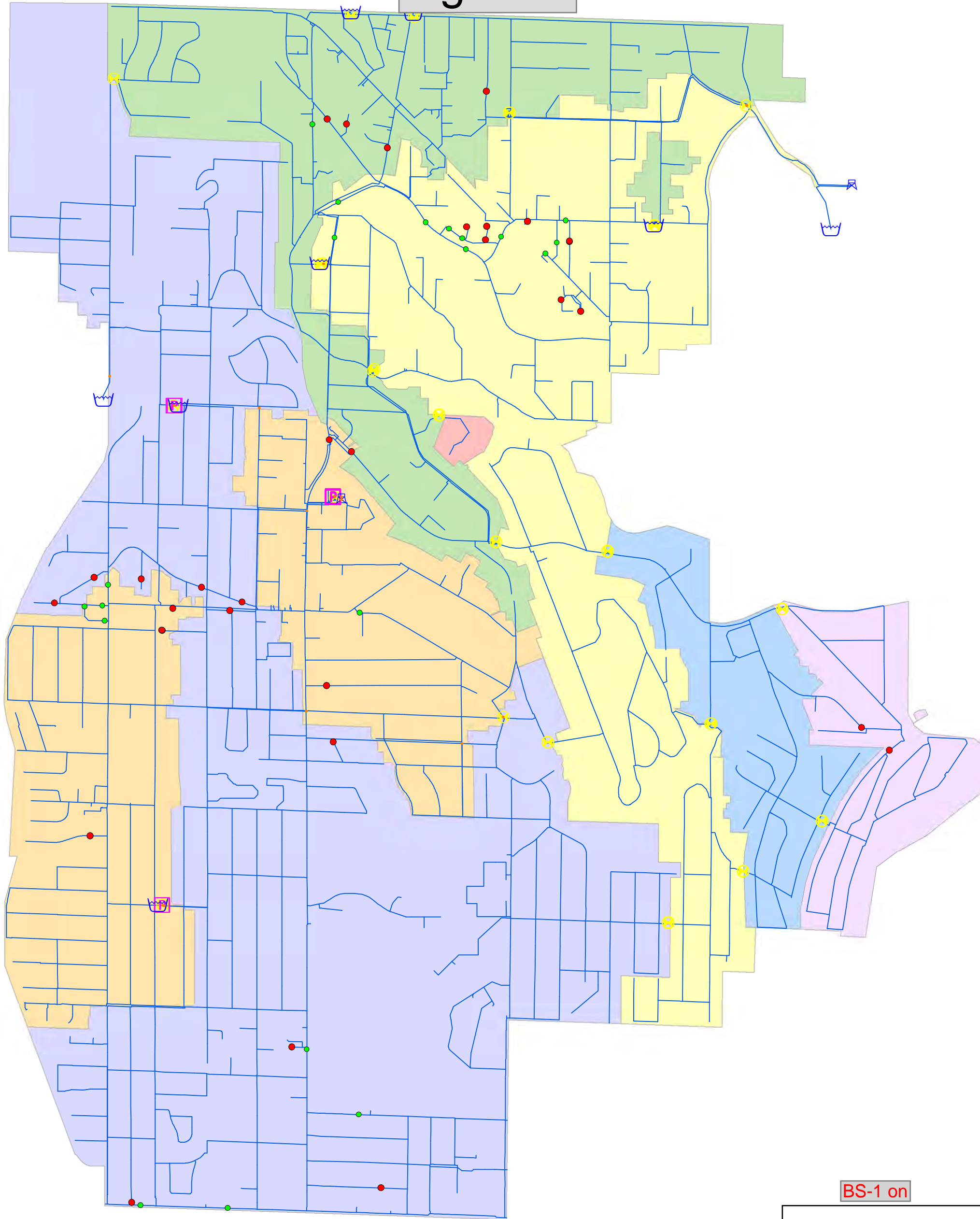
BS-2 on

**Junction
AVAIL_FLOW**

- < 1500 gpm
- > 1500 gpm

***North City Water District
Existing 1,750 gpm Fire Flow***

Figure 8



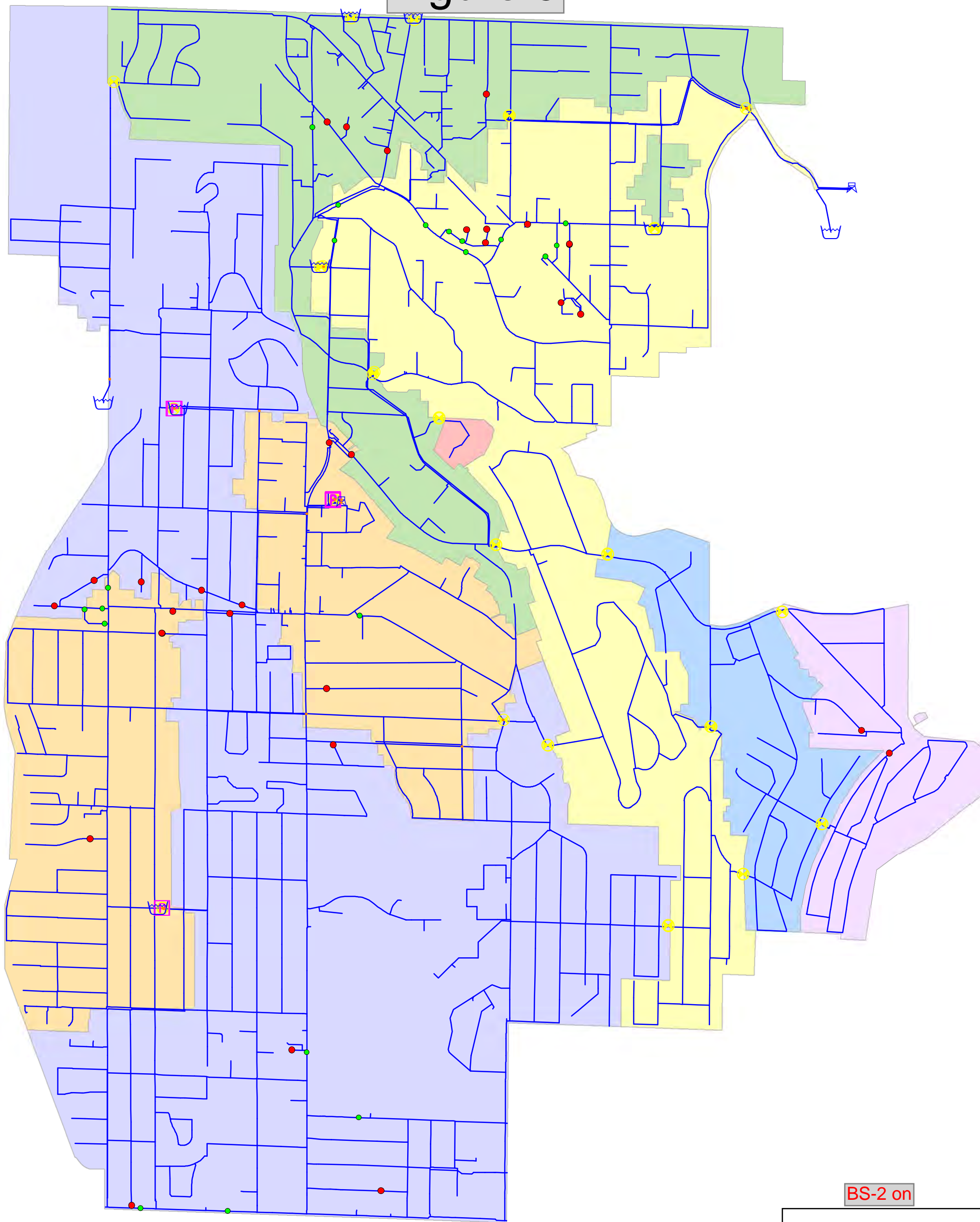
BS-1 on

**Junction
AVAIL_FLOW**

- < 1750 gpm
- > 1750 gpm

*North City Water District
Existing 1,750 gpm Fire Flow*

Figure 9



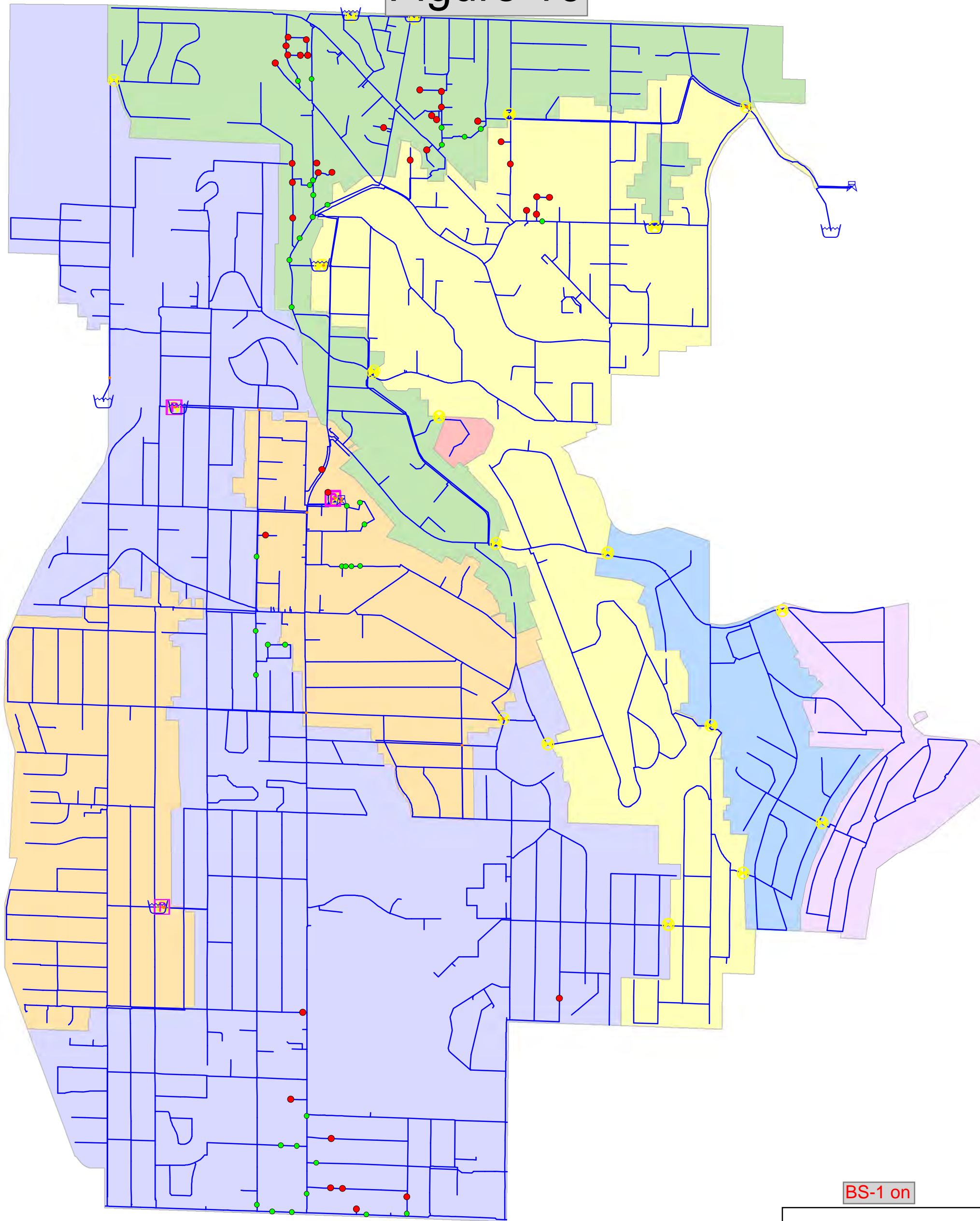
BS-2 on

**Junction
AVAIL_FLOW**

- < 1750 gpm
- > 1750 gpm

*North City Water District
Existing 2,500 gpm Fire Flow*

Figure 10



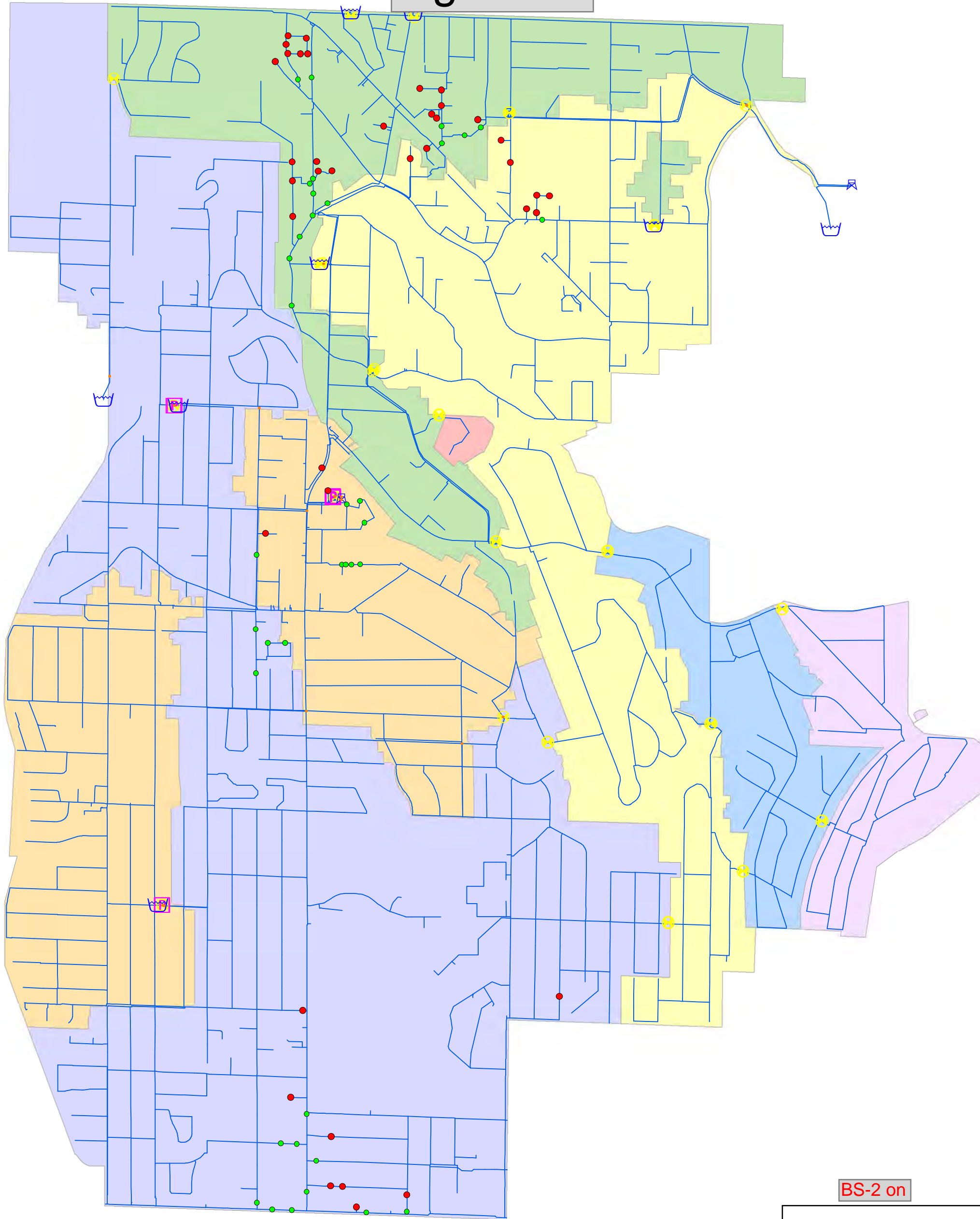
BS-1 on

**Junction
AVAIL_FLOW**

- < 2500 gpm
- > 2500 gpm

*North City Water District
Existing 2,500 gpm Fire Flow*

Figure 11



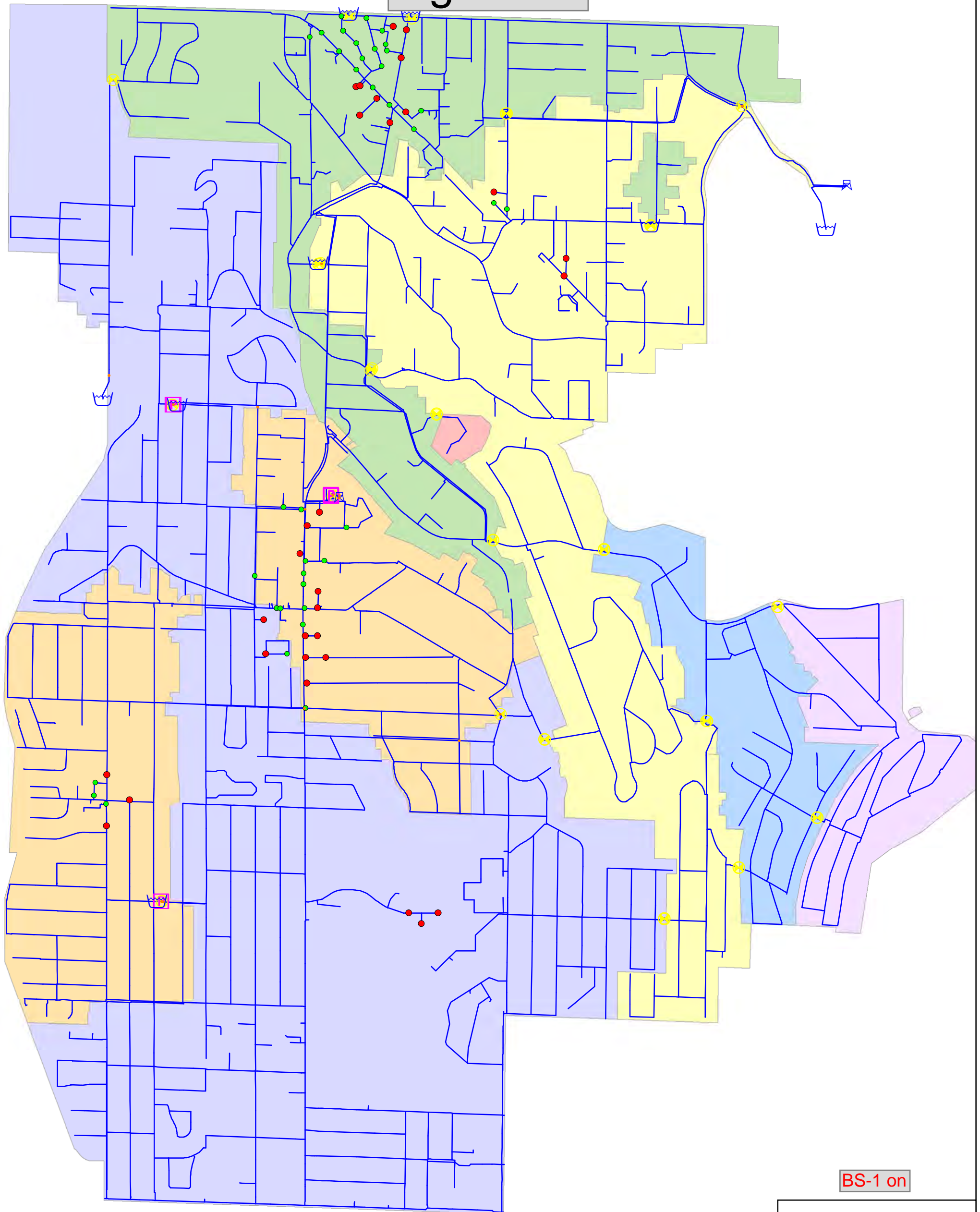
BS-2 on

**Junction
AVAIL_FLOW**

- < 2500 gpm
- > 2500 gpm

***North City Water District
Existing 3,000 gpm Fire Flow***

Figure 12



BS-1 on

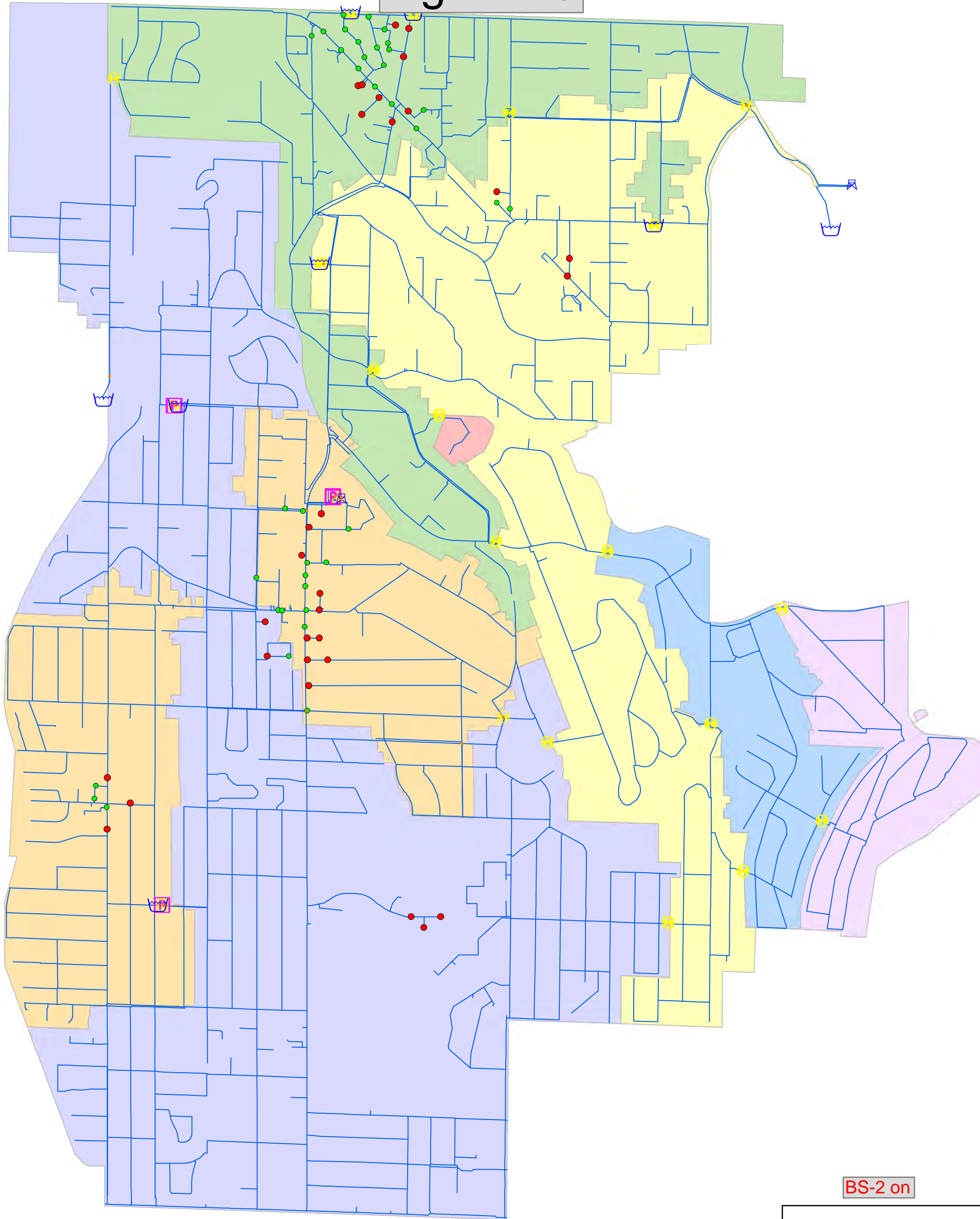
Junction

AVAIL_FLOW

- < 3000 gpm
- > 3000 gpm

*North City Water District
Existing 3,000 gpm Fire Flow*

Figure 13



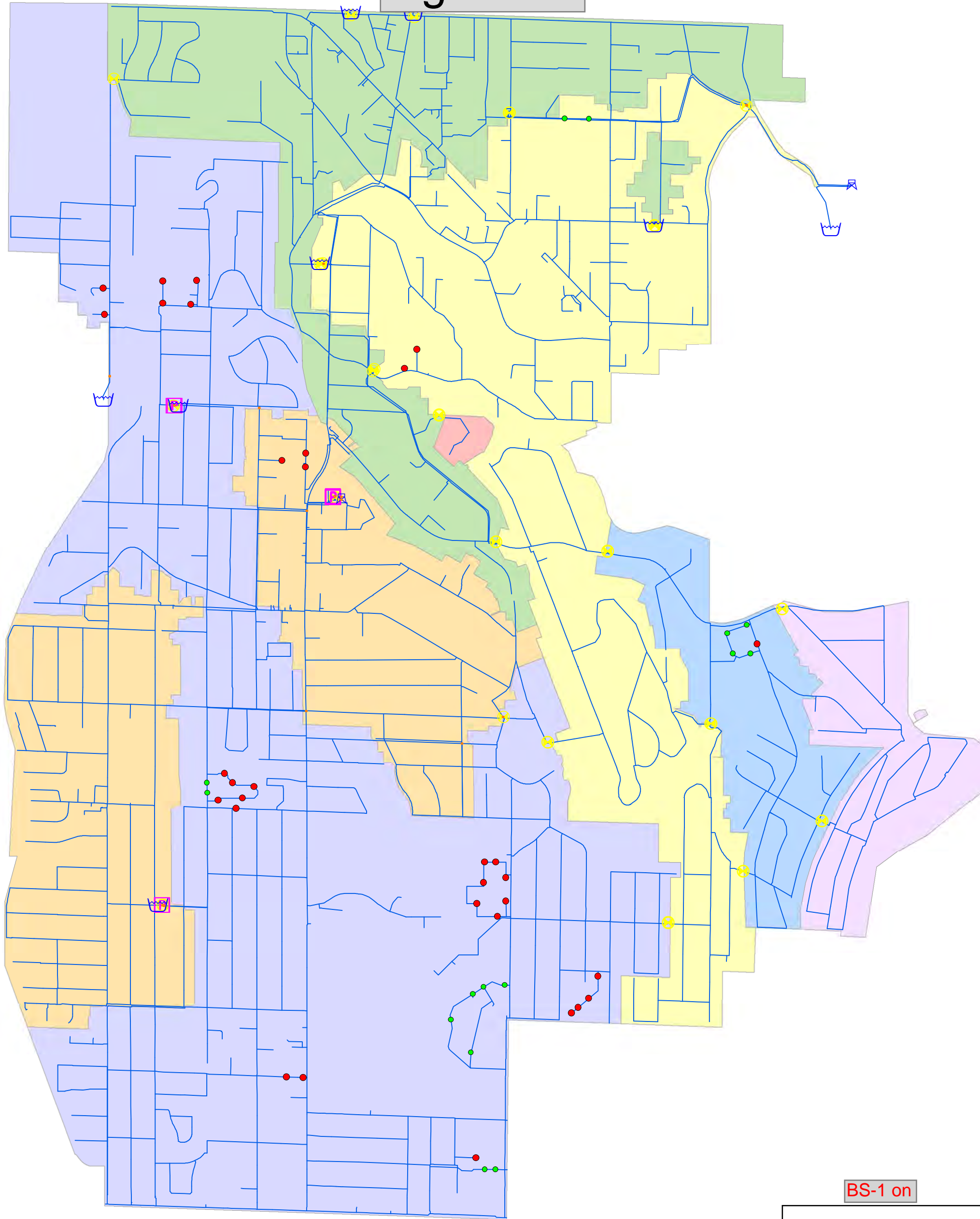
BS-2 on

**Junction
AVAIL_FLOW**

- < 3000 gpm
- > 3000 gpm

*North City Water District
Existing 3,500 gpm Fire Flow*

Figure 14



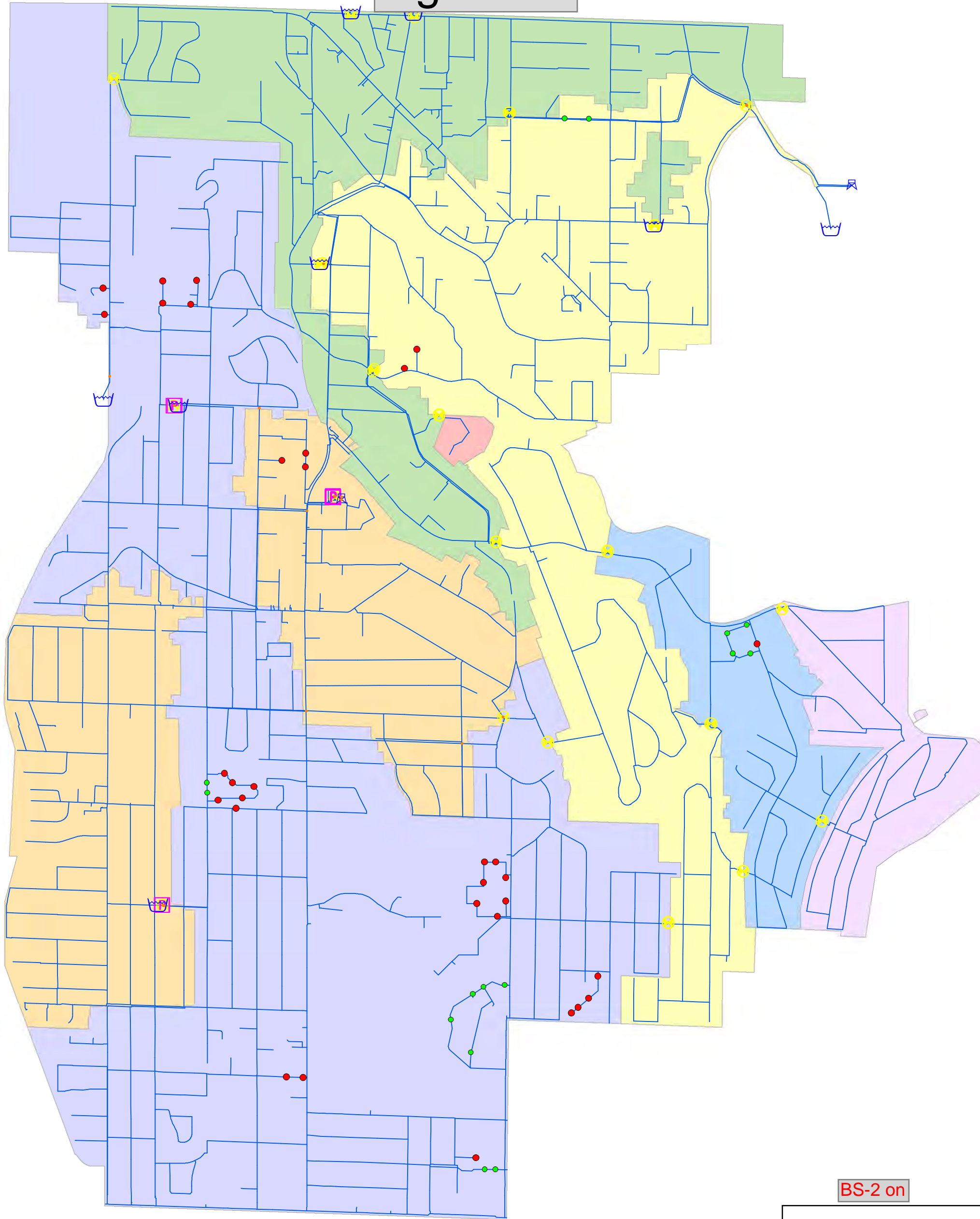
BS-1 on

**Junction
AVAIL_FLOW**

- < 3500 gpm
- > 3500 gpm

*North City Water District
Existing 3,500 gpm Fire Flow*

Figure 15



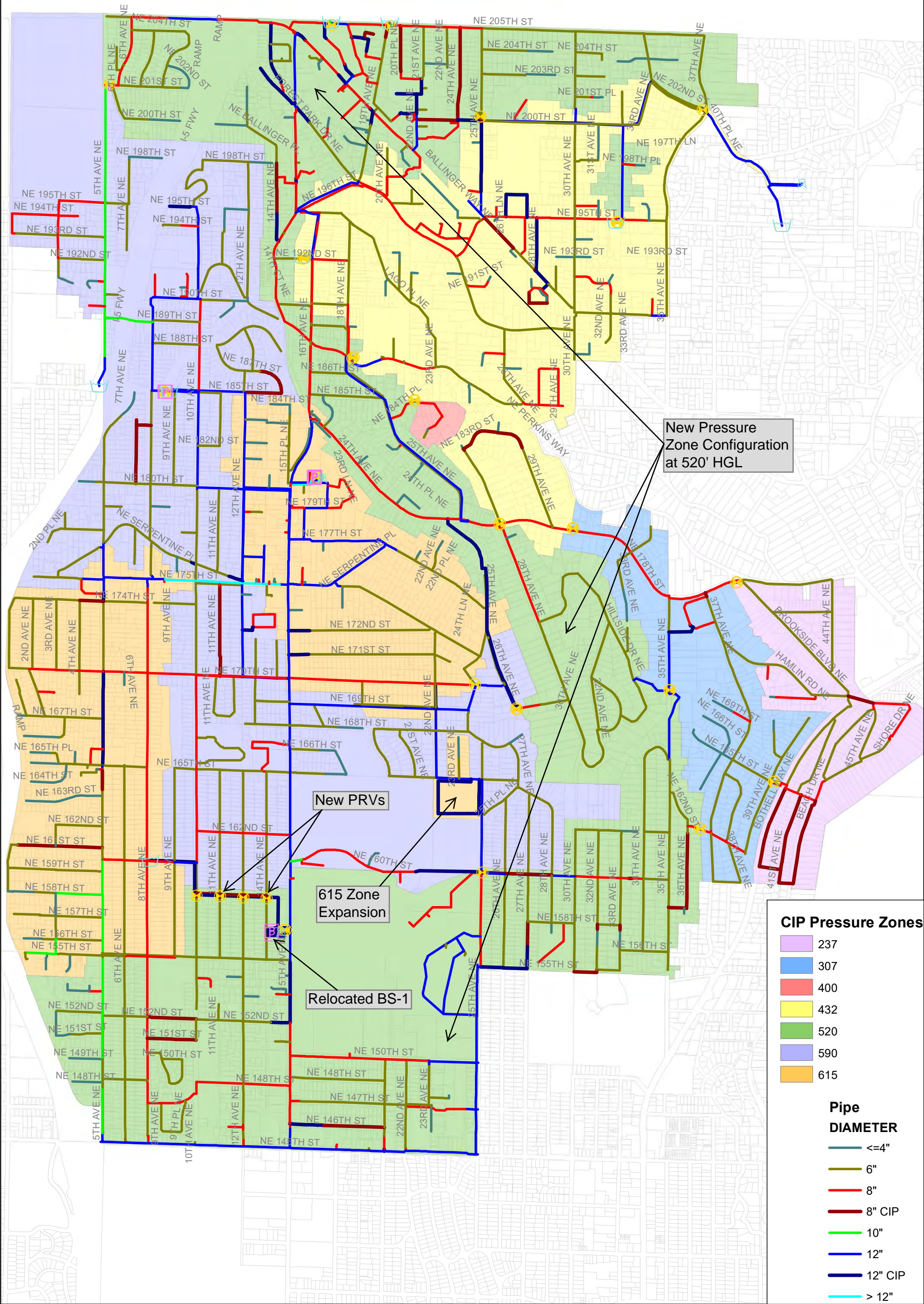
BS-2 on

**Junction
AVAIL_FLOW**

- < 3500 gpm
- > 3500 gpm

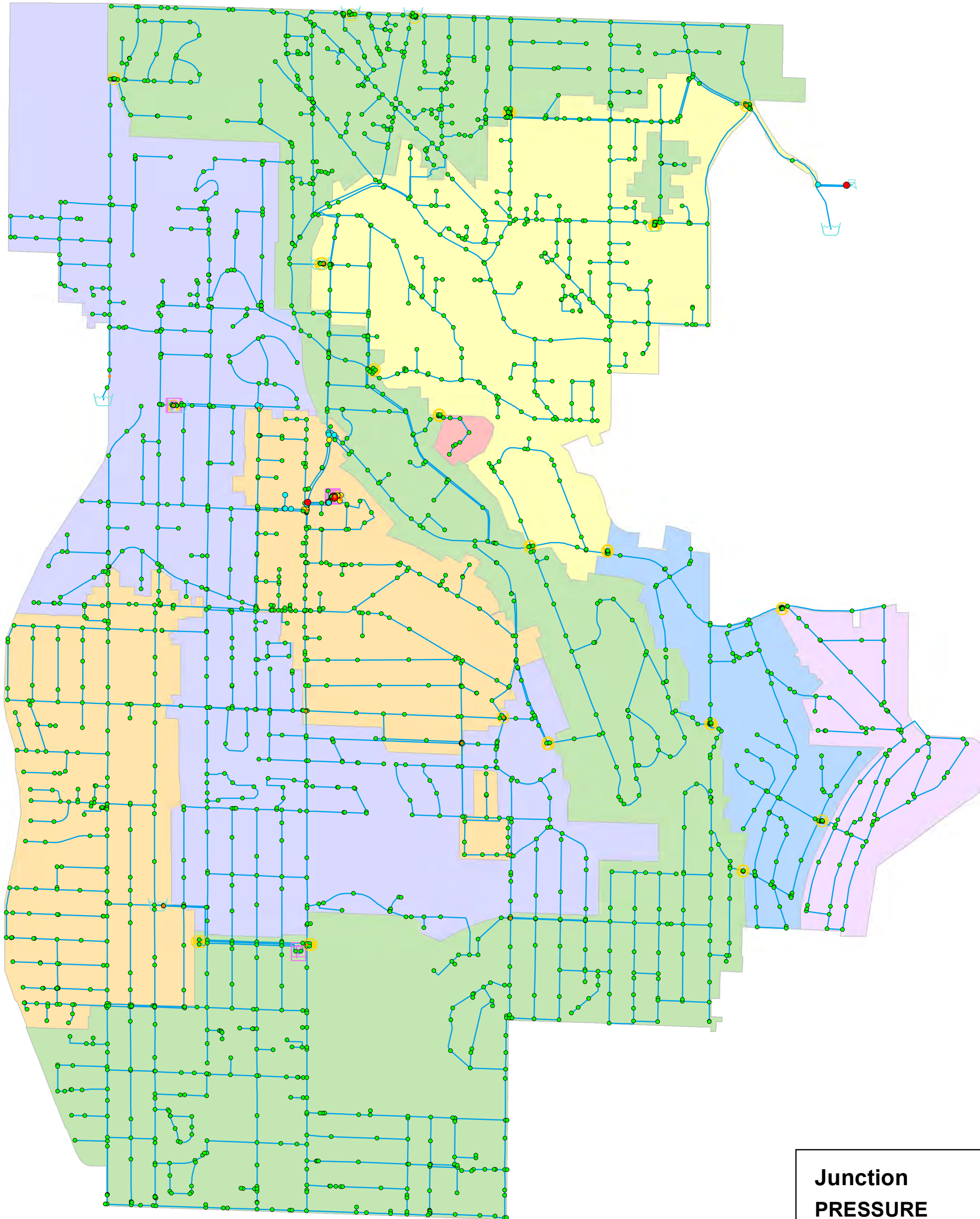
North City Water District Future CIP Model

Figure 16



North City Water District 2026 Minimum System Pressures

Figure 17



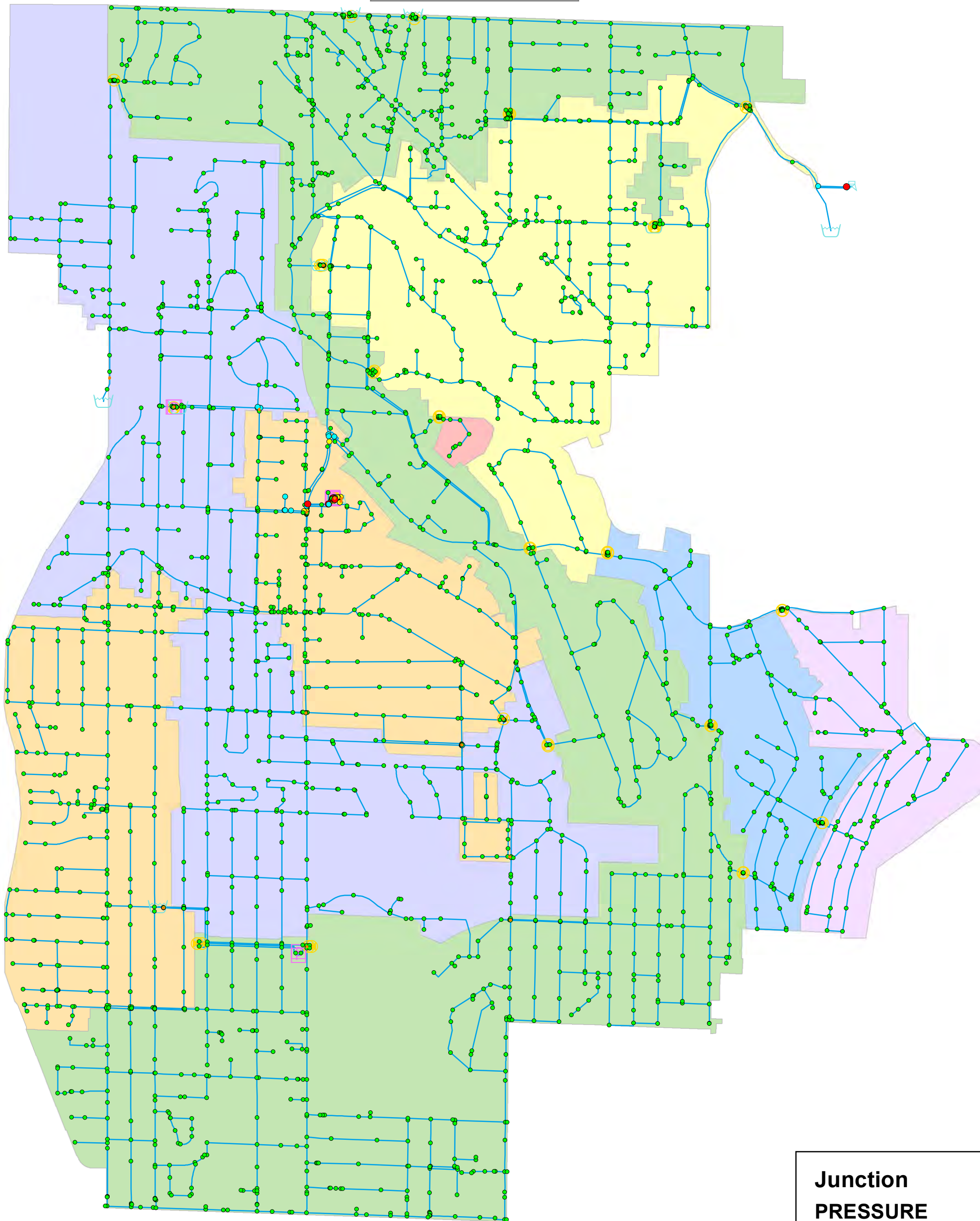
Minimum system pressures occur during Peak Hour Demand conditions and with the storage tanks at the bottom of their respective equalizing ranges

Junction PRESSURE

- < 30 psi
- 30 - 35 psi
- 35 - 40 psi
- > 40 psi

North City Water District 2036 Minimum System Pressures

Figure 18



Minimum system pressures occur during Peak Hour Demand conditions and with the storage tanks at the bottom of their respective equalizing ranges

Junction PRESSURE

- < 30 psi
- 30 - 35 psi
- 35 - 40 psi
- > 40 psi



MINUTES OF REGULAR MEETING OF THE BOARD OF COMMISSIONERS

March 17, 2020

The meeting was called to order at 3:02 p.m. by Board President Ron Ricker in the North City Water District Board Room.

Commissioners Present

Commissioner Ron Ricker
Commissioner Charlotte Haines
Commissioner Patricia Hale

Staff Present

Diane Pottinger, District Manager
Denny Clouse, Operations Manager
Amalia Mostrales, Finance Manager
Theresa Harrington, Executive Assistant
Joe Bennett, District Attorney (Via Phone)

PUBLIC HEARING FOR REVIEW OF THE NCWD WATER SYSTEM PLAN UPDATE AND DETERMINATION OF NONSIGNIFICANCE

Board President Ron Ricker opened the public hearing at 3:03 p.m. Rodney Langer, P.E. with CHS Engineers was in attendance to present the NCWD Water System Plan update. There was one member of the public present who came to listen but had no comment. The public hearing was closed at 3:05 p.m. and the regular meeting commenced.

APPROVAL AND/OR ADJUSTMENTS TO AGENDA

An amended agenda was distributed which included two additional resolutions for consideration under new business. Item **7b. Resolution 2020.03.14 Amending the NCWD Board of Commissioners Rules of Procedures** and item **7c. Resolution 2020.03.15 Emergency Related**. In addition, District Manager Diane Pottinger requested that the review of the NCWD Water System Plan, under old business 6a, be moved to follow item 3 on the agenda. Commissioner Hale moved to approve the amended agenda with the requested adjustment. Commissioner Haines seconded the motion and the motion passed.

OLD BUSINESS

- a. **Resolution 2020.03.13 Approving the North City Water District Water System Plan**
Rodney Langer, P.E. with CHS Engineers handed out an executive summary of the NCWD Water System Plan. Mr. Langer gave a high level review of the plan and answered questions from the Board. Commissioner Hale provided edits and corrections which Mr. Langer noted for incorporation into the final document. Mr. Langer informed the Board that a SEPA checklist had been completed by the District Manager and no comments were received. The District Manager confirmed that no comments on the SEPA had been received. In addition, a determination of non-significance was completed and published in the *Daily Journal of Commerce* and *Seattle Times* on March 3 and March 9. After Mr. Langer's report, Ms. Pottinger presented a resolution to approve the NCWD Water System Plan.

Commissioner Hale made a motion to approve the resolution, which was seconded by Commissioner Haines and approved by the Board. The commissioners signed the resolution.

Mr. Langer thanked the Board for their time. Mr. Langer will forward the Water System Plan to the appropriate agencies for approval and/or comment. Mr. Langer left the meeting at 2:50 p.m.

APPROVAL OF MINUTES

Commissioner Hale pointed out a typographical error in the minutes. Commissioner Haines made a motion to approve the corrected minutes from the March 3 regular meeting. Commissioner Hale seconded the motion. The motion passed and the commissioners signed the minutes.

APPROVAL OF VOUCHERS

Commissioner Haines moved to approve vouchers numbers 5771-5788 and 116532-116568 in the amount \$251,448.53 from the maintenance fund and voucher numbers 484-489 in the

amount of \$259,547.52 from the capital fund. Commissioner Hale seconded the motion, which passed unanimously. The commissioners signed the vouchers.

NEW BUSINESS

a. North City Water District COVID-19 Response

District Manager Diane Pottinger informed the Board that the management team met at the outset of the COVID-19 crisis to discuss possible action necessary for the health and safety of the public and staff. Management decided that beginning March 6th the administration building would be closed to the public. All District services will still be provided as usually, however, customer service will be provided at the drive up window, via the internet or phone only. In addition, use of board room by outside groups was been suspended until further notice. The Board affirmed these actions and agreed to revisit these policies at future Board meetings in light of the quickly changing nature of this crisis.

b. Resolution 2020.03.14 Amending the NCWD Board of Commissioners Rules of Procedure

In light of the COVID-19 crisis, it may become necessary for the Board to meet via conference call rather than in person. The current Board of Commissioners Rules of Procedures do not allow the flexibility for this. District Attorney Bennett and District Manager Pottinger proposed updates to the Board of Commissioners Rules of Procedures document to address this issue. The commissioners reviewed and discussed the changes and were in agreement that being able to meet remotely is essential at this time. Mr. Bennett also discussed the proposed authorizing. Commissioner Hale made a motion to approve the resolution, which was seconded by Commissioner Haines and approved by the Board. The commissioners signed the resolution.

c. Resolution 2020.03.15 Declaring and Emergency Due to COVID-19

Ms. Pottinger presented to the Board a resolution to declare an emergency due to COVID-19 and to authorize emergency measures to ensure uninterrupted water service by the District during the COVID-19 event. The resolution would give the Board and District management the appropriate flexibility to respond to this critical and fluid situation. The commissioners discussed the resolution. Commissioner Hale made a motion to approve the resolution, which was seconded by Commissioner Haines and approved by the Board. The commissioners signed the resolution.

MANAGER REPORTS

a. Finance Manager

Finance Manager Amalia Mostrales informed the Board that King County has suspended courier and pick up services for checks due to the COVID-19 crisis. Checks will be mailed out priority mail 5-8 days after the vouchers are signed. This may delay some payments. Ms. Mostrales also informed the Board that COVID-19 could pose challenges for employees who do not have at least two weeks of leave banked. If they or a family member becomes ill or show symptoms of the disease, it is recommended that ill individuals or individuals living with an ill person self-isolate for two-weeks. Ms. Pottinger inquired if the Board had input on policy for this unique situation.

Commissioner Hale made a motion that employees be allowed to donate their sick leave to a co-worker in need. The Commissioners engaged in a lengthy discussion regarding sick leave. Mr. Bennet reported that COVID-19 leave concerns were being discussed in Congress and a legislative response to the issue could be forthcoming. The Board decided it would be prudent to wait for legislative directive on the matter. Commissioner Hale withdrew her motion. The board agreed that if an employee should find themselves affected by the COVID-19 virus before a legislative solution is offered, a special meeting could be called to address the situation. The new paid family leave program may be an option as well.

b. Project Status Report/Operation Manager

Operations Manager Clouse reported on the progress on the new maintenance facility construction project. Mr. Clouse also reported that there is an outstanding WSEA for a 35 unit building on NE 152nd Street that is ready for Board action. However, the customer has not paid the fees associated with the WSEA because he is selling the property. The WSEA will be on hold until a new owner is ready to develop. Lastly, Mr. Clouse reported that he continues to work with the school district on additional work at the Kellogg School.

c. District Manager

District Manager Diane Pottinger reported that WASWD has convened a managers' group call to provide updates and share information on the evolving COVID-19 situation. The call will happen weekly. She also shared an email from Sound Cities with information on how different cities are approaching the issue. In addition, Mr. Pottinger informed the Board that

the retrospective rating pool has a new administrator so the District has been asked to re-sign the existing contract. The board instructed Ms. Pottinger to resign the contract. Finally, Ms. Pottinger informed the board of the passing of Walt Canter, long time Commissioner of Cedar River Water and Sewer District.

COMMISSIONER REPORTS

Commissioner Hale asked for a clarification on the dates for the Cascadia training at the UW. Ms. Pottinger confirmed it will be June 17 & 18. Ms. Harrington will correct the date on the commissioners' calendar. Commissioner Hale also reported that she received a call from a customer complementing the NCWD field crew and customer services representatives who were responsive and helpful when they called regarding a problem with a pressure reducing valve.

Commissioner Haines reported on her attendance at the Shoreline Chamber of Commerce Meeting.


Commissioner Ricker reported that most of his meeting attended has been via phone due to the current restrictions on in person meetings.

LEGAL REPORT

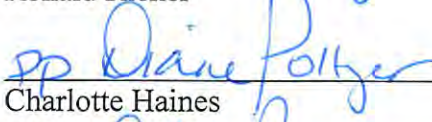
Legal report was covered during the discussion of the COVID-19 related resolutions. There was no additional legal report at this time.

The meeting was adjourned at 5:35 p.m.

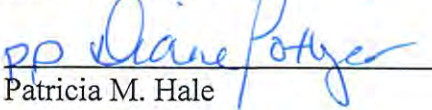
The next regular meeting will be Tuesday, April 7, 2020 at 3:00 p.m. at the District offices or remotely depending on public health directives.



Ronald Ricker



Charlotte Haines



Patricia M. Hale



King County

Utilities Technical Review Committee

Department of Local Services
35030 SE Douglas St #210
Snoqualmie, WA 98065
www.kingcounty.gov

North City Water System Plan Review – Initial Comments

July 22, 2020

Diane Pottinger

North City Water District

[sent via email only]

On April 15, 2020, the King County Utilities Technical Review Committee (UTRC) received a water system plan for review from the North City Water District. On July 15, 2020, the UTRC held an open public meeting and deliberated the plan content. The Committee agreed that the plan is thorough and very well prepared. The UTRC requests the following changes before advancing the plan to the King County Council for approval:

CONTENT EDITS

On Pages ES-7, 1-10, 1-11, and 2-1, the plan makes reference to three areas that are being served by the district outside of the district boundary, and to some properties being served by the district inside the boundaries of adjacent purveyors. There doesn't appear to be a quantified number of the parcels/connections being served in the annexation areas or in the other purveyors' areas, nor is there an anticipated timeline for annexation or resolution of these boundary issues. On associated Figure 2-1 it is difficult to see these proposed annexation and overlap areas.

The UTRC thanks you for the opportunity to review and comment. We look forward to seeing a completed plan.

Regards,

Jae Hill, AICP, CFM

Principal Planner | Chair of the Utilities Technical Review Committee

King County Dept. of Local Services

jhill@kingcounty.gov

o: 206-263-5690

From: Diane Pottinger <dianep@northcitywater.org>
Sent: Thursday, July 23, 2020 4:18 PM
To: Rodney Langer; Mary Dahl
Cc: Denny Clouse
Subject: FW: Water System Plan comments

Rodney-

We received this review comment this afternoon.

Diane

From: Alan Kerley <alan@lfpwd.org>
Sent: Thursday, July 23, 2020 2:40 PM
To: Diane Pottinger <dianep@northcitywater.org>
Subject: Water System Plan comments

Hello Diane:

Thank you for inviting our comments on your Comprehensive Plan update. Lake Forest Park Water District has only one comment related to the Comprehensive Water System Plan 2020, prepared by CHS Engineers, March 2020.

Referring to the plan document Section 1.4.5 Annexation and Merger Policies, Page 1-10, 1-11 we appreciate your commitment to “work with the adjacent purveyor to identify the appropriate water service provider in these areas....” And also we appreciate your recognition that “an interlocal agreement detailing the terms of service and approval by SPU and the adjacent utility is required...”

Regards,

--



Alan Kerley

General Manager

Lake Forest Park Water District

Good Water, Naturally

p: 206-365-3211 f: 206-367-3357
a: 4029 NE 178th St., Lake Forest Park, WA 98155
w: www.lfpwd.org e: alan@lfpwd.org



State of Washington
DEPARTMENT OF HEALTH

NORTHWEST DRINKING WATER REGIONAL OPERATIONS
20425 72nd Avenue South, Suite 310 • Kent Washington 98032-2388

August 18, 2020

DIANE POTTINGER, P.E.
GENERAL MANGER
NORTH CITY WATER DISTRICT
PO BOX 55367
SHORELINE WA 98155-0367

Subject: North City Water District, ID# 39600
King County
Water System Plan Review - 2020
Submittal #20-0402

Dear Ms. Pottinger:

Thank you for submitting the Water System Plan (WSP) for the North City Water District (the District), received in this office on April 10, 2020. We have reviewed the plan and offer the following comments. These comments must be adequately addressed prior to approval of the WSP.

Description of Water System

1. King County Utilities Technical Review Committee will review your WSP. Please respond to their issues. Adequate responses to their issues will be necessary in order to receive a WSP Adoption Ordinance from King County.
2. Provide statements of Local Government Consistency from the Cities of Shoreline and Lake Forest Park.

Basic Planning Data

The year 2017 was the last year of actual water use data used for the demand forecasting exercise. Review actual 2018 and 2019 water use data and compare with the forecasted 2018 and 2019 volumes.

System Analysis

3. It is our understanding that the District only receives water from the Tolt watershed via Seattle Public Utilities. However, Figure 3-1 indicates that there is a non-emergency intertie with Seattle that supplies water from the Cedar watershed (SS-4 in the figure). This could have an impact on water quality sampling programs. Please clarify or confirm.
4. Will there be any anticipated effects on the District from the proposed Federal revisions to the lead/copper rule?
5. Table 5-4. The values in the column labelled "Storage Surplus" do not appear to be derived from the various required storage components. Please confirm that there are no storage deficiencies in either pressure zone groups.



6. Regarding the addition of a new 2.0 MGal reservoir (Section 5.3.6) with an overall storage surplus, has the District considered the potential water quality impacts and `concerns (e.g. stagnation) on the distribution system?
7. It is recommended a table be included in Section 5.4.2 to quantitatively demonstrate that the NC/DC Pump Station meets the needs of the 615 Zone and other demands on the pump station. What are the values of the supply and demands that are being examined?
8. The hydraulic analysis in the appendices refers to a calibration memo from June 2018. Please submit the memo for review with the resubmittal.
9. Hydraulic Analysis. It appears that PHDs scenarios were run and presented in figures for the current conditions; however, no results for 10 or 20 year scenarios could be found. Were PHD scenarios developed for the 10 and 20 year planning horizons? If so please include their results. If not please develop these scenarios and include the results for review.

Water Use Efficiency/ Water Rights

No comments

Source Protection

No comments

Operations & Maintenance

10. Describe the procedures the District uses to issue localized health advisories in the event of localized distribution system depressurization events. What criteria are used to determine the need for an advisory? What protocols are in place to communicate with Seattle/King Public Health and/or Seattle Public Utilities for these events?
11. Please provide a summary table of the District's most recent required water quality results (e.g. lead and copper, DBPs, coliform, etc.). Does the district conduct any additional non-regulatory water quality sampling to monitor the conditions in the distribution system (e.g. HPCs, alkalinity, pH, etc)?

Distribution Facilities Design and Construction Standards

No comments

Improvement Plan

12. Has the City implemented an asset management program, which includes a remaining useful life assessment of major water system facilities? Please note that systems with an asset management program are awarded more points in the ranking process for selecting State Revolving Fund projects to fund. The Capital Improvement Plan (CIP) is a good place to describe the City's asset management program.

Financial Planning

No comments.

Other Documentation

13. The water system must meet the consumer input process outlined in WAC 246-290-100(8). Please include documentation of a consumer meeting discussing the WSP, prior to DOH approval of the WSP.
14. Prior to DOH approval, the District's elected governing body must approve and adopt the WSP.

15. Please provide copies of any comments made by adjacent purveyors or other interested parties, along with the District's response to those comments.
16. A signed SEPA Checklist was included with the draft WSP. Provide a SEPA threshold determination with the final WSP submittal?

Closing

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 **November 17, 2020**. 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 **\$3705.00.00**. An itemized invoice for the review of this project has been sent to the 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 in the enclosed envelope or mail payment to: WSDOH, Revenue Section, PO Box 1099, Olympia WA 98507-1099.

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 me at (253) 395-6771.

Sincerely,



Richard Rodriguez
Regional Planner

Enclosure (invoice)

cc: Jae Hill, King County UTRC
Seattle/King County Health
Denny Clouse, North City Water District
Rodney Langer, P.E., CHS Engineers
Alex Chen, Seattle Public Utilities

ecc: Brietta Carter, P.E., DOH

August 6, 2020

Commissioners:

Ron Ricker

Charlotte Haines

Patricia Hale

District Manager:

Diane Pottinger, P.E.

Jae Hill
King County UTRC Chair
Department of Local Services
35030 SE Douglas St. #210
Snoqualmie, WA 98065

SENT VIA EMAIL

RE: North City Water District Water System Plan
File 2020-0722

Dear Jae:

Thank you for your comments dated July 22 regarding our water system plan. In regards to the four pages referenced (ES-7, 1-10, 1-11 and 2-1), the North City Water District ("the District" or "NCWD") has been providing water service along both the eastern and western boundaries of the District since the early to mid-1950s. The parcels along the western boundary are not part of the Seattle Public Utilities service area, which provides services generally west of the NCWD in the City of Shoreline.

Along the eastern part of the District, there are two specific areas that are within the corporate boundaries of Lake Forest Park Water District ("LFPWD"). The following are the King County Parcels that are in each of these areas.

Northern area

4023500211
4023500212
4023500215
4023500216
4023500217
4023500220
4023500225
4023500226
4023500227
4023500228
4023500229

Southern Area:

4023500465
4023500590
4023500595
4023500600
4023500605
4023500610
4023500635
4023500640
4023500645
4023500650
4023500700

There is an area between both Districts that is not in either District's corporate boundaries along the southern part of NE 178th Street between Brookside Ave and Ballinger Way NE. Ten of the following 12 parcels have been served by King County Water District No. 42, the oldest since 1954. Three parcels 1154100115, 1154100116, and 1154100005, are served by Lake Forest Park Water District. Parcel 11541000010 is currently being developed and will be served by LFPWD.

1154100660
1154100135
1154100130
1154100125
1154100120
1154100115
1154100116
1154100110
1154100105
1154100100
1154100010*
1154100005

LFPWD is currently serving two parcel within the North City Water District boundaries:

4023501233
4023501235

The District has had some preliminary discussions with LFPWD about which district is the more appropriate water provider for these specific parcels. North City Water District is open to further discussions with LFPWD about these areas at some time in the future. We recognize that the corporate boundaries and/or the water purveyor may change at one or more of these parcels but getting these boundaries straightened out has taken a backseat to other more urgent projects within both Districts. For now, we propose simply identifying the parcels in question and agreeing to address these questions in the future.

Sincerely,



Diane Pottinger, PE
District Manager

October 7, 2020

Commissioners:

Ron Ricker

Charlotte Haines

Patricia Hale

District Manager:

Diane Pottinger, P.E.

Richard Rodriguez
Regional Planner
NW Drinking Water Operations
Department of Health
20425 72nd Ave South, Suite 310
Kent, WA 98032-2388

Subject: North City Water District (ID# 39600E)
Water System Plan Review – 2020
Submittal #20-0402

Dear Richard:

Thank you for your letter of August 18, 2020. The following is our responses to comments from the Department of Health. Where changes to the March 2020 Water System Plan (WSP) were identified as warranted, they have been incorporated in Amendment No. 1 to the WSP. The Amendment was adopted by the District Board of Commissioners on October 6, 2020 and copies are provided herewith to support approval of the March 2020 WSP (as amended) by the Department of Health.

Description of Water System

DOH1: King County Utilities Technical Review Committee will review your WSP. Please respond to their issues. Adequate responses to their issues will be necessary in order to receive a WSP Adoption Ordinance from King County.

NCWD responded to KC via email on 8/6/2020 identifying the parcels that have been being served by the District since the mid-1950s. There are northern and southern areas, each with 11 parcels that are within the Lake Forest Park Water District's (LFPWD) corporate boundary. There are 12 parcels that are between the two Districts' corporate boundaries that have also been served by NCWD since the mid-1950s. LFPWD currently is serving two parcels within North City Water District's corporate boundary. The District has had some preliminary discussions with LFPWD about which district is the more appropriate water provider for these specific parcels and is open to future discussions about these parcels at some time in the future (see letter to Jae Hill in Amendment No. 1 to the WSP, Appendix J).

DOH2: Provide statements of Local Government Consistency from the Cities of Shoreline and Lake Forest Park.

NCWD response: Copies of the consistency checklists were mailed to both the City of Shoreline and Lake Forest Park on January 10, 2020. Rodney Langer, CHS Engineers, received an email with a few questions/comments from Nora Gierloff, Planning Manager from the City of Shoreline on March 10, 2020. CHS responded to the questions with the submittal of the March 2020 WSP to the City of Shoreline for review and approval. A copy of that submittal letter was sent to the Department of Health concurrently with submittal of the WSP for approval. No signed checklists were received from either city by March 16, 2020. Therefore, in accordance to WAC 246-290-108, the District signed the Local Government Consistency Determination Form for both cities. Copies of those forms are included in Appendix J of the March 2020 WSP.

Basic Planning Data

DOH Basic Planning Data: The year 2017 was the last year of actual water use data used for the demand forecasting exercise. Review actual 2018 and 2019 water use data and compare with the forecasted 2018 and 2019 volumes.

NCWD response, including forecast and actual use data for both 2018 and 2019:

	2018 forecast(**)	2018 actual (*)	2019 forecast (**)	2019 actual
<i>Water sales/ authorized consumption, MG</i>				
<i>Single-family residential, MG</i>	415	381	415	364
<i>Multi-family residential, MG</i>	115	106	116	105
<i>Non-residential, MG</i>	55	68	55	71
Total water sales	605	555	607	540
<i>Water purchases, MG</i>	642	571	644	551
<i>Non-Revenue Water, MG</i>	36	16	36	11
<i>Percent non-revenue water</i>	6%	2.8%	6%	1.6%

** From Table 2-4, page 2-22*

***From Table 2-3, page 2-18*

System Analysis

DOH3: It is our understanding that the District only receives water from the Tolt watershed via Seattle Public Utilities. However, Figure 3-1 indicates that there is a non-emergency intertie with Seattle that supplies water from the Cedar watershed (SS-4 in the figure). This could have an impact on water quality sampling programs. Please clarify or confirm.

NCWD response. North City Water District's Supply Station 4 is also known to Seattle as Station 193. It is located within the Seattle Retail Water System Richmond Highlands 590 Zone. Both Supply Station 193 and the District's emergency connection, known to Seattle as Station 194, are part of the Northwest Subregional system. The District signed a separate wheeling agreement with Seattle, for these two connections (see appendix D of the March 2020 WSP). The District pays additional costs for water from these two connections as SPU pumps water from either the Tolt or the Cedar River water sources to this subregional system. SPU is aware of where the water comes from and will inform us if Cedar supply comes north.

DOH4: Will there be any anticipated effects on the District from the proposed Federal revisions to the lead/copper rule?

NCWD response: No. The District is part of the regional water quality committee that meets monthly. New regulations and impacts on the regional system and individual utilities are discussed at the regional meetings prior to the new regulations going into effect.

DOH5: Table 5-4. The values in the column labelled "Storage Surplus" do not appear to be derived from the various storage components. Please confirm that there are no storage deficiencies in either pressure zone groups.

NCWD response: There are no anticipated storage deficiencies in either group. Incorrect values are included in the March 2020 WSP version of the table. A corrected table is included in Amendment No. 1 to the WSP.

DOH6: Regarding the addition of a new 2.0 MGal reservoir (Section 5.3.6) with an overall storage surplus, has the District considered the potential water quality impacts and concerns (e.g. stagnation) on the distribution system?

NCWD response: As part of the future design of the reservoir in the new 520 zone, the District will be preparing a project report prior to getting DOH approval for the new reservoir. If need be, the District will consider adding a chlorine injection system to the new tank.

DOH7: It is recommended that a table be included in Section 5.4.2 to quantitatively demonstrate that the NC/DC pump station meets the needs of the 615 Zone and other demands on the pump station. What are the values of the supply and demands that are being examined.

NCWD response: The District recently completed construction of a new North City/Denny Clouse pump station. The project report was approved by Steve Deem, DOH on September 6, 2013. In that report, the District addressed a number of different operational/functional objectives. The objects that were considered.

DOH8: The hydraulic analysis in the appendices refers to a calibration memo from June 2018. Please submit the memo for review with the resubmittal.

NCWD response: The June 2018 calibration memo has been added to Appendix H by Amendment No. 1 to the WSP.

DOH9: Hydraulic Analysis: It appears that PHDs scenarios were run and presented in figures for the current conditions. However, no results for 10 or 20 year scenarios could be found. Were PHD scenarios developed for the 10 and 20 year planning horizons? If so, please include their results. If not, please develop these scenarios and include the results for review.

NCWD response: The Technical Memorandum that was in Appendix H has been updated and added to Appendix H by Amendment No. 1 to the WSP. The updated memo addresses the PHD scenarios.

Operations & Maintenance

DOH10: Describe the procedures the District uses to issue localized health advisories in the event of localized distribution system depressurization events. What criteria are used to determine the need for an advisory? What protocols are in place to communicate with Seattle/King Public Health and/or Seattle Public Utilities for these events?

NCWD response: The District has a coliform monitoring plan that was just adopted in 2019 which would address what the District is to do in the event of a water quality incident. Staff are trained to detail with the incident. The coliform monitoring plan was discussed during our DOH 2019 sanitary survey.

DOH11: Please provide a summary table of the District's most recent required water quality results (e.g. lead and copper, DBPs, coliform, etc). Does the District conduct any additional non-regulatory water quality sampling to monitor the conditions in the distributions system (e.g. HPCs, alkalinity, pH, etc)??

NCWD response: The District's 2019 consumer confidence report is included in Appendix E of the March 2020 WSP. The 2020 report is added to Appendix E by Amendment No. 1. These reports include the most recent water quality results. The District maintains a 24 hour pH analyzer at the NC/DC pump station. The intent is to add a second analyzer at the new maintenance facility by years end. The District does not conduct additional water quality sampling beyond what is required.

Improvement Plan

DOH12: Has the City implemented an asset management program, which includes a remaining useful life assessment of major water system facilities? Please note

that systems with an asset management program are awarded more points in the ranking process for selecting State Revolving Fund projects to fund. The Capital Improvement Plan (CIP) is a good place to describe the City's asset management program.

NCWD response: The District has a draft asset management plan that was completed in 2018. Several components of the plan were identified to need further information. District staff have been busy with some significant projects over the past 8 years and have not had the time needed to fully implement the asset management program but expects to begin doing so in the near future. Because the plan has not been adopted, it was not discussed in Section 6 of this plan.

Other Documentation

DOH13: The water system must meet the consumer input process outlined in WAC 246-290-100(8). Please include the documentation of a consumer meeting discussing the WSP, prior to DOH approval of the WSP.

NCWD response: District kept had kept the rate payers abreast of what the District of the water system planning process throughout 2018 and 2019 in the District's quarterly newsletters. Copies of the newsletters are also shared with city councilmembers of both the Cities of Shoreline and Lake Forest Park. One person attended the public hearing when the water system plan was adopted in March 2020. A copy of the District minutes for the public hearing have been added to Appendix J by Amendment No. 1.

DOH14: Prior to DOH approval, the District's elected governing body must approve and adopt the WSP.

NCWD response: The District Board of Commissioners approved and adopted the plan in March 2020. A copy of the resolution adopting the plan is included in Appendix J of the March 2020 WSP. The Board also adopted Amendment No. 1 to the WSP on October 6, 2020. A copy of that adopting resolution is included in Appendix J of the amendment.

DOH15: Please provide copies of any comments made by adjacent purveyor or other interested parties along with the District's response to those comment.

NCWD response: All comments to the plan are included in Appendix J of Amendment No. 1 to the WSP. District responses, where warranted, are also included in Appendix J of the Amendment No. 1 to the WSP.

DOH16: A signed SEPA checklist was included with the draft WSP. Provide a SEPA threshold determination with the final WSP submittal?

NCWD response: A sample distribution letter, the SEPA threshold determination (DNS) and SEPA checklist are included in Appendix A of the March 2020 WSP.

We look forward to your approval of the District's plan as well as our technical specifications and standard details.

Sincerely,



Diane Pottinger, PE
District Manager

CC: Jae Hill, UTRC

Attachment:

Amendment No. 1, Water System Plan, North City Water District, October 6, 2020

2 Print copies

1 Thumb drive

**NORTH CITY WATER DISTRICT
RESOLUTION 2020.10.34**

A RESOLUTION AMENDING THE 2020 WATER SYSTEM PLAN

Background

1. The District adopted its current Water System Plan (WSP) on March 17, 2020, as prepared by CHS Engineers, LLC (CHS). Copies of the WSP were sent to the Washington State Department of Health (DOH), King County, the cities of Lake Forest Park and Shoreline for review and approval. Courtesy copies were submitted to Seattle Public Utilities, Lake Forest Park Water District, Northshore Utility District and Olympic View Water and Sewer District for review.

2. The District has received comments on the plan from DOH, King County, and Lake Forest Park Water District. The District Manager has responded to the comments from King County and has drafted a response to the comments from DOH. No response is necessary to Lake Forest Park Water District given the nature of the comments. Responses to comments received have resulted in need for some revisions to the WSP, and such revisions have been prepared in the form of an amendment to the WSP.

3. Therefore, District staff recommends that the North City Water District 2020 Water System Plan, dated March 2020, be amended to address revisions necessary to respond to the review comments. Following adoption by the District, the WSP amendment will be submitted to King County, DOH and the cities of Lake Forest Park and Shoreline for approval. The amendment has been prepared by David Evans and Associates, Inc. (DEA), successors-in-interest to CHS. The same professional engineer that prepared the 2020 WSP at CHS has completed the amendment as an employee of DEA.

Action

IT IS RESOLVED THAT:

4. The Board adopts Amendment No. 1 to the 2020 Water System Plan, dated October 2, 2020, prepared by David Evans and Associates, Inc. in the form attached hereto as Exhibit A, and authorizes its submittal to the agencies with approval authority.

ADOPTED by the Board of Commissioners of North City Water District at a regular open public meeting on this 6th day of October, 2020.

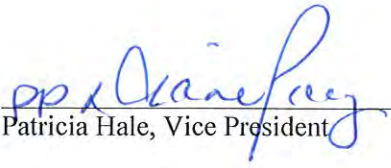
ATTEST:



Ron Ricker, President

Approved as to Form:

Joe Bennett, District Attorney



Patricia Hale, Vice President



Charlotte Haines, Secretary



2020 Water System Plan

March 2020



NORTH CITY WATER DISTRICT

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2020 WATER SYSTEM PLAN

North City Water District
1519 NE 177th Street
P.O. Box 55367
Shoreline, Washington 98155-0367
206-362-8100
www.northcitywater.org

Commissioners

Charlotte Haines
Patricia Hale
Ron Ricker

District Manager

Diane Pottinger, P.E.

Operations Manager

Denny Clouse

Prepared by:



12507 Bel-Red Road, Suite 101
Bellevue, Washington 98005-2500
425-637-3693
www.chsengineers.com

NORTH CITY WATER DISTRICT

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NORTH CITY WATER DISTRICT
2020 WATER SYSTEM PLAN
PROJECT CERTIFICATION

The body of this plan was developed for the 2020 Water System Plan. The hydraulic model and associated capital improvement plan were prepared by BHC Consultants, LLC. All other information was prepared by CHS Engineers, LLC with significant input from the District.



This plan was prepared under the direction of a Registered Professional Engineer in the State of Washington.

Prepared by:

Mary C. Dahl

Approved by:

Rodney Langer

Date:

March 17, 2020

NORTH CITY WATER DISTRICT

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GLOSSARY

ACRONYMS AND ABBREVIATIONS

ac-ft	acre-feet
af/yr	acre feet per year
ADD	average day demand
APWA	American Public Works Administration
AWIA	America's Water Infrastructure Act
AWWA	American Water Works Association
Board	District Board of Commissioners
BMP	best management practice
BPS	booster pump station
BS	booster station
CCCP	Cross-Connection Control Program
ccf	one hundred cubic feet
CCI	construction cost index
CCR	Consumer Confidence Report
cfs	cubic Feet per second
CFP	capital facilities plan
CIP	capital improvement plan
CI	cast iron
CWSSA	Critical Water Supply Service Area
D/DBP	Disinfectants/Disinfection By-Products
DI	ductile iron
District	North City Water District
DOE	Washington State Department of Ecology
DOH	Washington State Department of Health
DOT/APWA	Standard Specifications for Road, Bridge, and Municipal Construction, Washington State Department of Transportation and the American Public Works Association, latest edition

NORTH CITY WATER DISTRICT

2020 WATER SYSTEM PLAN

DS	dead storage
DSHS	Washington State Department of Social and Health Services
DWSRF	Drinking Water State Revolving Fund
EKCCWSP	East King County Coordinated Water System Plan
ENR	Engineering News Record
EPA	United States Environmental Protection Agency
ERP	Emergency Response Plan
ERU	equivalent residential unit
ES	equalizing storage
ESA	Endangered Species Act
fps	feet per second
FSS	fire suppression storage
ft	feet
GAAP	generally accepted accounting principles
GASB	Government Accounting Standards Board
GFC	general facilities charge
GIS	geographical information system
GMA	Growth Management Act
gpcd	gallons per capita per day
gpd	gallons per day
gpm	gallons per minute
HAA	haloacetic acid
HGL	hydraulic grade line
IBC	International Building Code
IFC	International Fire Code
LFC	local facilities charge
MCL	maximum contaminant level

NORTH CITY WATER DISTRICT

2020 WATER SYSTEM PLAN

MDD	maximum day demand
MF	multi-family
MG	million gallons
MGD	million gallons per day
NC/DC PS	North City/Denny Clouse Pump Station
NMFS	National Marine Fisheries Service
O&M	operations and maintenance
OS	operating storage
PHD	peak hour demand
PSRC	Puget Sound Regional Council
PRS	pressure reducing station
PRV	pressure reducing valve
psi	pounds per square inch
PWTF	Public Works Trust Fund
RCW	Revised Code of Washington
RRA	Risk and Resiliency Assessment
RTU	remote telemetry unit
RWSA	retail water service area
SB	standby storage
SCADA	supervisory control and data acquisition
SDS	Safety Data Sheet
SDWA	Safe Drinking Water Act
SEPA	State Environmental Policy Act
SF	single-family
SPU	Seattle Public Utilities
SS	supply station
SSMA	Satellite System Management Agency
SSMP	Satellite System Management Program

TTHM	total trihalomethanes
UBC	Uniform Building Code
UGA	urban growth area
ULID	utility local improvement district
UPC	Uniform Plumbing Code
WAC	Washington Administrative Code
WARN	Washington Water/Wastewater Agency Response Network
WASWD	Washington Association of Sewer and Water Districts
WFI	water facilities inventory
WSDM	Water System Design Manual
WSDOT	Washington State Department of Transportation
WSP	Water System Plan
WUE	water use efficiency

TERMS

Annual demand – Total water system demand for one calendar year, expressed in millions of gallons (MG), including all uses and unaccounted-for water.

Average day demand (ADD) – The annual demand divided by the number of days per year, expressed in million gallons per day (MGD).

Connection charge – The District's charge for connecting to the District's water system, including but not limited to the general facilities charge, the local facilities charge and the installation charge.

Cross-connection – A physical arrangement connecting a public water system, directly or indirectly, with anything other than another potable water system, and capable of contaminating the public water system.

Dead storage – The volume of stored water not available to all customers at the minimum design pressure in accordance with WAC 246-290-235 (5) and (6).

Equalizing storage – The volume of water required to meet hourly variations in demand in excess of the available rate of supply.

Equivalent residential unit (ERU) – The amount of water consumed by a typical full time single-family residence. An ERU is used for converting users other than single-family residences into an equivalent number for the purpose of demand forecasting, system analysis and facility sizing.

Fire Flow – The rate of water flow, in gpm, required to fight fires under WAC 246-293-640 or adopted District standards.

Fire suppression storage – The volume of water in gallons or millions of gallons (MG) required to accommodate fire demand, determined as the product of the fire flow and duration of fire flow in minutes.

Franchise area – A designated area within which the utility system is permitted, by franchise, to own, operate and maintain facilities within public rights-of-way.

Installation charge – A charge for the total cost (including the meter cost) incurred by the District which are directly attributable to the improvements required to **connect a property owner's real property to the District's system.**

Latecomer agreement – an agreement associated with completion of a Water System Extension Agreement between the District and property owner through which a share of the cost of the water system extension will be charged to third-party benefitting properties, with such charges, when collected, reimbursed by the District to the property owner that completed the water system extension.

Legal boundary – The corporate boundary established for the District (also referred to as corporate area). Extension of service beyond the District's legal boundary requires annexation to the District or specific agreement for the provision of such service.

Maximum contaminant level (MCL) – The maximum permissible level of a contaminant in water the purveyor delivers to any public water system user.

Maximum day demand (MDD) – The highest water demand anticipated for any given day, expressed in MGD.

Operational storage – The volume of the reservoir devoted to supplying the water system while, under normal operating conditions, the source(s) are in "off" status.

Peak hour demand – The maximum rate of water use over the period of one hour, excluding fire flow, which has occurred or is expected to occur within a defined service area at any time.

Potable – Water suitable for drinking by the public.

Pressure zone – A water supply or distribution subsystem operating at a uniform hydraulic gradient.

Retail water service area – The declared and recognized area within which the North City Water District does or intends to provide water service, as established in the **District's Water System Plan and recognized and confirmed** by the East King County Coordinated Water System Plan.

Standby storage – The volume of water required to augment the available supply of water during a period of partially or fully restricted flow from the supply source, due to such things as pipeline or pump failure or power outages.

Usable storage – That portion of the total available storage that is available on a continuous basis for use as operational, equalizing, standby or fire suppression storage, either by gravity flow or by reliable pumping facilities.

Water System Extension Agreement – an agreement between the District and a property owner through which the property owner agrees to complete improvements to and/or extension of the District water system, as a condition of the District providing the desired water service for the subject property and development thereof.

Wheeling - the process of moving or conveying a commodity, water in this context, from one system through another system, to a receiving system.

Wheeling rate – the charge for wheeling water through a system, typically volumetric for water supply.

Wheeling agreement – an agreement between two or more parties that defines the terms and conditions for wheeling.

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EXECUTIVE SUMMARY

The 2020 North City Water District Water System Plan (WSP) replaces and supersedes the District's 2011 WSP. The 2020 WSP is a compilation of planning and engineering efforts to describe and analyze system integrity and capacity to meet current and projected future demands. Included in this effort is a detailed capital improvement plan that identifies anticipated system needs through the 10-year and 20-year planning cycles. Also included in the WSP is a summary of District Policies to manage existing connections, proposed system modifications and anticipated new or redevelopment.

This document has been prepared in accordance with the rules and regulations governing the operation of public water and sewer systems as administered by the State of Washington Departments of Health and Ecology (DOH and DOE, respectively), King County, and the codes and policies of all other agencies having jurisdiction in the District's water service area.

LOCATION AND HISTORY

The District serves an area that generally extends from Lake Washington on the east to Interstate Highway 5 (I-5) on the west, and from the Seattle city limits on the south at approximately NE 145th Street to the King – Snohomish County boundary at NE 205th on the north. The District was originally formed in 1931 under the name "King County Water District No. 42" and was renamed in 1991 as "Shoreline Water District." In 2013 the District changed to its current name of North City Water District. The majority of the water system was constructed between 1948 and 1975 during a period of rapid development in the Seattle metropolitan area. Construction of I-5 in the 1960s bisected and reduced the original water District service area. Disruption of pipelines crossing the I-5 corridor resulted in the need to transfer connections west of the Interstate to Seattle Public Utilities (SPU) for service. The District has continued to serve the same areas for over 50 years. Service is provided to approximately 11,073 equivalent residential units (ERUs) through approximately 8,161 accounts.

SERVICE AREA CHARACTERISTICS

The District provides water service to a completely incorporated area within the cities of Shoreline and Lake Forest Park and as such, is responsible for compliance with the land use codes of these jurisdictions. The Land Use Plans of the two cities and forecasts prepared by the Puget Sound Regional Council (PSRC) in 2015 were used extensively throughout the planning process to document historical growth patterns in relation to water consumption and project future water demand according to planned development activity. The nature of development within the water service area is primarily single-family residential with socio-economic characteristics consistent with an urban neighborhood. Employment is generally limited to the commercial activities

associated with the Ballinger and North City areas and other community businesses. One primary exception is the State of Washington's Fircrest campus in the vicinity of 15th Avenue NE and NE 150th Street. The Fircrest campus includes a separate, state-owned and operated public water system. The Fircrest system receives water supply from the District. Fircrest and other specific areas are expected to have increased growth in the future, which will impact future water demand.

The WSP confirms the District's retail water service area (RWSA). The RWSA is a uniquely urban area with undulating topography and other natural features that complicate the provision of water service at required pressures and flows. While topography generally slopes down from west to east, steep slopes and deep ravines draining to Lake Washington inhibit the ability to provide a uniform grid of gravity-fed water service. Pump stations and pressure-reducing valves are required to isolate pressure zones and, in many instances, long lengths of pipeline are required to circumnavigate the ravines cutting west-east through the area.

POPULATION AND EMPLOYMENT

While most of the area appears "built out" at this time, significant in-fill development and redevelopment is anticipated. As part of the planning process, population and employment were projected through the year 2039. As of 2017 the District served a population of approximately 25,395, and is forecast to serve a projected population of approximately 26,714 in 2029 and approximately 28,323 by the year 2039. The majority of this population growth is expected to occur in the vicinity of the proposed Sound Transit Light Rail Station areas. These areas are designated "Station Areas" in the City of Shoreline Comprehensive Plan and presently have the following City of Shoreline 2019 Zoning Designations: MUR-35, 45 and 70 Mixed use Residential. Employment within the District's water service area totaled approximately 6,365 in 2017, and is forecast to increase to approximately 7,300 in 2029 and 8,947 by the year 2039. Higher fire flow requirements are anticipated in association with the shift from single-family residential to multi-family and non-residential land use.

WATER DEMANDS

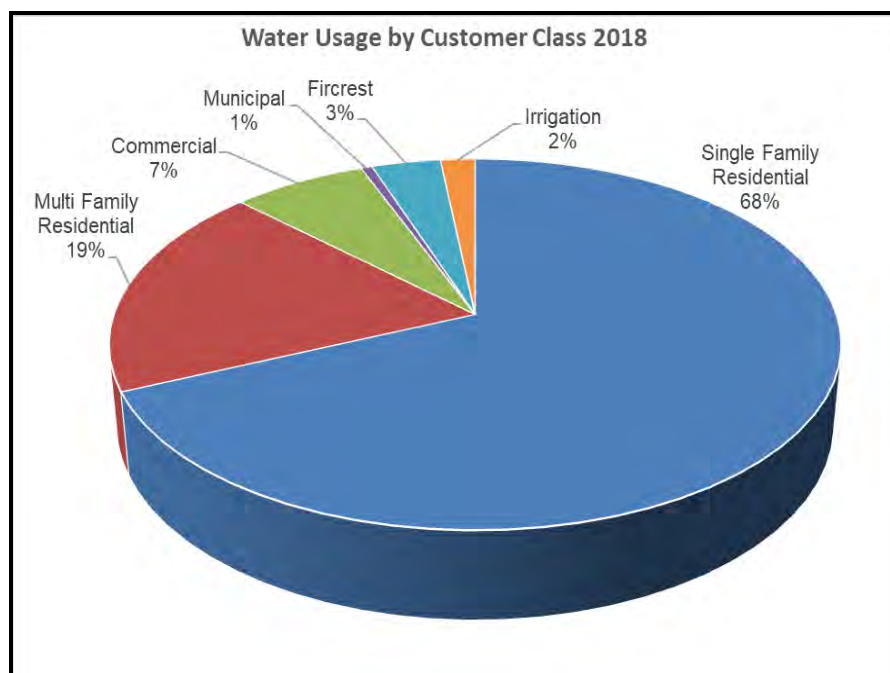
A detailed analysis of historical water system demands is imperative to the planning and engineering analyses performed in development of this document and is crucial to all financial aspects of operating a water utility. A comparison of historical water use is and a three-year average of water usage from 2016 through 2018 are presented in Table ES-1.

TABLE ES-1
HISTORIC WATER USAGE AND NUMBER OF CONNECTIONS BY YEAR

Year	2013	2014	2015	2016	2017	2018	Last 3-years' Average
Water Purchases (MG)	610.00	634.74	621.66	603.80	596.39	571.20	590.46
Water Sales (MG)	561.00	577.33	561.18	568.20	568.32	554.95	563.82
Non-Revenue Water (MG)	49.00	57.41	60.48	35.60	28.07	16.25	26.64
Percent Non-Revenue Water	8.03%	9.04%	9.73%	5.90%	4.71%	2.84%	4.48%
Number of Accounts	8,101	8,116	8,117	8,137	8,144	8,176	8,152

Water sales reached a high of 684 MG in the year 2003 and have decreased since then. The highest value in the 2013-2018 period was nearly 635 MG. Non-revenue water, or water that is unaccounted for or expended for operations and maintenance, has continued to decrease to an average of less than 5% for the past three years.

FIGURE ES-1



Water demand projections were determined through analyses of historical water-use data available from the District, current and projected land-use trends, and current

and projected population and employment projections based on data from the PSRC. Water demand projections by pressure zones were developed using the most current and detailed population and employment data available. This level of detail extends into the water system modeling performed during development of the WSP and allows for accurate allocation of water demands within the District's hydraulic model.

Historical and projected ERUs and consumption from 2017 through the year 2039 are presented in Figure ES-2. During the first ten-years of the planning cycle represented by this WSP (2020-2029), growth within the retail service area is expected to result in an annual demand increase to 668 MG in 2029¹. Increased development in specific areas will have a dramatic impact on water consumption compared to an average water use expected to increase throughout the District. The increased demand and potential fire flows will increase the need for larger water system facilities within specific areas.

FIGURE ES-2

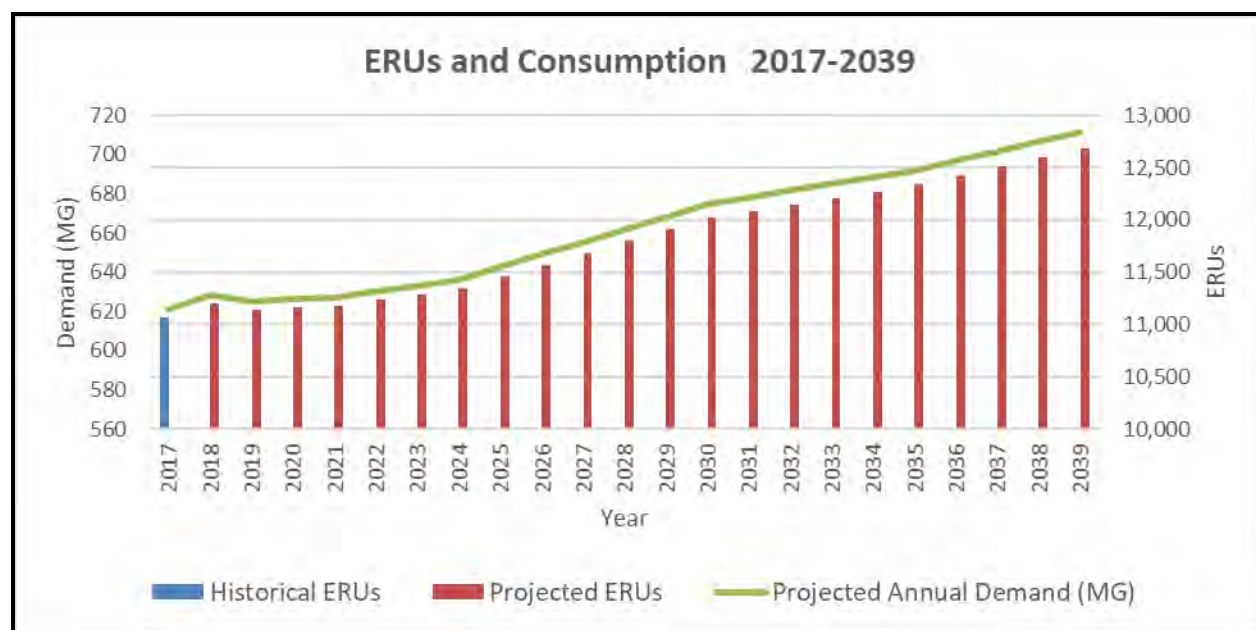


Table ES-2 summarizes the forecast ADD, MDD, and PHD for the District.

¹ The forecast is based on a value of ADD per ERU higher than the value evident in water sales in recent years. Therefore the trend line indicated in the forecast figure begins with values higher than reported for 2017 and 2018 in the table above.

TABLE ES-2 PROJECTED WATER DEMANDS			
	2020	2029	2039
ADD (MGD)	1.72	1.83	1.95
MDD (MGD)	3.33	3.56	3.79
PHD (gpm)	3,723	3,964	4,214

The District maintains a water use efficiency program that employs water conservation as a means of protecting the region's finite supply of water resources. The District has adopted a water use efficiency goal in accordance with Municipal Water Law requirements and is a strong proponent of, and participant in, regional water conservation programs. The details of the District's Water Use Efficiency Program are outlined in Appendix B.

EXISTING WATER SYSTEM

The District receives its entire water supply from the regional water system operated by SPU. Water supply is through five connections from the Tolt River Supply Line, which runs east-west through the District along NE 195th Street and north-south along 8th Avenue NE. These connections to the regional system supply the District's seven pressure zones, two storage reservoirs, and booster pump station. In addition, there are two local interties with the Mountlake Terrace water system north of the District and one with the SPU water system west of I-5. The interties are used only in emergency conditions. Mountlake Terrace water comes from the City of Everett's regional water system whereas the SPU intertie comes from the Northwest Sub-Regional Source, which has water from either the Cedar or Tolt rivers.

SYSTEM ANALYSIS

The water system was analyzed using hydraulic modeling software, based on water system mapping from the District. The hydraulic model was updated to incorporate anticipated increased development in specific areas of the District. The updated hydraulic model was calibrated and is capable of analyzing the system under various development/demand scenarios and water system design criteria. Criteria used for the analysis has been adopted by the District and is presented in Section 4. Design flow requirements were established using a combination of information obtained from the cities of Shoreline and Lake Forest Park and the International Fire Code. Minimum and maximum pressure requirements and source, storage and pumping requirements were determined from DOH criteria and regulations. Although the District requires that all

new facilities be designed for a maximum velocity of eight feet-per-second, the existing system was analyzed under a maximum velocity constraint of ten feet-per-second.

The results of the water system analysis indicated that while the system generally performs well under all design parameters, anticipated development in specific areas requires some pipe upsizing and system modifications and upgrades to accommodate current and anticipated fire flow requirements. Pressure zone reconfiguration was identified as a means of increasing water circulation and system performance while reducing the expense associated with pumping. The storage analysis for the system confirmed the adequacy of storage capacity under minimum DOH requirements. The District has considered the resiliency findings of SPU in the event of a significant seismic event and concluded that it should plan to add additional standby storage capacity, to be better prepared to meet its customer's minimal needs following a significant regional interruption of the water supply system.

CAPITAL IMPROVEMENTS

The objective of the Capital Improvement Plan (CIP) is to identify and prioritize the recommended improvements for implementation by the District in its annual budgeting process. A total of approximately \$55.3 million has been identified for various improvements to correct current system deficiencies and satisfy the projected water demands through the year 2039. Approximately \$29.2 million in capital improvements has been identified and is prioritized for completion in the next ten years. Table ES-3 presents a summary of the CIP by category, for the first and second decades of the planning period.

TABLE ES-3 CIP PROJECT COSTS BY CATEGORY		
Category	2020-2029	2030-2039
A – 520 Zone	\$3,515,569	\$1,680,600
B – Sound Transit	\$2,352,262	\$ -
C – ShakeAlert	\$9,776,810	\$ 5,859,907
D – Ongoing/Periodic	\$1,130,774	\$530,450
E – Annual	\$2,684,609	\$3,331,259
F – Fire Flow and Velocity	\$1,451,204	\$14,159,625
G – Miscellaneous	\$8,248,995	\$623,257
Total	\$29,160,223	\$26,185,098
Project costs are in 2020 dollars.		

As identified and evaluated in the system analysis, the primary areas of improvements to meet increasing demands, to improve system pressure in select areas of the District and to improve the redundancy and resiliency of the system include the following:

- Pressure zone reconfiguration – increase pressure in one zone and shift a large area of one lower zone to the new higher pressure zone
- Resiliency improvements include enhancements of seismic event monitoring and construction of additional storage and transmission mains
- Water main improvements – replacement and upsizing in select areas

Other key recommended projects include:

- Increase supply, transmission and storage system resiliency and reliability to enhance ability to continue to provide water supply following a significant seismic event
- Annex the three areas the District is currently providing service to and work with the adjacent purveyors to identify the appropriate water purveyor for adjacent parcels (see Figure 2-1)
- Renegotiate the contract with Fircrest or take over that water system, with associated funding to bring the water system up to current standards, given the projected increase in development and associated water use expected in the planning period at that site

IMPLEMENTATION

Implementation of the CIP requires careful consideration of rates and charges. The District relies on rates and charges, coupled with low interest loans, to finance capital improvements to the system. The majority of improvements identified herein are necessary to serve development and growth within the service area. The District has developed a connection charge specific to the single-family, multi-family and non-residential and irrigation customers. This charge includes growth paying for a large portion of upsizing the water mains in the specific areas.

Section 8 of the Plan identifies potential funding mechanisms for the recommended CIP and provides an overview of the District's financial policies and strategy. The District recently updated a Cost of Service Review of the rates and expects to update the connection charge to fund these projects. Bonding should be considered for specific projects that benefit a large portion of the District.

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NORTH CITY WATER DISTRICT

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NORTH CITY WATER DISTRICT



SECTION 1 INTRODUCTION

The North City Water District (District) is a Group A public water system (15 or more services) that operates under the authority of the Revised Code of Washington (RCW) Title 57 – Sewer and Water Districts. As indicated on Figure 1-1 the District serves an urban area in north King County and operates within the cities of Shoreline and Lake Forest Park. It is generally bounded by the Seattle city limits on the south, the King-Snohomish County line on the north, Interstate Highway 5 on the west and Lake Washington on the east. It serves an estimated population of 25,512 through nearly 8,200 connections (as of the end of 2018) and purchases its entire water supply from the Seattle Public Utilities (SPU) regional water supply system. The area is primarily urban residential with neighborhood businesses and schools located along several major thoroughfares.

This introductory section of the 2020 Water System Plan (WSP) outlines the goals of the planning process used to develop this document, presents a summary of key policies of the District, and summarizes regulatory requirements that the District is required to adhere to as a public water supplier. It also provides a summary of the other plans and studies that were relied upon or referenced for development of the WSP.

1.1 OVERVIEW

The District's **most recent** WSP was approved by King County in 2013 and the Washington State Department of Health (DOH) in 2014 (2014 WSP Update). Since that time, the District has completed several significant capital projects, which have in turn, improved the way the District operates the water system. The District has also updated its rate and connection charge structure. The District contracted with BHC Consultants, LLC to update the District's hydraulic model and CHS Engineers, LLC to develop a 2020 WSP. Much of this WSP utilizes the information in the District's **current** plan and updates select elements, including the population and demand forecast and system analysis, to complete a fully updated WSP. This document compiles and summarizes the results and conclusions of a variety of planning and engineering studies and supersedes and updates the previous WSP. It has been prepared in accordance with Washington Administrative Code (WAC 246-290), which requires all Group A water systems to prepare comprehensive water system plans every ten years for submittal to the DOH and the jurisdictions within which the District operates. For the District, these jurisdictions are the cities of Shoreline and Lake Forest Park and King County. Approval of the WSP is the responsibility of the District Board of Commissioners, the DOH, and the King County Council.

The WSP provides a guideline for orderly development, renewal, and replacement of the water system in a manner that will meet the potable water system and design flow needs of the District's existing and future customers. It documents the District's key service policies, describes the existing water system, establishes minimum design criteria for evaluation of the system, identifies system needs and recommended improvements, and presents a detailed capital facilities plan and implementation program for accomplishing the recommendations of the WSP. Mapping and water system hydraulic modeling used in development of the WSP are based on the data collected in the geographic information system (GIS) of the water system. Development of the GIS included review and documentation of each main, valve, fire hydrant, and appurtenance in the water system and provided a base for the planning and hydraulic analyses completed by BHC Consultants. Hydraulic modeling of the system is interfaced with the GIS and has been accomplished using MWSOft INFOWater. The hydraulic model was used for evaluating the existing system and simulating alternatives for recommended system improvements.

In accordance with DOH requirements, the appendices to this document contain the District's coliform monitoring plan, cross connection control program, and water use efficiency/conservation plan, as well as other supporting documentation.

1.2 OPERATION AND MANAGEMENT OF THE DISTRICT

The District operates under a three-member Board of Commissioners who are elected at-large for six-year terms by the residents of the District. The District has budgeted for 14 employees that include District Manager, Operations Manager, Finance Manager, Operations and Office Staff.

1.3 PURPOSE AND OBJECTIVES OF THE STUDY

This WSP is in accordance with all federal and state regulations governing the operation of a public water system and establishes the requirements for comprehensive water system planning. It is also in accordance with the requirements of Title 13.24 of the King County Code requiring comprehensive utility system planning every six years. This WSP replaces the approved Update to include changes in the basic planning data as required by WAC 246-290-100. A variety of additional regulations, guidelines, plans and policies by other agencies and jurisdictions, as outlined later in this section, have been addressed in this planning effort. This document provides a guideline for meeting the needs of the existing and future customers of the District through future development of the system in accordance with all applicable regulations. The WSP is based on existing conditions and the projected needs of the service areas through the year 2039. The primary goals, objectives and scope of the WSP are summarized as follows:

- Fulfill the DOH requirement of updating the District's previous WSP Update
- Update Water Service Policies
- Analyze the existing water system using the District's current standards and DOH regulations
- Update the demographic characteristics of the service area to include household and employment targets as identified in the Puget Sound Regional Council's Land Use Vision, which reflects the VISION 2040's Regional Growth Strategy Update land uses and historical water demand patterns for the purpose of projecting future system requirements within the service area
- Coordinate the existing and future service area of the District with the service areas of neighboring purveyors and other appropriate comprehensive planning documents
- Identify existing water system components that currently serve the customers of the District
- Conduct a detailed study of the existing water system, including hydraulic analyses with the use of a computerized hydraulic model
- Identify existing and projected water system needs and recommended improvements based on pipe size, age, material and hydraulic modeling results
- Provide improvement alternatives to be financed by new connections to the system, redevelopment and/or the District as appropriate
- Develop a Capital Facilities Plan and schedule which detail proposed improvements, are fiscally sound, and maximize performance of facilities
- Develop a financial plan which outlines the District's current rates, fiscal requirements and methods of financing for the improvements recommended in the WSP
- Provide an overview of required operations and maintenance activities including a structured schedule for valve and fire hydrant exercising
- Document and review water conservation efforts, including education of customers on the needs and benefits of water conservation and minimizing non-revenue water usage
- Address the requirements of the State Environmental Policy Act (SEPA) and other regulations governing environmental protection

- Identify supplemental documentation such as coliform monitoring, cross connection control, water use efficiency/conservation, and emergency response plans or programs which are to be updated in the future

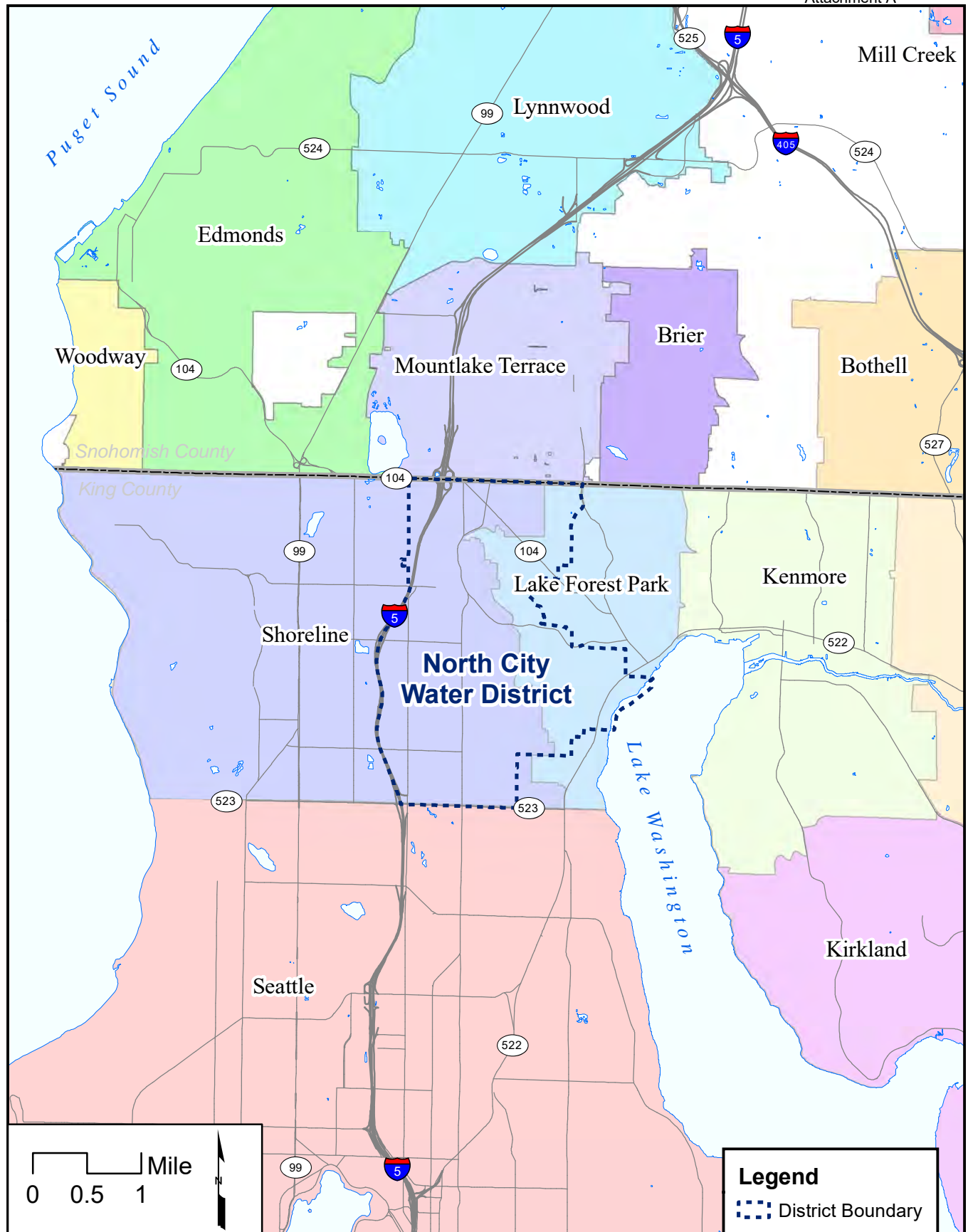
1.4 WATER SERVICE POLICIES

The District has prepared a collection of policies and contracts to assist in meeting the specific needs of District customers. This section discusses the planning importance of these policies.

1.4.1 Retail Water Service Area

The District has an established water service area, or retail water service area (RWSA), as indicated on Figure 1-1 and further described in Section 2 of this WSP. The District's policy is to require that the water system be extended or upgraded to serve all properties within its service area as development occurs. All areas within the service area are to be provided with direct, "urban level" water service consistent with State regulations, the minimum design criteria outlined in this WSP and other District codes and policies. Key to maintaining this level of service to all customers is the directive in RCW 57.08.005 that "property owners shall bear their equitable share of the cost of the system". The District recognizes that all general facilities include components that serve both existing and future customers and that growth still pays for growth, just not exclusively. To that end, developer extensions and other proposed new development within the water system will be required to meet all requirements associated with the current requirements of the District and the fire marshal having jurisdiction, whichever is greater.

There are no known Group B water systems in the retail water service area.



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1.4.2 Service to New Customers

To be timely and reasonable, the District will work with a potential customer or developer over several meetings, as necessary, to explain what the new customer will need to do to receive water service from the District. Prior to submitting a development or redevelopment permit to the local building official, a property owner or developer is required to submit a Request for Fire Flow Analysis/Certificate of Water Availability to the District. The District's analysis of the proposed water demand and development will conclude with a determination of specific conditions for water service to the proposed development or redevelopment. The District will evaluate the proposed development and hydraulic model to ensure adequate fire flow can be provided to the site. If the conditions are acceptable to the applicant, the District and the new customer will sign a Water System Extension Agreement (WSEA) which specifies the steps the developer must go through in order to connect to and receive potable and fire flow service from the system.

The District's new customer service policies impact financial planning for capital improvement projects. These policies, and the rate of growth, determine how much revenue will be generated from new connections to the District's system. The total connection cost to a new customer depends on the type of development and extent of work necessary to complete the connection. The District has separate policies for four methods of new customer connection: 1) Connection to Existing Water Mains, 2) Utility Local Improvement District (ULID) Extensions, 3) Water System Extension Agreement, and 4) Temporary Water Service Agreements.

In each method, new customers are required to pay a connection charge and installation charge in accordance with the current District fees and charges resolution. In addition, SPU assesses a Facilities Charge in accordance with the District's wholesale water agreement. When an existing main abuts the property to be served, the new customer may also be required to pay latecomer's fees and charges. The new customer must pay meter installation charges as established in the current resolution for installing the service connection and meter and right-of-way permit charges as applicable.

Service to properties outside the District's RWSA will be evaluated on a case-by-case basis by the Board of Commissioners and coordinated with adjacent water purveyors and the Department of Health.

1.4.2.1 Connection to Existing Water Mains

The most common method of connecting to the District's system is to connect to an existing adjacent or abutting main. District policy requires the property owner to apply to the District for a meter installation and pay

the necessary fees and charges. The District will then install the water service connection (including the meter, service line, and other appurtenances) to the property line. All connections to existing water mains are subject to the District minimum design standards as discussed in Section 4 and the District's minimum requirements as set forth in the Water System Extension Agreement described below.

1.4.2.2 Utility Local Improvement District (ULID)

In some cases, the District may extend the mains upon receipt of a petition requesting formation of a ULID. Water system comprehensive planning guidelines for providing new service to ULID's are explained in RCW 57.16, "Comprehensive Plan - Local Improvement Districts."

1.4.2.3 Water System Extension Agreement

A property owner developing a property that is either not served by an existing main, is served by an undersized main, or requires other water system improvements to meet the water system design requirements for the proposed development must apply to extend or improve existing District facilities and must enter into a water system extension agreement that outlines the conditions of service. The developer must then design and construct, **at the developer's expense**, the water main extension in accordance with District policies and standards. After construction is complete and deemed acceptable by the District, the developer must transfer the title to the facilities to the District and if applicable, may enter into a latecomer agreement as described in Section 1.4.4.

1.4.2.4 Temporary Water Service Agreement

Temporary water service is typically not allowed. However, under the following circumstances, the District may grant temporary water service on a "case-by-case" basis. When an applicant owns a single property no larger than a typical single-family building lot (not to exceed 14,520 square feet) that is not adjacent to a District water main, the District may allow for the provision of new water service on a temporary basis by entering into a temporary service agreement. The following criteria listed must also be met for a temporary service agreement to be allowed:

- The cost of main extension by developer extension appears to be unreasonably large in relation to the benefit of service for a single-family resident, in the judgment of the District

- Properties receiving temporary service will, at their expense, connect to permanent facilities when such improvements are installed
- If approved for temporary service, the property owner will pay, in addition to all other connection charges levied by the District at the time of connection, a temporary connection charge (a.k.a. “early-comer” charge) calculated to equal the “fair share” cost of permanent facilities to serve the property
- The property owner acquires all the necessary third-party easements deemed necessary by the District
- The property owner constructs, owns, and maintains the temporary service facility
- A temporary water service agreement is also subject to approval by both the fire department (Shoreline and Northshore Fire Departments) and the city (Shoreline and Lake Forest Park) with jurisdiction

The applicant must pay for all costs of the project and the necessary connection fees and charges established for new customers. Temporary service connections may require installation of long individual water service lines. The temporary service connection does not constitute a permanent service.

1.4.3 Main Extension

Distribution and transmission main extensions can be initiated by the District, developers, or property owner groups petitioning for formation of a ULID. In all cases, mainline extensions must be designed and constructed according to current District design, material, and construction standards and must meet the requirements of the District's policies in the WSP and/or in the District's code. These design standards are discussed in Section 4, Minimum Design Criteria.

The District's extension policies are important to this WSP as they delegate financial responsibilities to the District and independent property owners for transmission and distribution system improvements.

1.4.3.1 District Construction

The District may finance replacement or improvement of existing distribution mains. The District also may finance transmission main construction when water must be transported from one area of the District to another. Connection Charges are collected from benefited property owners that later connect to these improved facilities.

1.4.3.2 ULID

Property owners can petition to have water service extended to their area in the form of a utility local improvement district or ULID. The District Commissioners can approve the formation of a ULID after receiving a petition from the majority of the benefiting property owners (as represented by the area of the property they own) in the area requesting service. The District cannot accept any petition requesting service for an area that does not exist wholly within the District's corporate boundary. "Local facility" costs in the form of assessments are collected from all benefited properties that can connect to the facilities constructed within the ULID.

1.4.3.3 Water System Extension

The Developer must enter into a water system extension agreement with the District prior to connecting onto the water system. Developers must design and install mainline extension improvements or replacements at the developer's expense and in accordance with the current approved WSP, specifically with respect to appurtenances, pipe size, and location. To be timely and reasonable, the District will review and approve or deny all plans and proposals submitted by the developer. The District will provide construction observation during construction to assure compliance with District requirements, at the developer's expense. When applicable, "local facility" costs in the form of latecomer's fees, as described in Section 1.4.4, are collected from benefited property owners that later connect to facilities constructed by the developer.

1.4.4 Latecomer Agreements

When developers must construct facilities that benefit property not included in their project, they may be reimbursed for project costs under a District latecomer (or reimbursement) agreement in accordance with RCW 57.22. The total amount of reimbursement is based on the incremental construction cost of the project. The form of reimbursement is determined by District administrative procedures as identified in District code.

1.4.5 Annexation and Merger Policies

Service will not normally be provided to adjacent areas that have not been annexed into the District. However, the District is currently serving areas outside the District's corporate boundary that the District would like to annex into their corporate boundary. There are several potential annexation areas adjacent to the District (refer to Figure 2-1). The District may annex these areas and/or the areas may merge with adjacent

purveyors. There are also other areas along the District boundary that have been historically served by the District but are currently located within a neighboring water district's corporate boundary. The District will work with the adjacent purveyor to identify the appropriate water service provider in these areas. Water service is provided by public agencies for all the areas surrounding the District. Consequently, agreements should have been worked out with appropriate water providers before annexation or merger procedures were initiated. However, water service to each of these annexation areas have been continuous by the District for over 50 years and no formal annexation petitions have been identified for these areas. The District would simply like to annex those properties that have been receiving water service from the District for this long period of time. District service policy does not prohibit the distribution of water to customers located outside District boundaries. However, an interlocal agreement detailing the terms of service and approval by SPU and the adjacent utility is required.

1.4.6 Water Main Over-sizing Policy

If the District's WSP requires installation of a water main larger than that required for an acceptable level of service to the property intended to be served by the facility, the District may reimburse the developer under the water main over-sizing provisions stipulated in RCW 57.22.050. The reimbursement can be in the form of a credit for the capital facilities charge on the developer's property or by some other means determined by the District. The amount shall be the estimated difference in material cost between the water main size that would be necessary to serve the development and the water main size required by the WSP.

1.4.7 Design Flow and Duration Requirements

For planning and design purposes and in accordance with the Uniform Building Code (UBC), the International Fire Code (IFC) and local requirements, the District requires the following minimum fire flow be provided (Resolution 2008.12.40). In all cases, newly connecting properties will be required to meet or exceed these requirements (see Table 1-1).

**TABLE 1-1
FIRE FLOW AND DURATION REQUIREMENTS
NORTH CITY WATER DISTRICT RESOLUTION 2008.12.40**

Land Use Category	Definition	Fire Flow Requirement	Flow Duration, hours
Low Density Residential	Single Family Residences; Duplexes	1,000 gpm	2
Medium Density Residential	Triplexes through 12-plexes	1,750 gpm	2
High Density Residential	Greater than 12-plex	2,500 gpm	2
Commercial/ Business Park	Meets all of the following: Under 10,000 square feet; maximum of 2 floors; general office use (non-manufacturing, service only such as insurance offices, real estate, legal services, banking, mini-mart without gasoline sales)	1,750 gpm	2
	Any commercial use not meeting criteria above	3,000 gpm	3
Light Industrial	Industrial Users	3,500 gpm	3
Schools	Educational Institutions	3,500 gpm	3
Special Study Areas*	Areas where a Master Development Plan or Subarea Plan have been adopted and population densities are currently unlimited (North City and Ridgecrest areas).	4,500 gpm (anticipated)	4 (anticipated)

*In areas where a Master Development Plan or a Subarea Plan have been adopted and fire flow requirements are presently undetermined by the appropriate City or Fire Marshal, the District anticipates fire flow requirements up to 4,500 gpm for 4 hours.

1.4.8 Conservation

In accordance with its water supply contract, the District participates in the City of Seattle's regional water conservation program. The District will promote the efficient and responsible use of water and will conserve water during a water shortage in accordance with all current regulations and requirements. The District's current water use efficiency documentation is included in the Appendices and discussed in detail in Section 2. The District's Water Shortage Contingency Plan is a separate document on file with the District.

1.4.9 Cross-Connection Control Program

The District has responsibility to protect the public water system from contamination due to cross connections. Cross Connections that can be eliminated, will be eliminated. The District's Cross-Connection Control Program is included in the Appendices and identifies acceptable backflow prevention devices and cross-connection inspection procedures in accordance with WAC 246-290-490 through 246-290-500 entitled "Cross-Connection Control Regulation in Washington State." The District adopted a Cross-Connection Control Program in 1999 (Resolution 99-19). The District's current Cross Connection Control Program was completed in 2012 and adopted by Resolution 2012.12.93. The Program was updated in 2018 to more accurately reflect the current communication methods to the District customers. See Appendix F for the 2012 Program and 2018 amendments, and each resolution. It is the responsibility of a property owner or developer to ensure that an approved backflow prevention device is installed prior to modification of an existing service or for development of new services. This policy is critical due to the rapid development and redevelopment of properties served by the District.

1.4.10 Wholesaling and Wheeling Water

The practice of selling wholesale water typically involves selling water to another water purveyor, often at a rate different from that of the other customers served by the water purveyor selling water. "Wheeling" water is a practice of allowing one water purveyor to use another water purveyor's facilities to convey water to the purveyor purchasing water. Wheeled water generally incurs a fee for the use of one water purveyor's water facilities to convey water to the purchasing water purveyor.

The District sells water to Fircrest School/Department of Social and Health Services (DSHS) (Water System ID 18666Y) by intertie contract. The District has approached DSHS to update the service contract to more accurately reflect the relationship between agencies.

The current Board of Commissioners has indicated its willingness to consider wholesaling or wheeling water through the District to another utility, if appropriate. The necessary contractual and fee arrangements would be negotiated on a case-by-case basis if such an opportunity develops.

1.4.11 Water Distribution System, Limits of Responsibility

The District's water distribution system consists of all facilities used in the distribution of potable water. The water distribution system terminates at the customer's plumbing and/or mechanical system connection to the District's water meter (see Standard Detail 7-11 in Appendix K).

1.4.12 Customer Complaint Process and Recordkeeping

The record-keeping process for the District's customer complaints vary from department to department. Customer service requests, which include complaints that come in during the day, are noted in the billing software. Those calls that come in after hours are not tracked at this time.

Complaint letters that are sent to the attention of any or all of the Board of Commissioners are typically received by the Customer Service Specialist and forwarded to the District Manager, Finance Manager, and Operations Manager as appropriate. Most complaints are generally utility billing complaints. After the complaints have been addressed, a copy of the response letter is forwarded to the Board or discussed at a Board meeting.

Complaints received by the Operations staff are usually from service order requests.

Occasionally, customers have attended the District Board of Commissioner's meeting and requested assistance with their water bills. The Commissioners direct staff to work with the individual to understand the complaint and report back at the following meeting before making a decision about assisting the customer.

Water quality complaints are also recorded on service order requests and immediately referred to the Operations staff. The form includes the date, address, complaint, and who received the call. The office staff generates a service order using a type code for the water quality complaint and that data is stored in the customer database. For the last several years the District has received very few water quality complaints.

1.4.13 Satellite Management

The District is committed to serving water to all properties within its service area/future corporate area. The District has also considered assisting systems outside of its' service area that may request and/or need assistance.

There are several ways that properties outside the present service area may be served: direct connection to the District's system; through a Satellite System Management

Program (SSMP), or through a receivership process. The SSMP refers to arrangements whereby a qualified Satellite System Management Agency (SSMA), such as a water district, assumes some responsibility for the operation or management of another water purveyor. The SSMP concept is supported by the East King County Coordinated Water System Plan (EKCCWSP), King County, and DOH as a means to improve the quality of service to customers of small or rural water purveyors. At this time, the District has not received any formal requests for satellite management. Such inquiries would be addressed on a case-by-case basis.

1.5 RULES AND REGULATIONS

As a Group A Public Water System, the District must operate in accordance with specific Federal, State, and local rules and regulations. The District maintains adaptive management policies and practices in response to the ever-increasing and changing regulations, requirements, plans, and policies of agencies having jurisdiction. At the same time it must plan for and deliver a minimum level of service which is consistent with its commitment to domestic water and fire protection within the service area established by the EKCCWSP. A summary of key rules and regulations that the District is subject to follows:

1.5.1 Federal Regulations

1.5.1.1 Safe Drinking Water Act

Public Law 92-523, the Safe Drinking Water Act (SDWA) of 1974, directs the United States Environmental Protection Agency (EPA) to establish national drinking water standards that limit the amount of various specific substances, which may sometimes be found in drinking water sources. The District works closely with SPU to maintain a comprehensive coliform monitoring program that is in compliance with the current federal drinking water standards as governed by DOH. The District also publishes an annual Consumer Confidence Report (CCR) and has provided Lead and Copper Public Education Information according to EPA and DOH regulations. Specific information on water quality standards and monitoring is contained in Section 7 and the contained in the Appendices.

Amendments to the SDWA in 2002 required the District to complete a vulnerability assessment of its system before June 30, 2004, to identify potential threats to the security of the system and identify mitigation strategies. The District has completed this requirement and adopted a Vulnerability Assessment. As part of this WSP, the District emergency response plan was updated to address prevention, mitigation, and

recovery strategies that were identified in the Vulnerability Assessment. Another recent amendment to the SDWA requires development of a Disinfectants/Disinfection By-Products (D/DBP) Program in accordance with EPA regulations. The District submitted a proposed monitoring plan in 2006 and began monitoring in 2007.

1.5.1.2 Clean Water Act

The Clean Water Act of 1977 established regulations and requirements for restoration and maintenance of the integrity of the nation's waters in terms of physical, chemical, and biological characteristics and security considerations. The EPA is the primary administrator of the Clean Water Act, however in cases that occur within Washington State the EPA has delegated many aspects of administration of the Act to the State of Washington Department of Ecology (DOE).

1.5.1.3 Endangered Species Act

The Endangered Species Act (ESA) of 1973 impacts water system operations because of the listing of the Puget Sound Chinook Salmon and Bull Trout as "threatened species". A "4(d) Rule" has been adopted by the National Marine Fisheries Service (NMFS). "Best Management Practices" (BMPs), resulting from adoption of the "4(d) Rule" supplement the District's existing operations and maintenance activities and programs. The "4(d) Rule" refers to the ESA Section 4(d), which requires the National Marine Fisheries Service to issue regulations "to provide for the conservation of such species" when it lists fish populations as "threatened"¹. The 4(d) Rule provides additional and more practical regulation for species listed as "threatened" in an attempt to conserve species populations while conservation efforts can be determined and implemented.

Other federal regulations which may have an impact on District operations include those associated with specific permits for individual projects. These specific regulations will be identified and addressed on a project-by-project basis.

1.5.1.4 America's Water Infrastructure Act

The America's Water Infrastructure (AWIA) Act of 2018 established regulations and requirements for public water systems serving a population of 3,300 or more to complete a risk and resiliency assessment (RRA) and an

¹ Excerpt taken from discussion of [West Coast ESA 4\(d\) Rules Overview](#), National Marine Fisheries Service/National Oceanic & Atmospheric Administration.

ERP. The RRA must consider risk to the water system from malevolent acts and natural hazards. Once the risks are identified an ERP must be prepared to consider strategies, resources and improvements to address the potential threats to the system. The AWIA specifically includes consideration of cybersecurity vulnerability and risk mitigation in both the RRA and ERP. The schedule for compliance varies by population served. The District must complete its RRA by June 30, 2021 and its ERP update by December 30, 2021.

1.5.2 State of Washington Requirements

1.5.2.1 Administrative Code and Revised Code of Washington

The rules and regulations governing the operation of public water systems are a part of the WAC and were adopted pursuant to the provisions of RCW 43.20.050 for the protection of public health. The rules and regulations set forth in WAC 246 identify cross connection control requirements and provide the minimum standards for design, construction, operation and maintenance of public water systems. They are intended to conform to the requirements of the Safe Drinking Water Act of 1974, and all amendments thereto administered under the DOH document "Group A Public Water Systems Waterworks Standards" in accordance with WAC 246-290. Operation of the District is accomplished in accordance with the requirements of Title 57 of the Revised Code of Washington, which outlines the authorized actions, requirements and responsibilities of public water and sewer districts.

1.5.2.2 Growth Management Act

The Growth Management Act (GMA) of 1990 has a direct impact on utility system planning in that it requires a complete inventory of existing utility system facilities and a comprehensive effort towards determining the capacity of utility systems to support anticipated growth. Although the majority of growth management activities are the responsibility of counties and cities, data and information from special purpose districts is required for these agencies to make informed decisions on growth and the ability of the systems to support future development. A primary outcome of the GMA is the establishment of an urban growth area (UGA) boundary. Areas within the UGA are expected to experience an urban level of development and urban levels of service are required.

In 2017, the State legislature allocated funds for the William D. Ruckelshaus

Center to evaluate current practice and prepare a planning report focused on the future of the State, including consideration of the potential changes to the planning framework prescribed by the GMA necessary to achieve that future. The Center is a joint resource of Washington State University and the University of Washington, acting as a neutral body as a resource for developing solutions for matters of complex and/or difficult public policy. According to the respondents participating in the Center's "A Road Map to Washington's Future", June 30, 2019, (Road Map) the GMA and city annexations can affect special purpose districts. Participants stated that while *"cities should be the primary provider of urban services, others gave examples of instances where they thought a water, sewer or fire district was better able to provide services. Specifically, participants talked about sewer and water service being better delivered at the regional scale and gave examples of large utility districts that provide water and/or sewer service to several cities within their boundaries. Participants also cited instances where a city was not equipped to provide utility service due to scale or topography and was instead able to rely on special district to provide that service."*

1.5.2.3 State of Washington Auditor

Regulations related to accounting practices for municipalities such as the District are implemented and monitored by the State of Washington Auditor. District Finance Manager and Office staff stay current with changes when the Government Accounting Standards Board (GASB) develops or updates generally accepted accounting principles (GAAP).

1.5.2.4 State Environmental Policy

SEPA review is generally required for all District projects other than system extensions, renewal or replacement projects involving pipe sizes of 12-inches or less in diameter. SEPA requirements and exemptions are detailed in WAC Chapter 197-11 and adopted District environmental policies are in place to insure that environmental concerns associated with construction are adequately addressed. Initiation of the SEPA process can be at the District's direction or as required for various permits.

1.5.2.5 State Department of Health

Approval of this WSP and operation of the District's water system is under the jurisdiction of DOH. This WSP has been prepared, and the District is operated in accordance with the requirements set forth in the DOH Water

System Design Manual (WSDM, October 2019). This WSP incorporates the policies, guidelines, and practices of the DOH and identifies minimum engineering requirements for design, construction, and operation of a public water system.

1.5.2.6 Public Water System Coordination Act

The Public Water System Coordination Act of 1977 (RCW 70.116) establishes procedures for adjacent water utilities and local government agencies to coordinate the planning and development of water facilities. These procedures are intended as guidelines for providing future water service in the most efficient manner with the objective of coordinating water system development by geographical areas and integrating water system development with future land use plans. The District's water service area boundary has been approved by the Department of Health, King County, and neighboring jurisdictions through the EKCCWSP.

1.5.2.7 House Bill 1338

Washington State House Bill 1338 is an act relating to certainty and flexibility of municipal water rights and efficient water use and became effective in September 2003. The act more closely relates water system planning and engineering approvals by DOH with water rights administration by DOE. The legislation directed DOH to adopt enforceable water conservation regulations for public water systems by the end of 2005. Additional regulations related to Water Use Efficiency were developed by DOH and DOE and became effective in early 2007. The requirements include establishment of water conservation goals and strategies to increase water use efficiency. Additional detail and information on the District's conservation, water reuse and water use efficiency strategies are presented later in this WSP.

1.5.3 King County Requirements

Because the District operates within King County it is subject to King County Code Chapters 13.24 (Sewer and Water Comprehensive Plans) and 17.08, which have been utilized in the development of this document. Washington State Department of Transportation (WSDOT) has jurisdiction for permitting in the state highways in unincorporated King County. Communications with the King County has indicated they do not have jurisdiction on roads within the District boundary; all roads within the District Boundary are either in the WSDOT, City of Lake Forest Park or City of Shoreline jurisdiction for right-of-way permits.

1.5.4 Washington State Fire Code

A discussion on the minimum requirements for Washington State Fire Code is included in Section 4.

1.5.5 City Requirements

The District provides water service within the City of Shoreline and the City of Lake Forest Park. The land use plans, construction standards, and permitting requirements of these agencies are essential considerations in the design and construction of new water facilities. The District intends to maintain water service as proposed in this WSP and will continue to work with land use authorities to ensure that an appropriate level of service is planned for and provided by the District. Any extension of service area would entail negotiation between neighboring water service providers.

The cities of Shoreline and Lake Forest Park utilize the codes as indicated in Table 1-2.

TABLE 1-2 CODE COMPARISON CHART		
Code Type	City of Lake Forest Park	City of Shoreline
Building	2015 International Building Code	2015 International Building Code
Fire	2015 International Fire Code	2015 International Fire Code
Plumbing	2015 Uniform Plumbing Code	2015 Uniform Plumbing Code

1.6 PREVIOUS PLANNING STUDIES

This WSP updates and supersedes previous comprehensive water system plans of the District. The following previous plans and studies have been used in development of this document:

- Shoreline Water District Vulnerability Assessment Plan (2010) – RH2 Engineering, Inc.
- Shoreline Water District Emergency Response Plan (2010) – RH2 Engineering, Inc.

- Shoreline Water District Cross Connection Control Program (2012) – MSA, Inc.
- Water System Plan Update 2011, Revised 2013 - CHS Engineers, LLC
- King County Regional Hazard Mitigation Plan Update – North City Water District Annex (2014)
- King County Regional Hazard Mitigation Plan Update – North City Water District Annex (Draft, 2019)
- North City Water District Coliform Monitoring Plan (2019) – Murraysmith, Inc.
- 2019 Hydraulic Model Update and Analysis – BHC Consultants, LLC

1.7 PROFESSIONAL AFFILIATIONS

The District has maintained affiliation with the following organizations and planning groups as a means to remain on the forefront of water system operations and management, and in development of regional solutions to the issues facing water purveyors in the Pacific Northwest:

- King County Water Resource Inventory Area 8
- Water Supply Forum

The District has continued its active membership in the following organizations, with District Commissioners and staff taking leadership roles in the different organizations:

- American Water Works Association
- Pacific Northwest Section of American Water Works Association
- Washington Water Utility Council
- Seattle Public Utilities Operating Board
- Saving Water Partnership
- Washington Association of Sewer and Water Districts

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SECTION TWO - BASIC PLANNING DATA

NORTH CITY WATER DISTRICT

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NORTH CITY WATER DISTRICT

SECTION 2
BASIC PLANNING DATA**2.1 OVERVIEW**

This Section of the WSP provides an overview and description of the District's water service area. Physical and demographic characteristics of the service area are described and include a description of the service area and land use. Population and historical water use are also presented. This information, coupled with the policy information presented in Section 1, is used to develop the projections of the future population, employment, water use and other characteristics of the system. Customer and water demand projections presented in this Section are used for the various system analyses included in later sections.

2.2 STUDY AND SERVICE AREA

The District's "service area", "retail service area" and the "study area" for this document are identical to the District's "corporate boundary" except for some potential annexation areas along the District boundaries where the District is already providing water service. Therefore, the future "corporate boundary", "service area", "retail service area" and "study area" shall be referred to only as "service area". The District also provides service to the Fircrest campus as discussed in Section 1. This area is designated as a service area by agreement. No facilities planning is included for that area, but the current and anticipated future water demand is unchanged herein. The service area encompasses nearly five square miles and includes the area of the City of Shoreline lying generally east of Interstate 5 and the west portion of the City of Lake Forest Park. It is entirely within the Urban Growth Area established for King County and the cities within it.

As indicated on Figure 2-1, the service area is generally bounded by Seattle city limits on the south, the King-Snohomish County line on the north, generally Interstate Highway 5 on the west, and Lake Washington on the east. The water service area as presented herein is consistent with that defined by and agreed to in the East King County Coordinated Water System Plan.

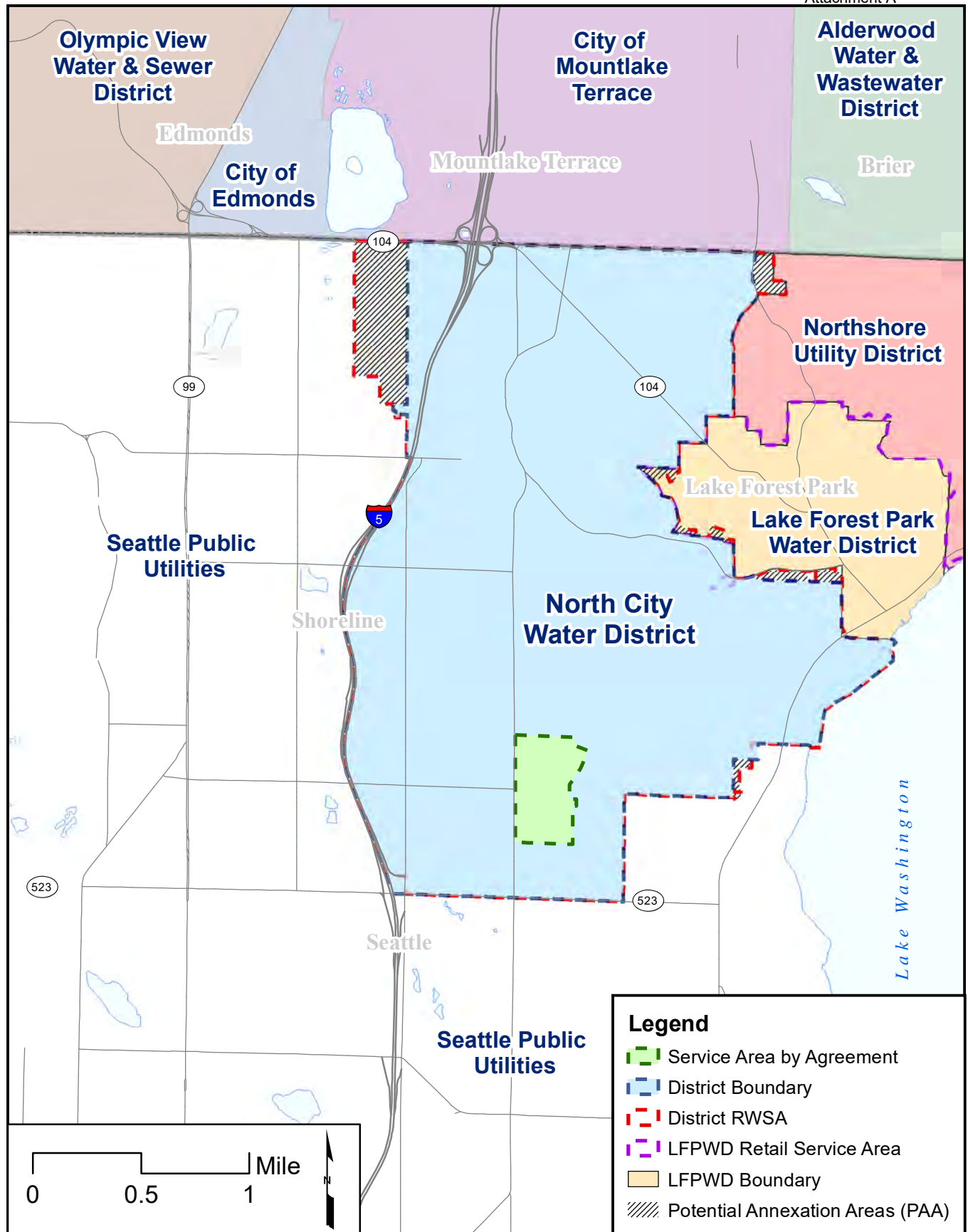
The characteristics of the area are what one might expect for an urban, primarily residential neighborhood center. The area is mostly developed to near build-out conditions, although there are scattered undeveloped or underdeveloped parcels of land that may experience future development. Subdividing land for higher density residential land-use has been common practice since the early 1970s and has led to an increasing customer population and increased water demands.

This Water System Plan (WSP) focuses on anticipated redevelopment and infill of properties within the District's service area and recognizes that potential changes to the service area are limited. Exceptions to this include transfers that might be negotiated by interlocal agreement to logically serve individual properties along the fringe of the service area. Potential larger water service area changes include expansion to the west if Seattle were to elect to transfer its services within the City of Shoreline or any portion thereof, additional services from the western portion of Lake Forest Park, or takeover of the independent Fircrest Water System that is completely surrounded by and receives water from North City Water District (District). The Fircrest system serves State of Washington facilities in the Fircrest campus. Fircrest is not anticipated to expand or substantively increase its water demand at this time. Several studies have been completed since the 1990s regarding redevelopment potential. It is the District's desire to work with DSHS to either have them take on the direct responsibility of being a water provider or bring the system up to District standards and transfer the operation and/or ownership of the system to the District. The potential but undefined larger service area expansions associated with transfer of services from Seattle or Lake Forest Park are not contemplated in this WSP. If requested, the District will perform independent studies to evaluate the feasibility of such an expansion of the service area.

2.3 HISTORY OF THE DISTRICT

The District was formed in 1931. The District's has an interesting history given its evolution and geographical location. The following is a brief summary of the history of the District and include major policies, installation of major facilities, and other important events.

1931: The District was created as King County Water District No. 42 by an election of the people and the first water system plan was adopted in 1933. The City of Seattle's Cedar River source (located southeast of the City of Renton) provided the wholesale water supply to serve the entire District. Most of the area was served by gravity flow from the Seattle system but higher elevations were supplied via a pump station located near NE 185th Street and 5th Avenue NE.



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1930s to 1960s: The District's service area grew and expanded through annexations as housing and commercial areas were developed.

1936: A 50,000 gallon elevated reservoir was constructed to meet water pressure demands.

1950: A 0.4 million gallon (MG) reservoir was constructed to aid in supplying an increasing water service population and demand.

1953: A 1 MG concrete reservoir, Supply Station (No. 3) and over four miles of cast iron mains were constructed.

1954: The City of Seattle assumes that portion of the District south of NE 145th Street within the new city limits. One fifth of District financial accounts is transferred to the City.

1963: Seattle's Tolt River supply improvements were completed allowing water supply from the closer source of supply located northeast of the City of Woodinville. This allowed construction of the District's Supply Station 3 to deliver water from the Tolt River Supply Line, eliminating the second water source from the Cedar River. The District constructed Booster Stations 1 and 2 to pump water to the higher elevations of the service area. Construction of Interstate 5 began, which isolated the western portion of the District.

1964: Most of the isolated services were transferred to the Seattle Water Department once the construction was completed in the summer.

1965: Shoreline's Supply Station 1 was constructed to provide an additional connection to Seattle's Tolt River supply. An engineering study determined that many of the District's existing steel and cast-iron mains were in various states of deterioration. A water main replacement program began in 1966 and over 46 miles, the majority of the system, was replaced with cast and ductile iron pipes and financed through increased rates.

1970s: Growth within the Seattle Metropolitan area, including the District, continued through the decade and water demand increased considerably. Seattle began a demand metering program for all wholesale customers, including the District, to avoid drawing peak flows from the Seattle system pipelines. Seattle demand metering program required wholesale customers to withdraw water supply at a uniform rate or incur financial penalties in the form of a demand charge. The Seattle demand charge encouraged wholesale customers to build sufficient water storage to regulate withdrawals from Seattle and to supply their system during peak demand periods. One of the District's supplies from the Tolt River Supply Line, Supply Station 2, was retired and deactivated because it could not be operated without incurring the Seattle demand charge.

1976: The 580 Zone 3.7 MG Reservoir and Reservoir Booster Pump Station were constructed to comply with Seattle's demand metering program. The booster pump station maintained pressures in the high elevation service areas during times of reservoir drawdown. Pressure zone boundaries were adjusted to provide more uniform water pressure to customers.

1980s: Water main replacements were constructed to replace leaking and failing mains and new water main construction occurred as development increased. Booster Station 1 was rehabilitated. Piping modifications were done to the 0.4 MG and 3.7 MG reservoirs to improve supply distribution. Construction of Pressure Reducing Valve (PRV) Stations 7, 8, and 9 were completed.

1981: A thirty year "Water Purveyor Contract" was signed between the District and the City of Seattle. The contract is no longer in effect and was replaced in 2001.

1988: The 424 Zone 2.0 MG Reservoir was constructed to meet storage requirements for an increasing customer population and demand.

1990s: Water main replacement projects were initiated to replace cast iron pipe and to increase fire flows throughout the District. Construction of PRV Stations 11 and 12 were completed and PRV Station 4 was replaced.

1991: District name formally changed from King County Water District No. 42 to Shoreline Water District.

1992: Booster Station 2 was rehabilitated.

1993: Improvements made to the Supply Station 3.

1994: The old Reservoir Booster Station was converted to the 660 Zone Booster Pump Station upon successful completion of creating a new 660 Zone. The District and City of Seattle signed the "First Amendment to the Water Purveyor Contract".

1996: Two emergency interties were constructed to allow the exchange of water with the City of Mountlake Terrace in emergency conditions, such as large fire events.

2001: On November 5, 2001 the District signed a new 60-year "Full Requirements Contract" with the City of Seattle for the Supply of Water. This replaced the 1981 contract.

2006: 424 Zone 2.0 MG Tank roof was resurfaced. Connection to 492 Zone was opened within the Supply Station 3 facility.

Replaced 340 feet of 6" cast iron (CI) Water Main with 340 feet of 8" ductile iron (DI) Water Main on NE 148th Street from 15th Ave NE to 1522 NE 148th St. as part of a developer's lawsuit. Upsized 6" to 12" along 15th Avenue from Forest Park Drive to 300' to north.

2007: Complete update of water system mapping and data management completed in GIS format. The District's datum changed to NAVD88 from the Seattle datum. Pressure zones were reconfigured to the new datum. New comprehensive Water System Plan developed. Pilot program to do a pilot project to replace meters with Sensus AMR meters.

2008: Installed emergency backup generators at the Administration Office and 660 Booster Station. Began annual replacement of 500 AMR Sensus meters (continued through 2012).

2009: Upsize 6" to 12" along 15th Avenue from NE 205th Street south 840 feet connecting to the new main installed in 2006. The District began a Needs study to determine how and where to locate the Administrative and Maintenance staffs.

2010: For the existing 2.0 MG reservoir, a new supply station (SS-2), fill line and reservoir mixing project was constructed. The exterior of the reservoir was also painted. Water main was constructed connecting the 432 Zone to the 392 Zone. An emergency intertie with SPU's northwest sub-regional source was installed. The Shoreline Water District crews replaced the District's internal Master Meters with mag meters at all SPU connections and at the 615 Booster Pump Station (3 locations – 615, 590 & 502) (CIP-2010-01). The District's Vulnerability Assessment, Hazard Vulnerability and Emergency Response Plans were updated.

2011: Water System Plan Update included King County Countywide Planning Policies, hydraulic model and reconfigured pressure zones. The 0.4 MG Reservoir was demolished to make way for the new pump station (Project 11 or Project 2011-02). Completed the 25th Avenue project combining two different pressure zones to improve fire flow (CIP 2009-03). Reconnected a fourth Supply station (SS#4) to the SPU Northwest Sub-regional System (Project 14 or CIP 2010-07). Also constructed an emergency intertie near the Supply Station (CIP 2010-05). New 16" transmission main was installed along NE 175th Street from 15th to 8th Ave NE (Project 1B – CIP 2010-02).

2012: Negotiated 25-year leases with wireless carriers and taxi company. One carrier has a monopole onsite. Other carriers agree to share in the costs to construct of a building for the carriers and a railing on top of the 3.7 MG reservoir. Signed a Wheeling Agreement with the City of Seattle for the Northwest sub-regional system with the connection at Supply Station 4. Began construction of a new administrative building after considering alternative location options (CIP 2011-01). Purchased land adjacent to the District Administration building for expanding the parking area of the District (P-1 or CIP 2012-06). Approved for two Drinking Water State Revolving Fund loans – one for what is likely the last steel mains in the District's distribution system and the other for the pump station project. Supply Station 1 Transmission Main was completed to increase the main size from

195th Street to Forest Park Drive and 19th which included multiple crossings of Ballinger Way (CIP 5a, 6, 7 and 8) to improve fire flow (CIP 2010-08). Telemetry was upgraded connecting the District's major components so that they could be monitored/adjusted remotely (CIP- 2012-02).

2013: District name changed from Shoreline Water District to North City Water District by Resolution 2013.09.36 to better reflect the District as a separate entity from the City of Shoreline. Completed construction of a new Administration Building (P-1). Entered into two public private partnerships with developers to complete district projects expanding the 615 Zone (CIP 1d, 1e, 1g, 1h/2b, 1k and 2e). Completed steel main replacement project (CIP 30 or CIP 2012-01). Water System Plan was approved by King County and Department of Health (CIP 2010-04).

2014: Upgraded telemetry system connecting all the District's critical infrastructure 2012-02). Constructed a new Multiuser Accessory Equipment Building (MUAEB) at the tanks site as a partnership with the wireless carriers (CIP 2012-03). Completed replacement of more than 5,000 AMR Sensus iPearl meters for the entire District (CIP 2013-01). Painted both inside and outside and rehabilitated 3.7 MG Reservoir. Added PAX mixer inside reservoir. Constructed new railing system on top of reservoir for carriers (CIP 2009-04). Purchased property to construct a new maintenance facility. Rebuilt PRV Stations 7 and 9 (CIP 2014-01).

2015: Amended the Wheeling Agreement with Seattle. Updated the District's Hazard Vulnerability Plan as part of the King County Regional Hazard Mitigation Plan. Completed a water main replacement project as part of the City of Lake Forest Park's NE 178th Street Project.

2016: Added two new sampling stations (42-11 at 14541 25th Ave NE and 42-12 at 16505 5th Ave NE). Rebuilt PRV station 1.

2017: Completed construction of the North City/Denny Clouse Pump Station. The 615 West Zone began operation on November 1. Installed three new sampling stations (42-13 at 16505 5th Ave NE, 42-14 @ 16747 41st Ave NE ,42-15 for the 590 Zone and 42-16 for the 502 Zone at 18012 15th Ave NE).

2018: Began construction of a new maintenance facility (CIP 2012-09).

2.4 TOPOGRAPHY

Most of the District's water service area is situated in areas of elevation greater than 250 feet above mean sea level (MSL). The range of elevations served by the District is approximately 20 feet MSL to greater than 500 feet MSL. It is this wide range of elevations that necessitate multiple pressure zones. As discussed in Section 3, there are currently seven separate zones.

The highest elevations of the District are located approximately near NE 177th Street and 17th Avenue NE and slope downward radially. The lowest elevations of the District are located along Lake Washington east of Bothell Way NE.

2.5 LAND USE AND ZONING

Land use planning and zoning is the primary factor impacting how and where development may occur. Changes in land use planning and zoning in the District's water service area within the cities of Lake Forest Park and Shoreline impacts the District's policies on water service, may require additional water facilities, and may necessitate changes in the physical layout of the water system.

Most of the District's service area was near build-out conditions until the City of Shoreline rezoned the areas around the future light rail stations in 2015 and 2016. There has been steady infill, consisting of redevelopment and subdivision of larger single-family lots into smaller lots for single-family residences, along with redevelopment and increased densities within the newly zoned corridors for many years. Redevelopment occasionally includes demolition of smaller and older single-family residences to make space for larger residences and possible subdivision of existing residential lots that increase residential densities. There are many areas experiencing rapid redevelopment and subdivision where existing water mains and facilities are undersized for such redevelopment and subdivision. Redevelopment in the vicinity of the 185th Street Station (NE 185th Street and 5th Ave NE) will likely coincide with the phased zoning schedule to occur in 2015, 2021 and 2033. Such redevelopment will increase the population density in areas that have previously been single-family residential as they transition to become as densely developed as a mixed-use structure 70 feet in height. The area around the 145th Street Station (NE 147th Street and 5th Ave NE) also has phased zoning which is expected to occur in 2016 and 2033. District policy mandates that growth pay for growth, just not exclusively. In all instances, new development will be required to meet current design flow criteria in accordance with District standards. Where an upgrade is required for new development or connection to the District's system in order to meet current District criteria, the work shall be done at the developer's or owner's expense.

The major commercial corridors of the District within the City of Shoreline are: 1) along 15th Avenue NE between NE 165th Street and NE 185th Street and 2) along Ballinger Way NE between 23rd Avenue NE and 14th Avenue NE. Aside from these and other small neighborhood commercial zones, and the light rail station areas, the City of Shoreline is predominantly residential with low residential land use density (R-4 or R-6 which is four or six residential units per acre).

Land use within the District's water service area in the City of Lake Forest Park is predominantly single-family residential with infill occurring at the larger lots throughout

the City. A future parking garage is currently being discussed by Sound Transit, to be located within the town center property. Rezoning of the areas adjacent to the parking garage could impact the District's water services in that area but it is unknown at this time how high of density the City will allow.

Figure 2-2 illustrates the current land use for the Cities of Shoreline and Lake Forest Park within the District's service area. Table 2-1 provides a summary of the acreage associated with each primary land use classification within the District and in doing so, provides an overview of the general characteristics of the service area.

TABLE 2-1
SUMMARY OF ACREAGE BY LAND USE CLASSIFICATION

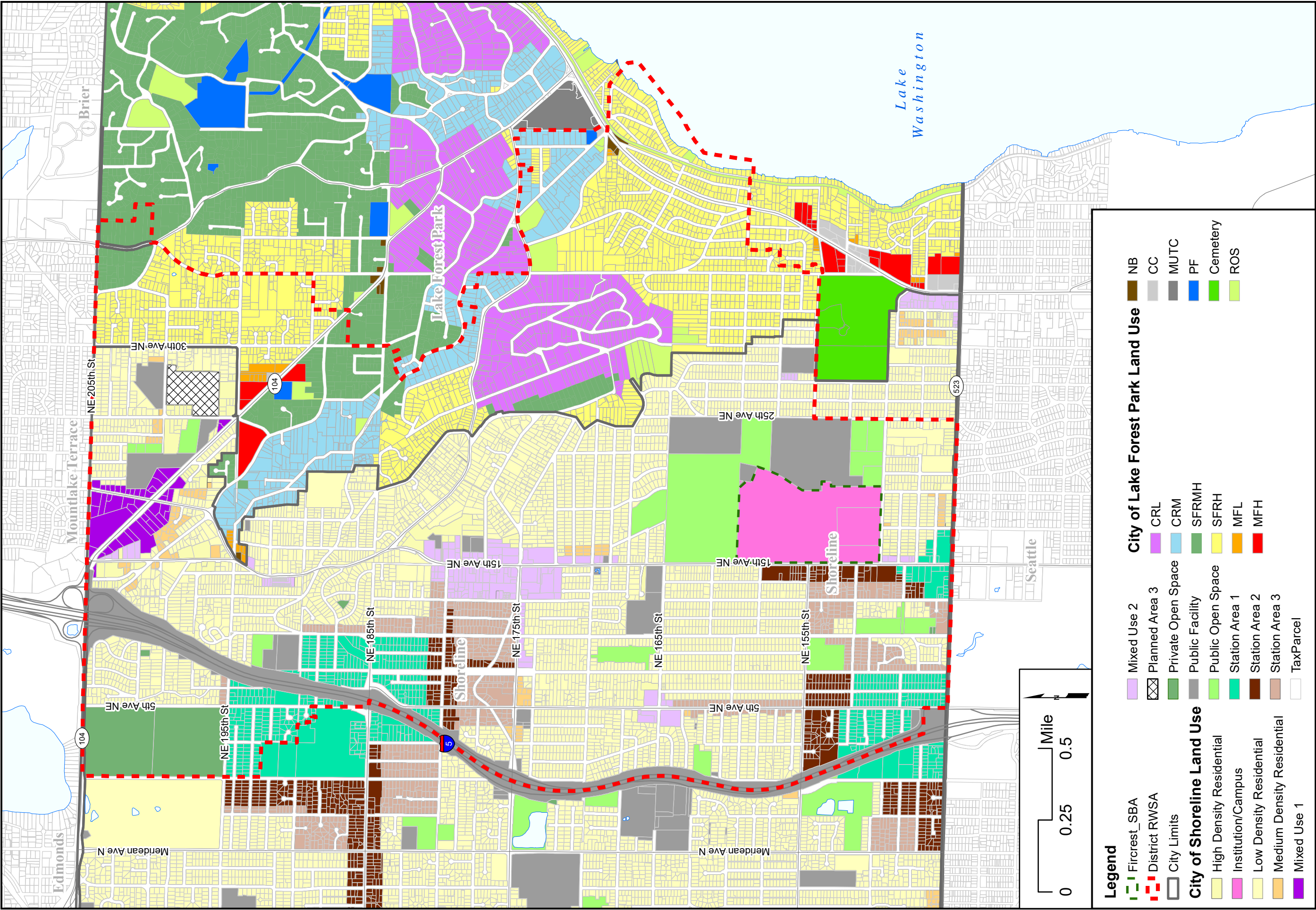
CITY OF SHORELINE			CITY OF LAKE FOREST PARK		
LAND USE CLASSIFICATION	ACRES	% of SERVICE AREA	LAND USE CLASSIFICATION	ACRES	% of SERVICE AREA
Low Density Residential	933	33.8	Conservation Residential, Low (CRL)	121	4.38%
Medium Density Residential	23.7	0.86	Conservation Residential, Moderate (CRM)	132	4.76%
High Density Residential	56.9	2.06	Single Family Residential, Mod/High (SFRMH)	95.3	3.45%
Mixed Use	102	3.70	Single Family Residential, High (SFRH)	405	14.7%
Public Facilities	223	8.07	Multi Family Low (MFL)	6.85	0.25%
Institution/Campus	88.0	3.19	Multi Family High (MFH)	12.8	0.46%
Planned Area 3	16.2	0.58	Corridor Commercial (CC)	1.12	0.04%
Open Space	213	7.69	Neighborhood Business (NB)	1.54	0.06%
Station Area 1	129	4.67	Public Facility (PF)	3.47	0.13%
Station Area 2	60.4	2.18	Recreation/Open Spaces (ROS)	33.7	1.22%
Station Area 3	105	3.80			
Total Acres (Shoreline)	1,950	71%	Total Acres (Lake Forest Park)	812	29%

Notes:

Acreage shown is for parceled lots only and does not include right-of-way, bodies of water, etc.

Percent of Service Area is the percentage of land area within a land use classification compared to total parcels served by the District.

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2.6 POPULATION AND EMPLOYMENT

Table 2-2 tabulates the historical and projected population and employment throughout the District's water service area. Current population and employment data were obtained from the Puget Sound Regional Council (PSRC) at Forecast Analysis Zone (FAZ) to Census Tracts (CT) to Block Groups (BG) level of detail and were ultimately assembled as the basis for development of projections by water system pressure zone. The Land Use Vision projections were prepared via a regional method by PSRC with local input. The growth targets were selected for the cities prior to 2015 and therefore, do not include the increased population expected once the light rail stations are completed.

Land use was utilized in estimating population and employment increases and especially in determining the future distribution of population and businesses. By estimating areas likely to be redeveloped, projected infill or areas targeted for future business and/or commercial, it was possible to project the distribution of water demands within the system for analysis of the system under existing and future conditions.

PSRC forecast data was provided for population, households, and employment. From that forecast the average household density was calculated and found to be anticipated to decline from 2.40 in 2017 to 2.24 in 2039. From the PSRC base, District records were used to allocate the current population to single family and multi-family housing. The projection used for this WSP utilizes an adjusted rate of growth of households through year 2024 (the "adjusted" projection), then an increased growth rate to "catch-up" to the PSRC households and population forecast for the service area in 2030. The forecast holds the single-family growth to a constant increase of eight households per year, which generates a single-family population that decreases over time, due to the limited household growth rate and the forecast decline of household density. Multi-family population is projected to experience limited growth through 2023 before an increase in growth concurrent with construction of the light rail stations. The result is slow growth in the near-term then prorated growth to bring the population projection into line with the PSRC forecast by the year 2030 (see Figure 2-3).

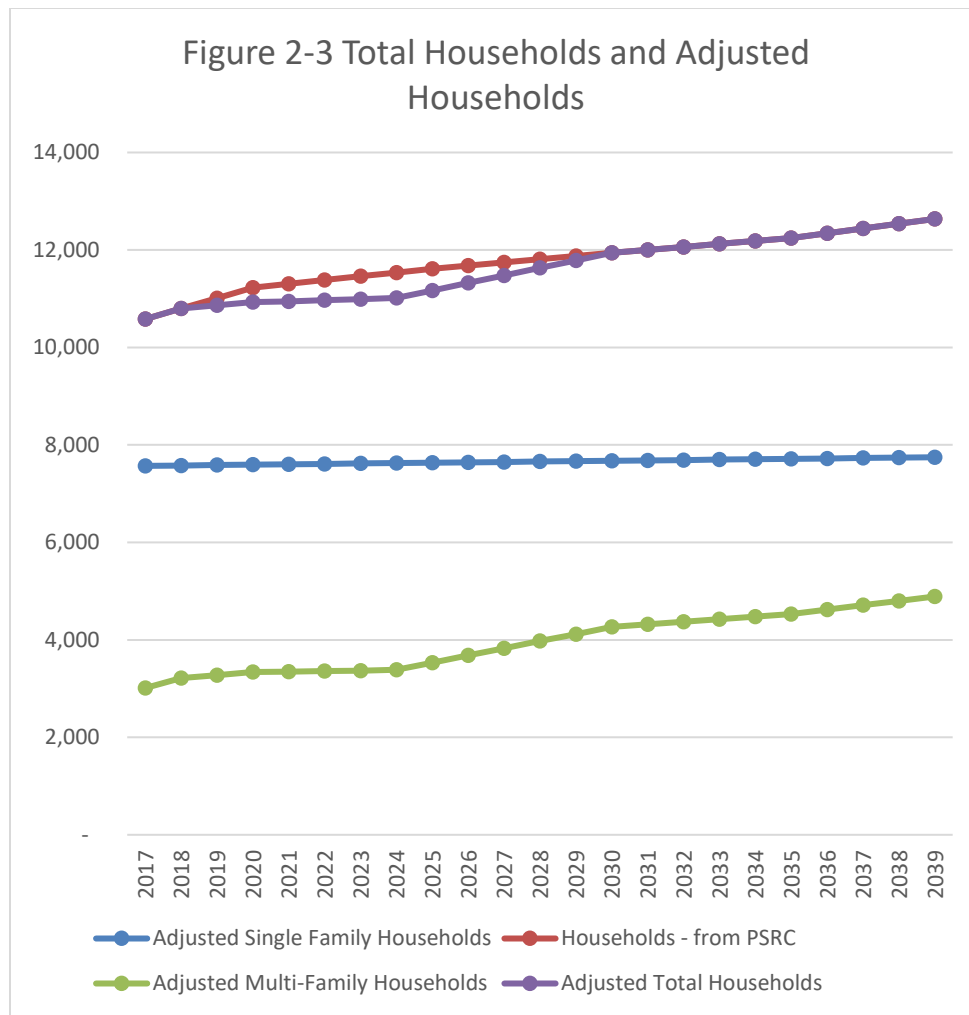


Table 2-2 shows employment and population forecasts based on 2015 PSRC data. As of the end of 2018 the District served an estimated population of approximately 25,512 and, as shown in the table, is forecast to serve a projected population of approximately 26,714 by 2029 and approximately 28,323 by the end of the planning period in the year 2039. The District recognizes these population projections do not include impacts from redevelopment associated with completion of the light rail stations, given the populations have increased less than 1,000 people since 2000. The existing and proposed populations are shown for each of the areas that are fed by the 2.0 MG Reservoir (portion of Pressure Zone 432) or 3.7 MG Reservoir (current Pressure Zones 237, 307, portion of 432, 400, 502, 590 and 615). The pressure zone boundaries have changed since the 2013 WSP and are anticipated to change one additional time within this planning period (see Sections 3 and 5). The District plans to adjust the 502 Zone to become the 520 Zone and raise the hydraulic gradient in a portion of the 432 zone so that area is part of the 520

Zone. Several projects are necessary to fully complete these pressure zone adjustments. See Section 6 for the project descriptions and anticipated schedule.

Employment within the District's water service area, as of the end of 2018, totaled approximately 6,365 and is forecast to increase to approximately 7,299 in 2029 and 8,947 by the year 2039. This forecast employment projection is based on the PSRC Employment forecast and indicates an increase of approximately 41 percent. Future employment growth is expected to occur mainly within the 15th Avenue NE commercial corridor, and the Ballinger Way NE commercial area. Note that the employment estimates and projections include the area within the Fircrest Water System, an independent water system and customer of the District.

TABLE 2-2 ¹							
POPULATION AND EMPLOYMENT BY RESERVOIR SERVICE AREA							
zone		2020	2021	2022	2023	2024	2025
2.0 MG	Population	6,419	6,414	6,415	6,410	6,411	6,487
	Employment	1,144	1,161	1,178	1,196	1,214	1,232
3.7 MG	Population	18,647	18,632	18,635	18,620	18,624	18,844
	Employment	5,349	5,428	5,509	5,590	5,673	5,757
TOTAL	Population	25,066	25,046	25,050	25,030	25,035	25,331
	Employment	6,493	6,589	6,687	6,786	6,887	6,989
		2026	2027	2028	2029	2034	2039
2.0 MG	Population	2,990	3,050	3,115	3,174	3,316	3,463
	Employment	1,041	1,053	1,064	1,076	1,183	1,319
3.7 MG	Population	22,698	22,971	23,265	23,540	24,189	24,859
	Employment	6,024	6,089	6,156	6,223	6,842	7,629
TOTAL	Population	25,688	26,020	26,380	26,714	27,506	28,323
	Employment	7,065	7,142	7,220	7,299	8,025	8,947

2.7 HISTORICAL WATER DEMANDS

An analysis of historical water system demands is imperative to the planning and engineering analyses performed in development of this document and is crucial to all financial aspects of operating a water utility. Recordkeeping of water purchases and sales are required by state law and are tracked through direct billing records from the water source wholesaler (Seattle Public Utilities).

This demand analysis first provides a simple comparison of water purchases and sales for the past six years (2013 through 2018). Non-revenue data has been reviewed to determine the general condition of the water system and for compliance with Municipal Water Law.

¹ Population forecast does not reflect local impacts of construction of Sound Transit light rail station or support facilities in the service area, resulting in 82 single family homes removed in 2019, but that impact is reflected in the ERU and Demand forecast discussed later in the section. It is anticipated that some of those customers relocated elsewhere in the District or will return in equivalent or greater numbers with the growth associated with future development around the light rail stations.

TABLE 2-3
HISTORIC WATER USAGE BY YEAR

Year	2011	2012	2013	2014	2015	2016	2017	2018	Last 3-years' Average
Water Purchases (MG)	486	501	610	634	621	603	596	571	590
Authorized Consumption (MG)	551	547	561	577	561	568	568	555	563
Non-Revenue Water (MG)	-64.36	-46.2	49.0	57.4	60.5	35.6	28.1	16.3	26.6
Percent Non-Revenue Water	-13.2%	-9.23%	8.03%	9.04%	9.73%	5.90%	4.71%	2.84%	4.48%

Water sales reported by the District include sales by customer class, which include single-family and multi-family residential and non-residential water customers.

The highest annual water purchase in recent years was in 2014: 634.74 MG. Annual purchased volumes have decreased since then. Non-revenue water (also referred to as unaccounted-for water) is the difference between water purchases and authorized consumption. Some of this water is unmetered but authorized consumption (such as main flushing, tank cleaning and firefighting). In the case of the District, non-revenue water equates to the difference between water purchased from the City of Seattle and water sold to the District's customers. Water sales may also include water supplied through interties to neighboring purveyors. Water use in 2011 and 2012 was more than purchased due to faulty meters. As indicated in Table 2-3, non-revenue water in the District's system has averaged 6.7 percent over the past six years, dropping to under 4.5% for the last three years. Industry standards indicate that water loss of less than 10% is considered acceptable. This loss factor is referred to as distribution system leakage (DSL) by DOH and in the demand forecast discussion below.

2.8 SYSTEM DEMAND PROJECTIONS

Water system demands are the basis for the water system analysis of this WSP. The water system demands include current and projected-year water-use rates per customer class

and include three types of residential demands: Average Day Demand, Maximum Day Demand, and Peak Hour Demand.

Average Day Demand (ADD) is the total amount of water delivered to the system in a year divided by the number of days in the year. ADD can also be expressed as the average day demand for one equivalent residential unit, as discussed further below. ADD is typically the most useful data for water system planning and is used for reviewing water use trends, effectiveness of conservation programs and forecasting future water system demands. ADD is used for more specific types of system analyses including standby storage requirements. The ADD for this WSP was derived from District supply records and SPU wholesale billing data.

Maximum Day Demand (MDD) represents the highest use over a 24-hour period in a given year. It is typically the hottest summer day when recreational water use coupled with lawn and garden watering are at a peak. MDD is used for source of supply analyses as well as design flow analyses. In the case of design flow analyses, the MDD is added to the minimum required fire flow demand; together, the MDD and fire flow demand constitute the minimum required system design flow. Many facility design analyses are accomplished using MDD conditions. All new water systems or extensions must be designed to meet MDD with fire flow demand at a pressure of 20 psi or greater (there are a few exceptions allowed under DOH regulations).

Peak Hour Demand (PHD) represents the highest use within the water system, excluding fire flow, for a one-hour time period. PHD is one of the criteria used to evaluate equalizing storage. PHD can be determined either from actual system data or by calculation using a DOH prescribed formula. All new water systems or extensions must be designed to provide PHD while maintaining a pressure of 30 psi within the system and therefore at the **customer's point of connection** (there are a few exceptions allowed under DOH regulation).

Equivalent Residential Unit (ERU) is the unit used for measuring connections on the basis of the amount of water consumed by a typical full-time single-family residence over a one-year period. An ERU is used for converting uses other than single-family into an equivalent number for the purpose of demand forecasting, system analysis and facility sizing.

Water demand projections with and without additional savings from water conservation efforts are presented in Tables 2-4 and 2-5. These were determined through analyses of historical water-use data available from the District, current and projected land-use trends, and current and projected population and employment data from the PSRC, adjusted as described above. Water demand projections by reservoir service area were developed using the most current and detailed population and employment data

available. This level of detail extends into the water system modeling described in later sections of the WSP and allows for accurate allocation of demands within the District's hydraulic model.

The demand forecast was developed using the following methodology:

- Obtain population, housing unit and employment growth forecasts for service area. Determine current and future population per housing unit. The growth rates of each of these measures were determined from the PSRC data without respect to municipal boundaries
- Evaluate and adjust housing unit growth trends based on anticipated low residential growth and anticipated phased zoning changes associated with light rail stations. The District growth rate adjustments were focused on customer type without respect to municipal boundaries
- Determine revised population growth trend based on adjusted housing unit growth
- Determine ADD per ERU, ratio of MDD to ADD and DSL allowance based on historical use records
- Water use has been relatively constant in recent years. The ADD for single family residential customers was 137 gallons per day (gpd) in 2018. A forecast value of 145 gpd was selected for this WSP. The District estimates that MDD has been as much as two times ADD. Therefore, an MDD/ADD factor of 2.0 was selected for this WSP. A DSL factor of six percent was selected for this WSP
- Determine ERUs for all non-residential customers based on ADD/ERU. Forecast increase in ERUs through the planning period, by customer type and by reservoir zone group. The forecast growth rate for commercial ERUs was calculated from the PSRC employment projections, while the non-commercial non-residential ERUs, were chosen to show little expected growth in those customer classes
- Develop 20-year water demand forecast based on ERUs by year, ADD/ERU, MDD/ADD and DSL. The MDD/ADD factor is applied to the total ADD for all customers, not including DSL, then DSL is added to determine MDD. Use DOH equation for calculation of PHD based on these factors

Two demand forecasts have developed. The first assumes no future impacts from ongoing or future water use efficiency programs. The second is based on anticipated future impacts from water use efficiency programs. Future impacts are anticipated to result in a reduction in ADD/ERU from 145 gpd to 140 gpd. By comparing the two forecasts the savings per year can be estimated. For example, in the tenth year of the

forecast there is a projected annual savings of approximately 23 million gallons in that year alone. By 2039 the annual savings is forecasted to be approximately 25 million gallons.

NORTH CITY WATER DISTRICT

TABLE 2-4
NORTH CITY WATER DISTRICT
HISTORICAL AND PROJECTED WATER DEMANDS BY RESERVOIR
WITHOUT CONSERVATION

	2017	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2034	2039
2.0 MG Reservoir (432)													
Residential ERUs	575	576	576	578	578	579	595	612	628	645	661	701	744
Non-Residential ERUs	13	13	13	13	13	13	14	14	14	14	14	14	15
Total ERUs	588	589	590	591	591	593	609	626	642	659	675	715	758
Annual Demand (MG)	32	33	33	33	33	33	34	35	36	37	38	40	43
ADD (MGD)	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.11	0.12
MDD (MGD)	0.17	0.18	0.18	0.18	0.18	0.18	0.18	0.19	0.19	0.20	0.20	0.21	0.23
PHD (gpm)	246	253	253	254	254	254	259	265	270	276	281	294	308
3.7 MG Reservoir (Zones 615, 590, 515, 502, 432, 400, 307, 237)													
Residential ERUs	9,124	9,138	9,146	9,159	9,167	9,180	9,262	9,351	9,434	9,523	9,606	9,829	10,070
Non-Residential ERUs	1032	1041	1053	1093	1133	1174	1189	1200	1210	1221	1233	1333	1459
Fircrest	394	394	394	395	395	395	395	395	396	396	396	397	398
Total ERUs	10,551	10,573	10,593	10,646	10,695	10,749	10,846	10,946	11,040	11,140	11,234	11,559	11,927
Annual Demand (MG)	589	593	594	597	600	603	608	614	619	625	630	648	669
ADD (MGD)	1.61	1.63	1.63	1.64	1.64	1.65	1.67	1.68	1.70	1.71	1.73	1.78	1.83
MDD (MGD)	3.14	3.16	3.16	3.18	3.19	3.21	3.24	3.27	3.30	3.33	3.36	3.45	3.56
PHD (gpm)	3,448	3,470	3,477	3,494	3,509	3,527	3,558	3,590	3,621	3,653	3,683	3,788	3,906
TOTAL													
Residential ERUs	9,699	9,714	9,722	9,737	9,745	9,759	9,858	9,963	10,062	10,168	10,267	10,530	10,813
Non-Residential ERUs	1,046	1,054	1,066	1,106	1,147	1,188	1,202	1,213	1,224	1,235	1,246	1,347	1,474
Fircrest	394	394	394	395	395	395	395	395	396	396	396	397	398
Total ERUs	11,139	11,162	11,183	11,238	11,286	11,342	11,455	11,572	11,681	11,799	11,909	12,274	12,685
Annual Demand (MG)	621	626	627	630	633	636	643	649	655	662	668	689	712
ADD (MGD)	1.70	1.72	1.72	1.73	1.73	1.74	1.76	1.78	1.80	1.81	1.83	1.89	1.95
MDD (MGD)	3.31	3.33	3.34	3.36	3.37	3.39	3.42	3.46	3.49	3.52	3.56	3.67	3.79
PHD (gpm)	3,694	3,723	3,730	3,748	3,763	3,781	3,818	3,855	3,891	3,929	3,964	4,081	4,214

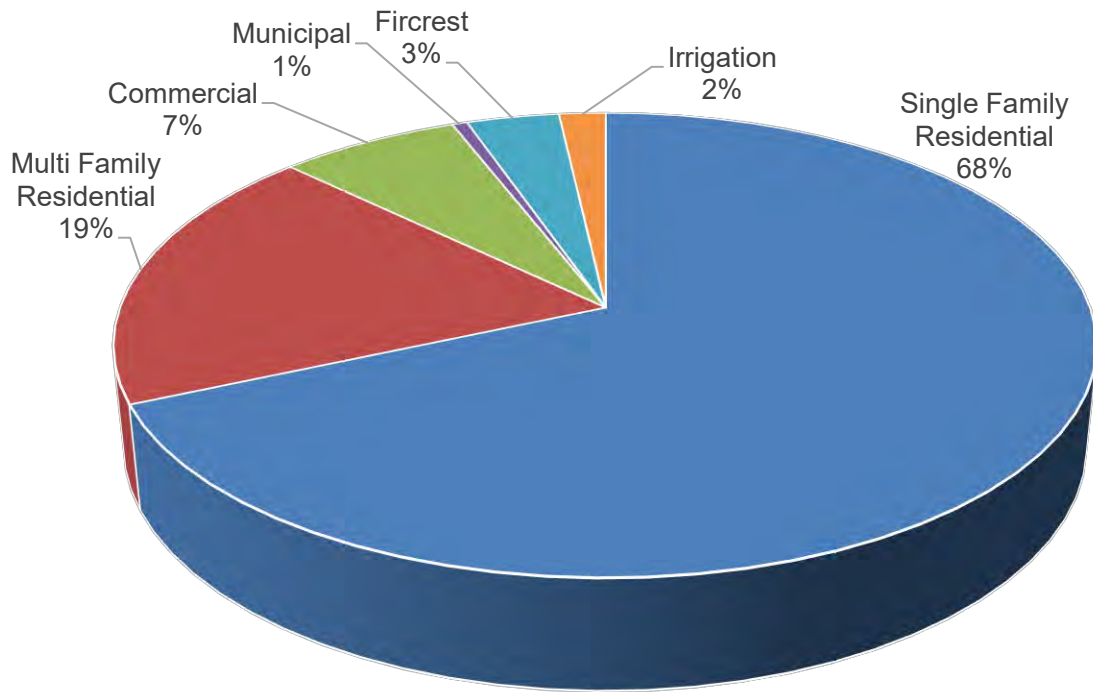
*Historical ERUs are based on customer data. However, projected Annual Demand (MG) is based on ADD/ERU of 145 gpd/ERU.

TABLE 2-5
NORTH CITY WATER DISTRICT
HISTORICAL AND PROJECTED WATER DEMANDS BY RESERVOIR
WITH CONSERVATION

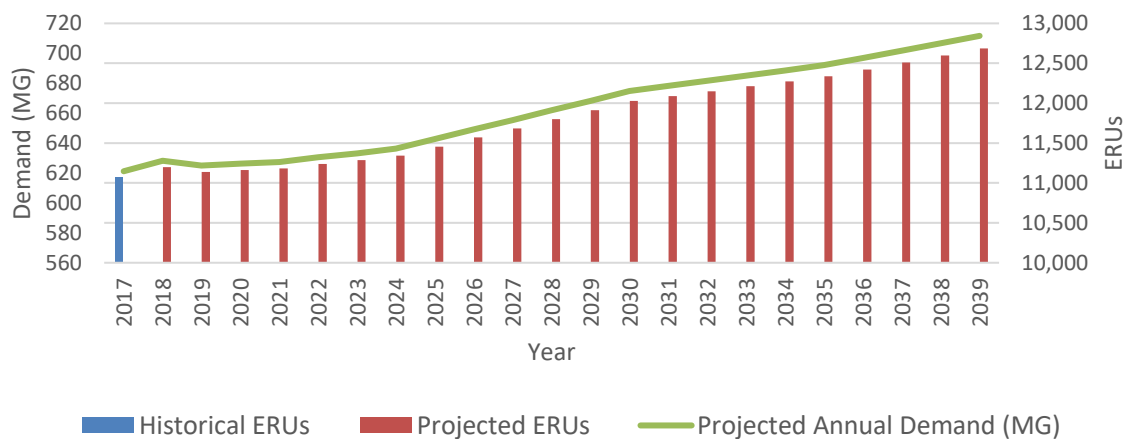
	2017	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2034	2039
2.0 MG Reservoir (432)													
Residential ERUs	575	576	576	578	578	579	595	612	628	645	661	701	744
Non-Residential ERUs	13	13	13	13	13	13	14	14	14	14	14	14	15
Total ERUs	588	589	590	591	591	593	609	626	642	659	675	715	758
Annual Demand (MG)	31	32	32	32	32	32	33	34	35	36	37	39	41
ADD (MGD)	0.08	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.11	0.11
MDD (MGD)	0.16	0.17	0.17	0.17	0.17	0.17	0.18	0.18	0.19	0.19	0.19	0.21	0.22
PHD (gpm)	238	245	245	246	246	246	251	256	261	267	272	284	298
3.7 MG Reservoir (Zones 615, 590, 515, 502, 432, 400, 307, 237)													
Residential ERUs	9,124	9,138	9,146	9,159	9,167	9,180	9,262	9,351	9,434	9,523	9,606	9,829	10,070
Non-Residential ERUs	1,032	1,041	1,053	1,093	1,133	1,174	1,189	1,200	1,210	1,221	1,233	1,333	1,459
Fircrest	394	394	394	395	395	395	395	395	396	396	396	397	398
Total ERUs	10,551	10,573	10,593	10,646	10,695	10,749	10,846	10,946	11,040	11,140	11,234	11,559	11,927
Annual Demand (MG)	569	573	574	577	579	582	587	593	598	603	609	626	646
ADD (MGD)	1.56	1.57	1.57	1.58	1.59	1.60	1.61	1.62	1.64	1.65	1.67	1.72	1.77
MDD (MGD)	3.03	3.05	3.06	3.07	3.08	3.10	3.13	3.16	3.18	3.21	3.24	3.33	3.44
PHD (gpm)	3,330	3,351	3,357	3,374	3,389	3,406	3,436	3,467	3,496	3,528	3,557	3,658	3,772
TOTAL													
Residential ERUs	9,699	9,714	9,722	9,737	9,745	9,759	9,858	9,963	10,062	10,168	10,267	10,530	10,813
Non-Residential ERUs	1,046	1,054	1,066	1,106	1,147	1,188	1,202	1,213	1,224	1,235	1,246	1,347	1,474
Fircrest	394	394	394	395	395	395	395	395	396	396	396	397	398
Total ERUs	11,139	11,162	11,183	11,238	11,286	11,342	11,455	11,572	11,681	11,799	11,909	12,274	12,685
Annual Demand (MG)	600	605	606	609	611	614	620	627	633	639	645	665	687
ADD (MGD)	1.64	1.66	1.66	1.67	1.67	1.68	1.70	1.72	1.73	1.75	1.77	1.82	1.88
MDD (MGD)	3.19	3.22	3.23	3.24	3.25	3.27	3.30	3.34	3.37	3.40	3.43	3.54	3.66
PHD (gpm)	3,568	3,596	3,603	3,620	3,635	3,652	3,687	3,724	3,758	3,794	3,829	3,942	4,070

*Historical ERUs are based on customer data. However, projected Annual Demand (MG) is based on a reduction of ADD/ERU from 145 to 140 gpd/ERU.

Figure 2-4 Water Usage by Customer Class 2018



**Figure 2-5:
ERUs and Consumption 2017-2039**



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SECTION THREE – EXISTING WATER SYSTEM

NORTH CITY WATER DISTRICT

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NORTH CITY WATER DISTRICT

**SECTION 3**
EXISTING WATER SYSTEM

This section provides an overview of the North City Water District (the District) existing water system, including sources of supply, storage, transmission and distribution system. Primary system components are described according to the pressure zones that they serve. This provides the basis for system analysis by pressure zone presented in Section 5. Figure 3-1 illustrates how the system operates in hydraulic profile format. A system map is presented in Figure 3-2.

The District is a consecutive water system, which means that it has no water production facilities but purchases all water from an adjacent water system. In the case of the District, all water is purchased from Seattle Public Utilities (SPU) and the District currently maintains seven connections to the SPU system. Five sources of supply from the SPU Tolt Pipeline by gravity include two open system booster stations that pump water to the District's 590 Zone and 3.7 MG Reservoir, two supply stations that convey water to the District's 502 Zone, 432 Zone and 2.0 MG Reservoir, and one supply station that conveys water to the District's 432 Zone and 2.0 MG Reservoir. The other two connections are from SPU's Cedar River system to the District's 590 Zone.

The supply stations can provide water to lower zones through use of appropriate valving. The supply from SPU is delivered via gravity from the Tolt Pipelines or "pumped" from the Cedar supply to the District's 590 Zone. These connections receive water from the Northwest Sub-Regional System which includes pipelines, pump stations and reservoirs. The SPU System provides supply to the District at its seven connections at contractual minimum hydraulic gradients, which are based on SPU-calculated demands of the District. The minimum hydraulic gradients for the Tolt supply stations range between 505 feet and 525 feet and the minimum gradient for the Cedar stations is 565 feet. A 60-year "Full Requirements Contract" with SPU was entered into in 2001 and was revised in 2005. The contract is anticipated to be updated in 2020 or 2021. The contract includes specific requirements which are discussed in greater detail in subsequent sections of the Water System Plan (WSP). A wheeling agreement was signed in 2012 for the two "pumped" SPU connections, one of which is for emergency only. The assets identified in the wheeling agreement are not part of the Regional Transmission System but part of the Northwest Sub-Regional Transmission System. The District joined Olympic View Water and Sewer District and SPU in a three- party agreement to address water delivered to the two districts from additional SPU assets. Included in the Northwest Sub-Regional Wheeling Agreement is a provision for a review of the agreement every five years to address changes that may have occurred in the SPU transmission system. The most recent Amended Wheeling

Agreement was completed in 2016. The agreement and rates were reviewed in August 2018 for the 2019-2023 period.

From the seven sources of supply, water is distributed throughout the service area to all seven pressure zones through the use of 13 pressure reducing stations (PRS), a closed system booster pump station, two above-ground storage reservoirs and a network of transmission and distribution water mains. In addition to the five primary supply source connections, the District also has two emergency intertie connections with SPU and two emergency intertie connections with the City of Mountlake Terrace. The City connections provide gravity-fed reduced-pressure emergency supply from the City of Mountlake Terrace's 530 Zone. Emergency supply from the District to the City of Mountlake Terrace requires a mobile pumping unit.

3.1 WATER SUPPLY

Beginning in 1964, water from the Tolt River Source is conveyed through the District in a 66-inch diameter transmission main from east to west along NE 195th Street, from 35th Avenue NE to approximately 18th Avenue NE, continuing southwest to approximately NE 185th Street and 8th Avenue NE. From NE 185th Street and 8th Avenue NE, the main is reduced to 60-inches in diameter and extends south along 8th Avenue NE.

Within the District's service area, five metered connections exist between the District and the SPU transmission mains. Supply Stations (SS) 1, 2 and 3 do not require pumping; rather, they rely on sufficient hydraulic head within the SPU supply transmission main to deliver water to the 502 Zone (SS-1 and SS-3), 432 Zone (SS-2) and lower zones through appropriate valving. Booster Pump Stations 1 and 2 pump water directly from the Tolt Pipelines to the 590 Zone and 3.7 MG Reservoir.

Water from the Northwest Sub-Regional System can come from either the Cedar River or the Tolt River and is conveyed to the District through Sub-Regional pipelines (located both within and outside the District boundaries), as well as two SPU pump stations (one within the District boundaries and one outside the District boundaries) and two storage tanks (both outside the District boundaries). Both the meter connections, SS-4 and the SPU emergency intertie, require pumping to deliver water to the 590 Zone. A list of the specific components of the sub-regional system are included in both the wheeling agreement and the amendment in Appendix D.

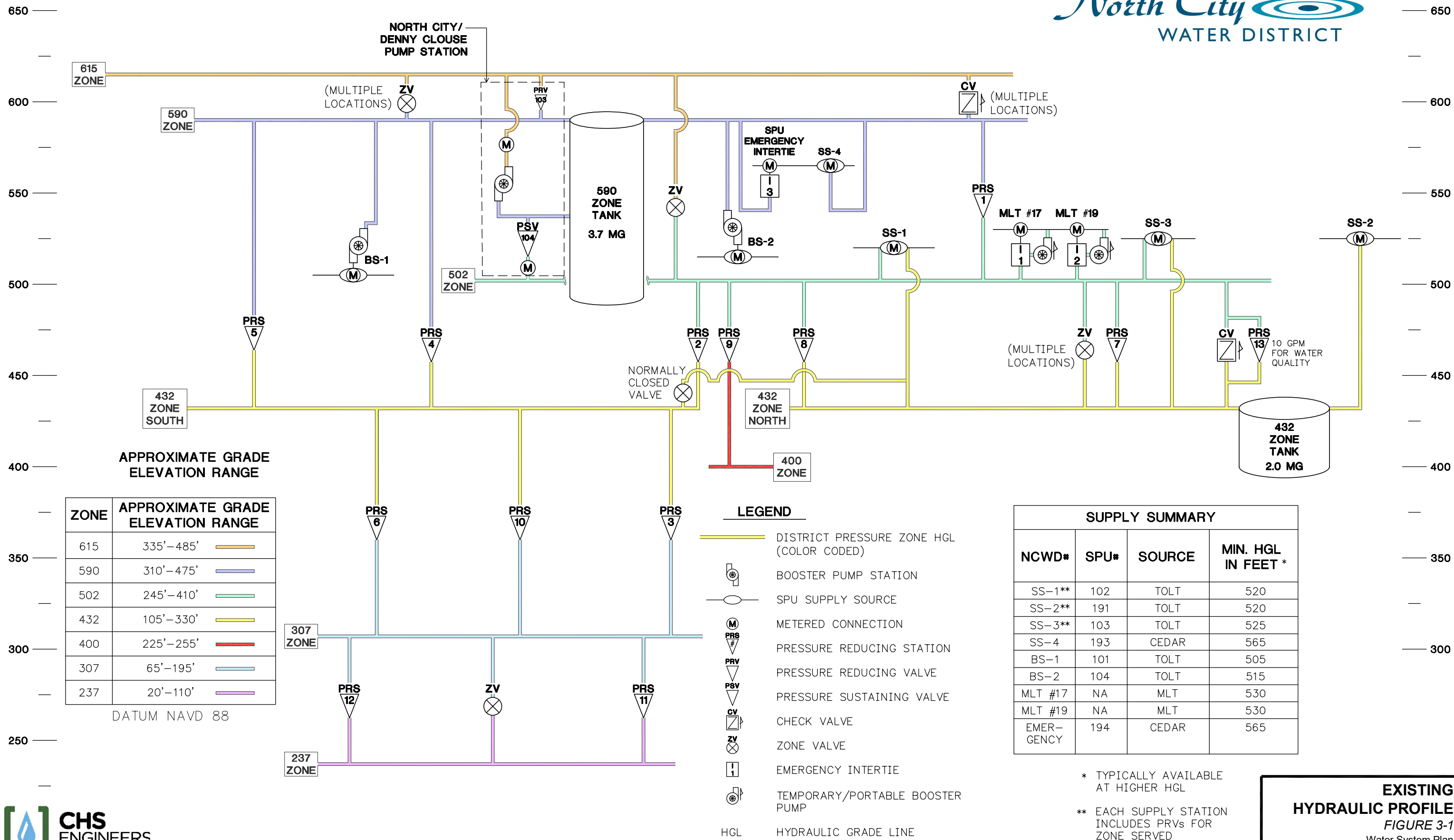
Completion of the 2012 Wheeling Agreement supported an increase of the maximum supply rate under minimum supply hydraulic gradient of 500 gpm. The new maximum supply rate is 3,330 gpm and is identified in an updated Exhibit II of the SPU agreement (Appendix D). Each of the seven connections to the SPU System is discussed in the following facilities description.

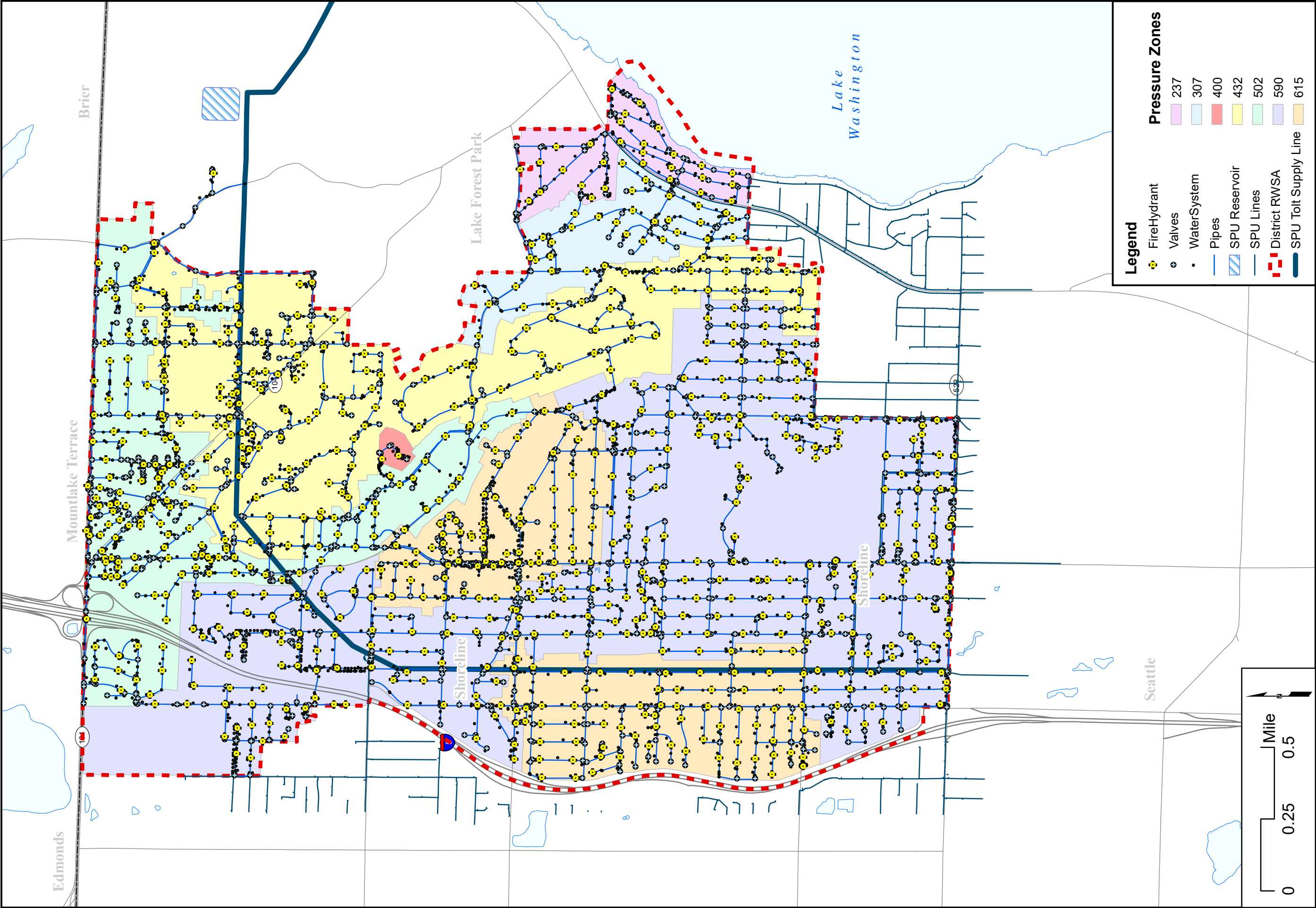
In 1974, the District filed a water right claim with the State Department of Ecology (DOE). The claim is for a portion of the City of Seattle's (now managed by SPU) right in the Cedar River and South Fork of the Tolt River. The filing of the claim is documented by District Resolution No. 573. The claim is for a rate of 12 cubic feet per second (5,386 gpm) and an annual quantity of 3,000 acre-feet per year (2.68 million gallons per day). The resolution and claim are included in Appendix C.

The water rights assessment table is included in Appendix C.

As a regional discussion with other water purveyors, SPU completed an Economic Analysis of the North Seattle Reclaimed Water in 2010. The overall conclusion to the study was that it would not be a sound investment for the region due to the high costs, a low level of benefits and the availability of much lower-cost alternatives for achieving comparable benefits. While the District did not do an independent analysis, it is not financially in the District's best interest to seek out and develop reclaimed water potential opportunities independent of the wholesale or regional systems.

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3.1.1 SPU Tolt Supply Station 1

Supply Station 1 (District SS-1 and SPU Station 102) conveys SPU Tolt River Supply water directly into the 502 and 432 Zones. Under normal conditions, the head in the SPU Tolt Pipelines does not exceed SPU's Lake Forest Park Reservoir overflow, which is 560 feet (NAVD88). The rated capacity of SS-1 is approximately 1,800 gpm.

SS-1 was constructed in 1965 within two below-grade concrete vaults. SS-1 was rehabilitated in 1976 and included the addition of telemetry and control modifications. More recent upgrades have included a new vault, telemetry control of supply to the 432 Zone; the upgrades allow individual control of supply into the 432 and 502 Zones.

3.1.2 SPU Tolt Supply Station 2

In 2010, the District finished construction of its current Supply Station 2 (District SS-2 and SPU Station 191). A 12-inch main connects the SPU Tolt Pipelines to SS-2.

SS-2 is contained within a below grade vault. The pressure reducing valves (PRVs) are capable of operation based on level control, flow control or pressure control. Under normal operation, flows are conveyed through SS-2 to the 2.0 MG Reservoir. The rated capacity of SS-2 is approximately 2,700 gpm.

SS-2 provides lead supply to the 2.0 MG Reservoir and 432, 307 and 237 Zones. SS-2 operates in a level mode during normal demand periods, in a flow control mode during high demand conditions and in a pressure mode when the 2.0 MG Reservoir is isolated. Supply to the 432 Zone is controlled by telemetry in the 2.0 MG Reservoir and relies on a set minimum operating water level to open the PRV at which time it will remain open until the 2.0 MG Reservoir is filled. The contractual limit is the maximum amount (3,330 gpm) that can be taken in any configuration regardless of how many supply stations and booster stations are in operation.

3.1.3 SPU Tolt Supply Station 3

In 1953, Supply Station 3 (District SS-3 and SPU Station 103) was first constructed to convey SPU Tolt Pipelines water directly into the 502 and 432 Zones. The rated capacity of SS-3 is approximately 1,500 gpm. Improvements were made to the station in 1992 which included the addition of telemetry and control modifications.

SS-3 operates similar to SS-1: pressure mode during normal demand periods and flow control mode during high demand conditions. In pressure mode, the combined flow control/pressure reducing valve maintains the pressure of supply to the 502 Zone. In flow control mode, the combined flow control/pressure reducing valve maintains the combined flow rate to the 502 and 432 Zones. The connection to the 502 Zone was completed in late 2006 and relies upon a set pressure to maintain the hydraulic grade

line within the 502 Zone. SS-3 provides lag supply to the 502 Zone. The 432 Zone PRV in SS-3 is telemetry-controlled and normally set to the pressure mode.

3.1.4 SPU Cedar Supply Station 4

Supply Station 4 (SS-4 and SPU Station 193) was added to the system in 2011 and conveys “pumped” SPU Cedar River Supply water into the 590 Zone. Under normal conditions, the hydraulic grade line in the SPU 30-inch transmission main at the intersection of NE 185th Street and 5th Ave NE is 585 feet, which is higher than the hydraulic gradient coming from the Tolt Pipelines. The rated capacity of SS-4 is approximately 3,500 gpm. Should the District lose the Tolt Pipelines water supply, SS-4 can supply flow to the entire District system until supply from the Tolt Pipelines water is reestablished.

SS-4 was connected to the Sub-regional System through piping in an existing SPU vault. A new below grade vault and piping was constructed within the right-of-way north of NE 185th Street and east of 5th Ave NE. The new station includes a continuous chlorine monitor and telemetry.

SS-4 operation varies depending on the level of the water in the 3.7 MG Reservoir. The connection to the westernmost part of the system relies upon a set pressure to maintain the hydraulic grade line within the 590 zone. SS-4 provides supply to this part of the system when the tank level drops.

3.1.5 SPU Tolt Booster Station 1

Booster Station 1 (BS-1 and SPU Station 101) is considered an open system booster pump station as it transfers water to a higher-pressure zone where the water surface is open to the atmosphere. It was originally constructed in 1963 then upgraded in 1992. It is located in a cast-in-place concrete vault that is entirely below grade and within the right of way in NE 160th Street at 8th Ave NE.

BS-1 operates in flow control or pressure mode and supplies the 590 Zone and 3.7 MG Reservoir. Under normal operating conditions BS-1 operates in pressure mode; only under high demand conditions does the station operate under flow control mode. Under adequate supply head conditions from SPU, the station may forego pumping and convey supply water directly to the 590 Zone, which the District has reported is common throughout much of each year. In the case of a loss of power to BS-1 and Booster Station-2 (BS-2), the SPU hydraulic gradient, through SS-4, is capable of maintaining a minimum water level in the 3.7 MG Reservoir at 70 feet.

BS-1 pumps SPU water from the Tolt Pipelines directly to the 590 Zone and 3.7 MG Reservoir, which is then used to convey water to other zones through the use of PRVs and the North City/Denny Clouse Pump Station (NC/DC PS). The capacity of pumps 1 and 2 in BS-1 were measured at 2,000 gpm each in a flow test on May 13, 2009. The rating curve

for each pump was 2,450 gpm. Therefore, BS-1 has a capacity of approximately 2,000 gpm through the use of one of two pumps, which operate alternately to ensure that if one pump becomes disabled, supply is uninterrupted.

The pumps in BS-1 operate automatically in response to varying water level within the 3.7 MG Reservoir. The pumps turn on at a set minimum operating water level in the reservoir and remain on until the reservoir is filled. The backpressure sustaining valve protects the pumps from damage. BS-1 and BS-2 are rotated to provide lead and lag supply to the 590 Zone. Both pump stations are called to run when the elevation in the reservoir drops to 65 feet, depending on which station is lead and which is lag. This rotation provides equal wear on the two facilities and ensures that both booster stations are not operating simultaneously unless high system demand warrants operation of both booster stations.

3.1.6 SPU Tolt Booster Station 2

Like BS-1, Booster Station 2 (BS-2 and SPU Station 104) is considered an open system booster pump station. It was originally constructed in 1963 and was rehabilitated in 1992. It is located in a cast-in-place concrete vault that is entirely below grade and within the right of way in NE 185th Street west of 9th Ave NE.

BS-2 operates in flow control or pressure mode as required, similar to BS-1, and supplies the 590 Zone and 3.7 MG Reservoir. SPU is contracted to supply BS-2 at a minimum head of 515 feet, although under normal conditions, supply head from SPU fluctuates between 550 feet and 560 feet. Under adequate supply head conditions from SPU, the BS-2 may forego pumping and convey supply water directly to the 590 Zone, which the District has reported is common throughout much of each year. As stated earlier, in the case of a loss of power to BS-1 and BS-2, the SPU hydraulic gradient, through SS-4, is capable of maintaining a minimum water level in the 3.7 MG Reservoir of 70 feet.

BS-2 pumps SPU water directly to the 590 Zone from the Tolt Pipelines, which is then used to convey water to other zones through the use of PRSs and the NC/DC PS. Pumps 1 and 2 in BS-2 were measured at 2,300 gpm each in a flow test on May 13, 2009. These values matched those on the rating curve for each pump. Therefore, BS-2 has a capacity of approximately 2,300 gpm through the use of one of two pumps which operate alternately to ensure that if one pump becomes disabled, supply is uninterrupted.

The pumps in BS-2 are telemetry-controlled by operating water levels within the 3.7 MG Reservoir. The pumps turn on at a set minimum operating water level in the reservoir and remain on until the reservoir is filled. The backpressure sustaining valve ensures that the pumps do not cavitate. Operation of BS-1 and BS-2 is rotated to provide lead and lag supply to the 590 Zone. Both pump stations are called to run when the elevation in the reservoir drops to 65 feet, depending on which station is lead and which is lag. This rotation provides equal wear on the two facilities and ensures that both booster stations

are not operating simultaneously unless high system demand warrants operation of both booster stations.

3.2 EMERGENCY INTERTIES

The District owns, operates and maintains two 10-inch diameter emergency interties to the City of Mountlake Terrace on NE 205th Street between Ballinger Way and 19th Ave NE and one 12-inch diameter emergency intertie with SPU (SPU Sta 194) located on NE 185th Street east of 5th Avenue NE. These three interties shall be used only in the event of an emergency. The two Mountlake Terrace emergency interties allow bi-directional transfer of water between the City of Mountlake Terrace and the District during emergency situations where one of the two systems' water supplies may be low or overdrawn. The City of Mountlake Terrace purchases water from the Alderwood Water District, which purchases all water from the City of Everett. City of Everett water comes from the Sultan River water source and is treated at the Everett Water Filtration Plant and chlorinated by the Alderwood Water District. The City of Mountlake Terrace does not provide additional treatment.

Both Mountlake Terrace emergency interties connect the District's 502 Zone to the City of Mountlake Terrace's 530 Zone. Due to the difference in hydraulic grade line between the two systems, water may flow by gravity from the City of Mountlake Terrace 530 Zone to the District and must be pumped in order to transfer water from the District to the City of Mountlake Terrace. Pumping is achieved through a dual fire hydrant arrangement and a trailer-mounted portable pumping unit.

The SPU emergency intertie connects SPU's 590 Zone to the District's 590 Zone. The District added this connection to the regional system when King County was in the process of constructing the conveyance lines to the Brightwater Treatment Facility. The Brightwater Effluent Transmission Main is located directly under the Tolt Pipelines. Should this line ever fail, District customers could be without water for an extended period. Because the water from this connection is "pumped" from the SPU Northwest Sub-Regional System, the water from this connection can be used to supply the entire distribution system without additional pumping required.

3.2.1 MLT 19 - Emergency Intertie

Beginning from the Mountlake Terrace 530 Zone the facility includes a 10-inch inlet, sampling station, 10-inch electromagnetic bi-directional flow meter, 10-inch combination pressure reducing/backpressure sustaining valve and 10-inch outlet.

For water to be transferred from the City of Mountlake Terrace to the District, the combination valve reduces pressure from the City of Mountlake Terrace 530 Zone to the District's 502 Zone in a gravity-feed condition. A portable booster pump must be utilized

to transfer water from the District to the City of Mountlake Terrace's 530 Zone; in such an event the combination valve maintains pressure in the District's 502 Zone.

3.2.2 MLT 17 - Emergency Intertie

Beginning from the Mountlake Terrace 530 Zone the facility includes a 10-inch inlet, sampling station, 10-inch electromagnetic bi-directional flow meter, 10-inch combination pressure reducing/backpressure sustaining valve and 10-inch outlet.

For water to be transferred from the City of Mountlake Terrace to the District, the combination valve reduces pressure from the City of Mountlake Terrace 530 Zone to the District's 502 Zone in a gravity-feed condition. A portable booster pump must be utilized to transfer water from the District to the City of Mountlake Terrace's 530 Zone.

3.2.3 SPU - Emergency Intertie

The SPU emergency intertie (SPU Station 194) was constructed in 2010. The emergency intertie is connected to SPU's distribution system supplied by the Cedar River (Northwest Sub-Regional Source). Beginning from the connection to the SPU system, the facility includes an 8-inch inlet, an 8-inch turbine meter (owned by SPU) and an 8-inch outlet. The intertie can supply the District's 590 Zone in an emergency.

3.3 STORAGE FACILITIES

Two above-ground water storage facilities include the 3.7 MG and 2.0 MG Reservoirs. The 3.7 MG Reservoir is physically located in the north-central portion of the 615 Zone. The 2.0 MG reservoir is physically located east of the 432 Zone.

3.3.1 590 Zone 3.7 MG Reservoir

The 3.7 MG Reservoir provides storage for the following pressure zones: 615, 590, 502, south portion of 432, 400, 307 and 237. . The 615 Zone is a closed zone and receives water from the 590 Zone through the NC/DC PS, which is located adjacent to the 3.7 MG Reservoir.

The District leases a portion of the combined facility site to cellular telephone communication companies for a multi-user accessory dwelling building and for cellular telephone antennae on top of the 3.7 MG Reservoir. The NC/DC PS is also located on the same parcel. The total facility site is landscaped and fenced.

The 3.7 MG Reservoir was constructed in 1976 and consists of a steel cylinder. It is 106 feet tall with 98 feet of available water storage (depth to overflow), 80 feet in diameter, a base elevation of approximately 492 feet and an overflow elevation of 590 feet (NAVD88). The 3.7 MG Reservoir has an approximate capacity of 37,600 gallons per foot of height. Major recent upgrades to the 590 Zone 3.7 MG Reservoir include:

1988 – Re-coating of reservoir interior.

1994 – Removal of lead-based coating on the reservoir exterior; installation of a spiral staircase from the base to the top of the reservoir; installation of seismic anchor chairs; touch-up painting of reservoir interior; and painting of reservoir exterior.

2001 – Seismic updates, which brought the reservoir into compliance with current code.

2013 – Construction of a multi-user accessory equipment building for the wireless carriers.

2014 – Reservoir improvement which included security and site access, new catwalk and cable raceways, new mixer, rehabilitation of tank access, new coating inside and outside of the tank.

2018 – Completion of the NC/DC PS and site improvements.

The 3.7 MG Reservoir is connected to the 590 Zone and NC/DC PS via a 20-inch diameter water main. In 2001 the 20-inch diameter main that served as a common inlet and outlet pipe was branched to provide a 16-inch dedicated inlet and a 16-inch dedicated outlet. A bi-directional magnetic meter located within the NC/DC PS measures water flow rates to and from the 590 Zone and the 3.7 MG Reservoir. The water level in the reservoir is measured by a pressure transducer. The pressure transducer readings and flow meter readings are transmitted to the District's Administration Building via the District's telemetry system. The NC/DC PS contains a chlorine analyzer that measures chlorine residuals in the stored water. An eight-inch diameter pressure reducing/backpressure sustaining valve, located in the NC/DC PS, allows manual or automatic transfer of water from the 3.7 MG Reservoir to the 502 Zone; this valve would normally not be used unless SS-1 and/or SS-3 were unable to adequately pressurize the 502 Zone. The water level in the 3.7 MG Reservoir is controlled by telemetry coordination with BS-1 and BS-2. Water levels below the set minimum operating water level in the 3.7 MG Reservoir turn on pumps in BS-1 or BS-2 and turn off the pumps when the maximum operating water level set point is reached. Under normal operating conditions the booster stations operate in lead/lag manner and alternate as needed.

3.3.2 502 Zone 0.4 MG Reservoir

Until it was demolished in 2011, the 0.4 MG Reservoir provided storage for the 502 Zone.

3.3.3 432 Zone 2.0 MG Reservoir

The 2.0 MG Reservoir provides storage for the north portion of the 432 Zone. In an unusual or emergency operating condition, the District could supply water from this reservoir and north portion of the 432 Zone to the south portion of the 432 Zone and the 307 and 237 Zones by opening a normally closed transmission main valve (see Figure 3-1).

The 2.0 MG Reservoir was constructed in 1988 and consists of a reinforced-concrete cylinder. It is 35 feet tall with 34 feet of available water storage (depth to overflow), 100

feet in diameter, and has a base elevation of approximately 398 feet and an overflow elevation of 432 feet (NAVD88). The 2.0 MG Reservoir site is fenced and landscaped.

Major recent upgrades to the 2.0 MG Reservoir include:

1997 – Chlorine analyzer added to monitor chlorine residuals in reservoir water.

2006 – Roof was resealed after a structural assessment identified cracks in concrete roof.

2010 – SS-2 was established to provide dedicated supply to the reservoir. A dedicated inlet with mixing manifold was installed and the existing drain was converted to a dedicated outlet. The chlorine analyzer was replaced.

Control equipment for the reservoir is housed in a meter and valve vault located west of the reservoir. The reservoir inlet and mixing manifold consist of 12-inch diameter piping. The outlet is 12-inch diameter. Two 12-inch diameter electromagnetic flow meters measure water flow rates to and from the reservoir. The water level of the 2.0 MG Reservoir is measured by a pressure transducer. Additionally, a chlorine analyzer measures chlorine residuals in the outlet in real-time. The pressure transducer readings, flow meter readings and chlorine residuals are transmitted to the District via the District's telemetry system.

The water level in the 2.0 MG Reservoir is controlled by SS-2. Water levels below the set minimum operating water level in the 2.0 MG Reservoir open the PRVs in SS-1 and SS-3 and remain open until the maximum operating water level in the 2.0 MG Reservoir is reached. Currently, SS-2 is the lead supply for the 2.0 MG reservoir and SS-1 and SS-3 provide lag supply. The minimum operating water level for the 2.0 MG Reservoir is set lower in SS-1 and SS-3 compared to SS-2, thus ensuring that SS-2 provides the lead supply to the north portion of the 432 Zone and the 2.0 MG Reservoir.

3.4 PUMPING FACILITIES AND GENERATORS

The District owns and operates three booster pump stations, two of which are supply booster pump stations from the SPU Tolt Pipelines (BS-1 and BS-2), and the NC/DC PS, which pumps water from the 590 Zone to the 615 Zone in a constant-pressure condition. BS-1 and BS-2 are discussed above in Section 3.2 – Water Supply.

3.4.1 North City/Denny Clouse Pump Station

The station boosts water from the 590 Zone to the 615 Zone, which is a closed zone, through a system of six pumps. The system includes two vertical turbine pumps with a rated capacity of 4,500 gpm each, and four horizontal end-suction pumps, two rated at 120 gpm and two rated at 580 gpm. The range of pump capacity helps to keep a constant pressure condition and provide water supply to the 615 Zone and the entire system, under normal demand conditions.

As the 615 Zone is a closed zone, per DOH requirements, the 615 Zone BPS must be capable of supplying Peak Hour Demand with Equalizing Storage depleted and, also, Maximum Day Demand concurrently with Fire Flow when Equalizing Storage and Fire Suppression Storage volumes are depleted. In addition, DOH requires that the 615 Zone must supply fire flow when the largest capacity booster pump that is "routinely used" to meet normal daily or peak water system demands is out of service.

The NC/DC PS was constructed in 2017 where the previous 0.4 MG reservoir was located. A total of 16 different functional objectives were developed to provide normal, emergency and fire flow service to the 502, 590, and the 615 Zones and to improve operations of the 3.7 MG Reservoir. Station piping includes a 12-inch main connecting to the 502 Zone, a 16-inch main connecting to the 590 Zone and a 16-inch main connected to the 615 Zone. A 16-inch main connects the discharge from the 3.7 MG reservoir to the NC/DC PS. Additional appurtenances in the NC/DC PS include a 500-gallon surge tank, a 150-gallon surge tank on the 502 Zone piping, a chlorine residual analyzer and a SCADA room.

3.4.2 Standby Generators

The District installed two above-grade diesel generators in sound attenuated enclosures in 2008 to provide standby power, one each, to the 615 Zone NC/DC PS and the District Administration Office in the event of a power outage. The generator at the NC/DC PS is rated at 300 kW. The generator installed at the District office is rated at 125 kW. An automatic transfer switch for each generator provides automatic transfer from line to generator power. A third generator is currently included in the design of the new Maintenance Facility.

3.5 TRANSMISSION AND DISTRIBUTION SYSTEM

The transmission and distribution system is comprised of approximately 96 miles of water main, not including individual customer service lines. The system is predominantly constructed with cast iron and ductile iron mains, which make up approximately 77 percent and 22 percent of the system, respectively. Water main sizes vary from 2-inches to 20-inches in diameter, although 72 percent of the system consists of 6-inch and 8-inch diameter mains. Over 50 percent of the District's water mains were installed between 1966 and 1968. See Table 3-1 for a water main inventory.

Water mains without service connections and larger than 8-inches in diameter are considered transmission mains. Currently, approximately 19 percent of the water system is cast iron or ductile iron transmission water main. Water main 8-inches in diameter and smaller is identified as distribution water main. Distribution water mains include service connections. Currently, approximately 84 percent of the water system is distribution water main constructed of mostly cast iron and ductile iron. The District has been working

on identifying all the unknown water mains and expects to have that completed in the near future.

TABLE 3-1							
WATER MAIN INVENTORY							
Main Size (in)	Main Material					Total Length (ft)	Percent of System
	Cast Iron	Ductile Iron	Galv. Iron	PVC	Unknown		
<4	90	18	1,638	1,631	221	3,598	1%
4	40,834	2,906	0	-	162	43,902	9%
6	253,262	5,729	250	-	1,720	260,961	52%
8	60,802	39,364	-	330	153	100,649	20%
10	9,244	1,751	-	-	-	10,995	2%
12	24,038	56,651	-	-	-	80,689	16%
16	-	3,458	-	-	-	3,458	1%
20	-	508	-	-	-	508	0%
Total Length (ft)	388,270	110,385	1,888	1,961	2,256	504,760	
% of System	77%	22%	0%	0%	0%		

3.5.1 Pressure Zones

There are seven pressure zones within the District's water system. Two of the pressure zones have storage facilities, which convey water to lower pressure zones through gravity flow at reduced pressure. The two zones with storage facilities are open systems, with pressure in each zone dependent on the water level in the reservoirs. The 615 Zone is a closed zone and relies upon the NC/DC PS to boost pressure from the 590 Zone. The remaining zones are also closed systems, each depending on the setting of the pressure control valve at each point of supply to the lower zone. See Table 3-2 for a list of physical connections by pressure zone and Figure 3-1 for a hydraulic profile of the system that shows hydraulic relationships between zones.

TABLE 3-2 PHYSICAL CONNECTIONS BETWEEN PRESSURE ZONES							
ZONE	615	590	502	432	400	307	237
615	Note 2	16					
590	16		2	2			
502		2		6	1		
432		2	6			3	
400			1				
307				3			3
237						3	
SPU Supply Connections		4	2	3			
Intertie City of MLT ³			2				
TOTAL CONNECTIONS ¹	16	24	13	14	1	6	3
Notes: ¹ Total system connections include PRVs, zone valves, check valves, connections to SPU and emergency interties. ² Shaded cells indicate same-zone match. ³ City of MLT: Mountlake Terrace 530 Zone.							

3.5.1.1**615 Zone**

The 615 Zone, previously the 660 Zone, is the only closed zone supplied by a booster pump station in the District. It is supplied by water pumped from the 590 Zone via the NC/DC PS. The 615 Zone is located in the center of the District and contains a major commercial corridor along 15th Avenue NE. The 3.7 MG Reservoir is physically located within the 615 Zone. Ground elevation varies in the 615 Zone from approximately 335 to 485 feet (NAVD88).

The 615 Zone is physically connected to the 590 Zone in sixteen locations. There seven check valves and nine zone valves that are normally closed. In the event the 615 BPS is unable to supply the 615 Zone the seven check valves convert the 615 Zone into the 590 Zone. Such an event would enable the 615 Zone customers to continue to receive water, albeit at considerably reduced pressure.

3.5.1.2 590 Zone

The 590 Zone is the largest of the District's pressure zones. BS-1 and BS-2 pump water to the 3.7 MG Reservoir, which maintains pressure within the 590 Zone. Water can also enter 590 Zone via SS-4 and the SPU Emergency Connection. Ground elevation varies in the 590 Zone from approximately 310 to 475 feet (NAVD88). The 590 Zone is predominantly zoned as residential but includes connection to the Fircrest Water System. The 590 Zone is bounded on the west by Interstate 5 (I-5), with the exception of a small area located north of NE 185th Street and west of I-5. The 590 Zone includes the 3.7 MG Reservoir, which provides storage for the following zones: 615, 590, 502, south portion of 432, 400, 307 and 237. This collection of zones is referred to as the 590 Zone Group, particularly for purposes of storage analysis in Section 5.

The 590 Zone is physically connected to the 615, 502, and 432 Zones in numerous locations. There are sixteen connections to the 615 Zone as described above. The 590 Zone is connected to lower zones via PRSs, which are described in Section 3.6. There are two connections to the 502 Zone via PRS-01 and at the NC/DC PS. There are two connections to the 432 Zone via PRS-04 and PRS-05. In addition, the 590 Zone connects to the SPU System at BS-1 and BS-2, SS-4 and the Emergency Connection.

3.5.1.3 502 Zone

The 502 Zone is the third largest pressure zone in the District. The 502 Zone is fed by SS-1 and SS-3 through gravity-fed PRVs. Storage for the 502 Zone is provided by the 3.7 MG Reservoir. Ground elevation varies in the 502 Zone from approximately 245 to 410 feet (NAVD88). The 502 Zone includes the Ballinger Commercial Area and is otherwise predominantly zoned residential.

The 502 Zone is physically connected to the 590, 432, and 400 Zones in thirteen locations. There are two connections to the 590 Zone as described above. There are six connections to the 432 Zone, which include PRS-02, PRS-07, PRS-08, PRS-13 and two zone valves (normally closed). There is one connection to the 400 Zone via PRS-09. In addition, the 502 Zone connects to the SPU system at SS-1 and SS-3 and to the City of Mountlake Terrace 530 Zone at two emergency intertie connections.

3.5.1.4 432 Zone

The 432 Zone is the second largest pressure zone in the District. The 432 Zone is fed by SS-1, SS-2 (lead) and SS-3 through gravity-fed PRVs. Ground elevation varies in the 432 Zone from approximately 105 to 330 feet (NAVD88). The 432 Zone is predominantly zoned residential. The 432 Zone includes the 2.0 MG Reservoir, which provides storage for the north portion of the 432 Zone.

The 432 Zone is physically connected to the 590, 502 and 307 Zones in 9 locations. There are two connections to the 590 Zone and six connections to the 502 Zones as described previously. The 432 Zone is physically connected to the 307 zone at three locations, PRS-03, PRS-06 and PRS-10. In addition, the 432 Zone connects to the SPU System at SS-1, SS-2 and SS-3. As shown in Figure 3-1, the 432 Zone is separated into north and south areas, isolated by a normally closed valve. This arrangement is to assure maintenance of an adequate chlorine residual in the southern portion of the 432 Zone, approaching the south District boundary. As noted above, the normally closed valve can be opened to allow supply from the north to south section of the zone, for supply and/or utilization of water stored in the 2.0 MG Reservoir as warranted by unusual or emergency conditions.

3.5.1.5 400 Zone

The 400 Zone is the smallest zone within the District and zoned as residential. Ground elevation varies in the 400 Zone from approximately 225 to 255 feet (NAVD88). The 400 Zone is physically connected to the 502 Zone at one location. PRS-09 is the sole source of water for the small number of customers within the 400 Zone.

3.5.1.6 307 Zone

The 307 Zone is predominantly zoned as residential. Ground elevation varies in the 307 Zone from approximately 65 to 195 feet (NAVD88). The 307 Zone is physically connected to the 432 and 237 Zones at three locations. There are three connections are to the south portion of the 432 Zone as described above and three connections are to the 237 Zone, which consist of one zone valve (normally closed), PRS-11 and PRS-12.

3.5.1.7 237 Zone

The 237 Zone is located along the northwest shore of Lake Washington and is the lowest zone in the District. The 237 Zone is predominantly zoned as

residential. Ground elevation varies in the 237 Zone from approximately 20 to 110 feet (NAVD88). The 237 Zone is physically connected to the 307 Zone in three locations as discussed above.

3.6 SYSTEM CONTROL FACILITIES

The water system operates using various types of control facilities, which include 13 PRSs, five check valves, six zone valves, and a sophisticated telemetry and SCADA system.

The District has 13 PRSs that each contain two PRVs except for Station 1, which has only one PRV, and valve 104 located in the NC/DC PS. The District has additional PRVs in system facilities, although most of them are in combination with flow control valves and backpressure sustaining valves. SS-1 and SS-3 each have two PRVs – one each for connections to the 432 and 502 Zones and are in combination with flow control valves. There is one PRV in each of the two emergency interties with the City of Mountlake Terrace; each is in combination with backpressure sustaining valves. There is one PRV in the NC/DC PS to transfer water from the 590 Zone to the 502 Zone; the PRV is in combination with a backpressure sustaining valve. PRV stations are calibrated and tested twice annually. Table 3-3 lists the PRV Stations and relevant information.

TABLE 3-3
PRESSURE REDUCING STATIONS

Pressure Reducing Station	Upstream Zone	Downstream Zone	PRV Size (in)¹	Bypass PRV Size (in)²
PRS-01	590	502	6	N/A
PRS-02	502	432	6	1
PRS-03	432	307	6	2
PRS-04	590	432	8	3
PRS-05	590	432	6	2
PRS-06	432	307	6	2
PRS-07	502	432	6	2
PRS-08	502	432	6	2
PRS-09	502	400	6	2
PRS-10	432	307	8	3
PRS-11	307	237	8	3
PRS-12	307	237	6	2
PRS-13	502	432	8	1
NC/DC PS Valve 104	590	502	6	
Notes: 1 Stations are designed to operate using bypass PRVs during normal demand periods. 2 Stations are designed to operate using larger diameter PRVs during high demand periods. 3 PRS-01 does not have a small-diameter bypass PRV.				

3.6.1 Check Valves

A check valve allows one-way flow of water to isolate one boundary condition from another. There are seven check valves installed along the 615-590 Zone boundary. These check valves essentially convert the 615 Zone into the 590 Zone in the event the NC/DC PS fails to provide water for the 615 Zone. In such an event, water will be available to 615 Zone customers at a reduced pressure. Under normal operating conditions the check valves remain closed. Table 3-4 lists the seven check valves and relevant information.

TABLE 3-4 CHECK VALVES				
Upstream Zone	Downstream Zone	Year Constructed	Valve Size (in)	Valve Type
615	590	1997	8	Check
615	590	2013	12	Silent Check
615	590	1997	12	Check
615	590	1997	12	Check
615	590	1997	6	Swing Check
615	590	2013	8	Silent Check
615	590	2013	8	Silent Check

3.6.2 Zone Valves (Normally Closed)

A zone valve is a gate valve whose purpose is to remain closed in order to maintain a pressure zone boundary. There are twelve zone valves that serve as pressure zone boundaries in the District. Nine zone valves are located along the 615-590 Zone boundary, four of which are 12-inch, one 8-inch and four 6-inch valves. There are also three additional valves, two along the 502-432 Zone boundary, and another along the 307-237 Zone boundary. Zone valves offer the flexibility to be opened in order to expand or otherwise change the boundary of a pressure zone. Table 3-5 lists the zone valves and relevant information.

TABLE 3-5 ZONE VALVES		
Upstream Zone	Downstream Zone	Valve Size (in)
615	590	12
615	590	12
615	590	12
615	590	8
615	590	6
615	590	12
615	590	6
615	590	6
615	590	6
502	432	6
502	432	6
307	237	6

3.6.3 SCADA Facilities

Supervisory control and data acquisition (SCADA) is a complex system that typically includes three components:

- Multiple remote telemetry units (RTU) connect to physical equipment such as valves and meters and collect and communicate data such as equipment status (i.e. valve open or closed, pump on or off), pressure and flow readings and alarm conditions
- Master station and human-machine interface (HMI) computers allow water system operators to remotely monitor and control physical equipment that are connected by the RTUs
- Communication infrastructure allows transmission of data to and from RTUs and the master station and HMI computers

The District has a **Wonderware™** SCADA software system that monitors various facility functional data such as pressure readings, flow readings, reservoir water levels, facility operation alarms, security alarms, and chorine residual analyzer data. Data is transmitted over leased telephone lines to the District Administration Office. Table 3-6 illustrates the various SCADA facilities utilized by the District. The District updated the SCADA system most recently in 2013.

The water system SCADA facilities may be monitored by District desktop computers. This allows the Water System Operator maximum flexibility in monitoring and adjustment of SCADA facility settings and alarms.

**TABLE 3-6
SCADA FACILITIES**

Facility	Pressure Reading	Flow Reading	Reservoir Level	Chlorine Residual Analyzer
Booster Station 1	SPU, Pump Discharge, 590 Zone	590 Zone	N/A	N/A
Booster Station 2	SPU, Pump Discharge, 590 Zone	590 Zone	N/A	N/A
North City/Denny Clouse Pump Station	615 Zone, 590 Zone	615, 590 & 502 Zones	N/A	Yes
MLT 19 Emergency Intertie - not connected at this time	MLT 530 Zone, 502 Zone	MLT 530 Zone, 502 Zone	N/A	N/A
MLT 17 Emergency Intertie - not connected at this time	MLT 530 Zone, 502 Zone	MLT 530 Zone, 502 Zone	N/A	N/A
SPU Emergency Intertie	N/A	N/A	N/A	N/A
590 Zone Reservoir (3.7 MG)	N/A	Inflow/Outflow	Yes	Yes
432 Zone Reservoir (2.0 MG)	N/A	Inflow/Outflow	Yes	Yes
Supply Station 1	SPU, 502 & 432 Zones	502 & 432 Zones	N/A	Yes
Supply Station 2	SPU, 432 Zone	432 Zone	N/A	N/A
Supply Station 3	SPU, 502 & 432 Zones	502 & 432 Zones	N/A	N/A
Supply Station 4	SPU, 590 Zone	590 Zones	N/A	Yes
Notes: MLT – City of Mountlake Terrace No SCADA facilities are at the SPU Emergency Intertie				

3.6.4 Chlorine Analyzers

In order to monitor water quality in the District's water system, the District has installed four residual chlorine analyzers that provide real-time chlorine residual measurements remotely from the locations of the analyzers. One chlorine analyzer monitors the

incoming Tolt Pipelines at SS-1, a second analyzer monitors the water as it leaves the 2.0 MG Reservoir, a third monitors the NC/DC PS and a fourth monitors water from SPU's 590 Zone Northwest Sub-Regional System Source at SS-4.

The District monitors chlorine residual on a continuous basis. Alarm conditions correspond to low residual level of 0.1 ppm and high residual level of 1.7 ppm. Chlorine residual levels vary throughout the year.

The District has sixteen water quality sampling stations within the service area. Six stations were added in 2016 and 2017. The locations and sampling schedule are identified in the District's current Coliform Monitoring Plan (see Appendix G). The District will continue to monitor the sixteen stations to determine if they are in appropriate locations and/or if they need to relocate any of the stations.

3.7 WATER TREATMENT

All water used within the District is supplied and treated to drinking water standards by SPU. Currently, SPU provides corrosion control, utilizes filtration, ozone and chlorination for disinfection of most waterborne pathogens and fluoridates the water supply for tooth-decay prevention.

SECTION FOUR – MINIMUM DESIGN CRITERIA

NORTH CITY WATER DISTRICT

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NORTH CITY WATER DISTRICT

SECTION 4
MINIMUM DESIGN CRITERIA

Minimum design criteria are established to ensure that all new water system improvements: 1) are designed to provide a current and future benefit to the system, 2) are designed in a manner consistent with District goals and policies, 3) maintain a prescribed level of performance that is cost-effective, and 4) are designed to follow, at a minimum, the requirements and standards put forth by the International Fire Code (IFC), U.S. Environmental Protection Agency (EPA), the Washington State Department of Health (DOH), King County and the cities in which the District serves.

Minimum design criteria addressed in this section include requirements related to the design of water supply, storage, distribution and transmission main facilities, and minimum water quality standards. Water system design standards have changed over time to reflect the standards at that time. Since at least 1952, the District's consulting engineering firms have used the standard recommendations at the time new water system improvements were made. The system has been evaluated per current criteria to determine deficiencies in the existing system relative to current and forecast demands and for determining system improvements for the District's water service area, as described previously in this document. These criteria are in addition to the District's requirements for completion of developer extensions to the system. Actual conditions required as part of the developer extension process may take precedence over the criteria put forth herein.

Furthermore, District design standards may be different than the fire flow requirements established by the local fire authority, but such may not be less than the requirements of the local fire authority or the IFC, whichever is greater.

4.1 JURISDICTIONAL REGULATIONS

Jurisdictional regulations may affect many aspects of a water system including, though not limited to, minimum fire flow rates and durations and fire hydrant spacing.

The District operates within the cities of Shoreline and Lake Forest Park. As such, the District strives to maintain public safety while providing water service to two separate communities with different municipal codes. Furthermore, the District's water system operations are governed by DOH and DOH's codes and regulations.

4.1.1 Washington State Department of Health

The DOH "Water System Design Manual" (WSDM, October 2019) is the primary document governing the sizing and design of public water systems in the State of Washington. The publication sets the minimum system planning and reliability considerations. Criteria for

distribution system design, water storage and daily supply requirements are summarized herein. DOH is governed by the Revised Code of Washington (RCW) and has developed regulations that are codified in the Washington Administrative Code (WAC). Washington State has adopted the IFC.

4.1.2 Cities of Lake Forest Park and Shoreline

The District operates within the Cities of Lake Forest Park and Shoreline, each of which has adopted the 2015 edition of the IFC in their respective municipal code.

4.2 REFERENCE DATUM

The datum used for planning of facilities in this plan and for District design work is NAVD88. The contour elevations are from the King County elevation contour data which were obtained using LIDAR technology with a contour interval of two feet vertical elevation.

4.3 DESIGN PERIOD

Planning for water facilities requires facilities to be designed and constructed with an expectation that the facilities will provide service over a specific period of time. This means that in the year 2039, some of the facilities proposed in this study may have reached their maximum capacity, assuming that the population projections are reached. Many of the components of the water system, however, have much longer useful lives than 20 years and will continue to serve the community far beyond the planning period. In planning water facilities with capacities adequate for the next 20 years, facilities can be designed and constructed in phased segments according to need.

4.4 PLANNING CONSIDERATIONS

Water facilities planning shall take into consideration the following:

- Initial system construction and additions should conform to the comprehensive water system plan and projected service area.
- Public water systems should be designed to provide minimum design flows in accordance with the anticipated development per the land use plan of the jurisdiction(s) within which the District operates.
- Phased development may be permitted where full development will take several years.

4.5 FACILITY RELIABILITY AND SECURITY CONSIDERATIONS

Design and maintenance of water facilities, both existing and proposed, shall take into account the following:

- Throughout the water system, multiple water sources are recommended in combination with adequate emergency reserve in gravity storage to allow for

interruption of supply at one point, while maintaining water supply to the system at the design rate.

- Pump stations shall contain multiple booster pumps of sufficient capacity to meet the maximum day demands with the largest pump out of service.
- Emergency backup power for pump stations is required where adequate gravity storage is not available. Emergency backup power includes, though is not limited to, portable or permanent power generators.
- Looping of water mains increases reliability, increases fire flow availability, and improves water quality through increased circulation. Looping water mains shall be required on all new water facilities construction or replacement projects, except where not practicable, as determined by the District. In the case where dead-end mains are unavoidable, the mains shall be sized for capacity in a manner that will satisfy, at a minimum, the highest potential design flows.
- All water system facilities, both-above ground and below-ground, shall be designed/rehabilitated such that access is limited to authorized personnel only and shall include appropriate remote alarms in response to intrusion or tampering of facilities, as deemed necessary by the District.

4.6 WATER SUPPLY REQUIREMENTS

The DOH WSDM recommends, and the District requires, a source capacity that meets the maximum day demand (MDD). As a reliability measure, the District also considers the condition when MDD is supplied while replenishing the fire suppression storage volume within 72 hours of its depletion.

4.7 WATER PRESSURE

Water pressure is critical in a water distribution system. Low water pressure may result in an inability to deliver water to customers and excessive high water pressures may cause premature failure of system facilities including pipelines, pumps, and valves. Water pressure is controlled by zone configuration (manipulation of hydraulic grade lines), pressure reducing valves, and operation of storage and pump facilities.

4.7.1 DOH Water Pressure Requirements and Recommendations

Washington State regulations [WAC 246-290-230(5), (6), and (9)] and DOH WSDM mandate that water systems provide the following minimum water pressures throughout the distribution system:

- Provide peak hourly demand (PHD) at no less than 30 pounds per square inch (psi) to all service connections throughout the distribution system, measured at all existing and proposed service connection meters.

- Under fire flow conditions, the distribution system shall be designed to provide the maximum day demand (MDD) with required fire flow at a minimum residual pressure of 20 psi to all service connections, existing and proposed, measured at the meter.
- Transmission mains with no service connections shall be designed to maintain a minimum pressure of five psi except for areas directly adjacent to storage tanks.
- The District criteria matches the state regulations.

4.7.2 Individual (End-User) Pressure Reducing Valves

Uniform Plumbing Code (UPC) provisions recommend installation of individual pressure reducing valves at customer connections whose pressure is expected to exceed 80 psi. Individual pressure reducing valves are described in detail under paragraph 4.10 of this Section.

4.8 MAXIMUM PIPELINE VELOCITIES

4.8.1 DOH Recommended Maximum Pipeline Velocity

The DOH recommends that the design of distribution mains maintain velocities less than or equal to eight feet per second (fps) under PHD conditions, unless otherwise specified by the pipe manufacturer. DOH recognizes that velocities may be greater than eight fps in mains under fire flow conditions, in short sections of main, or piping within pump and valve station facilities. DOH notes that “maximum velocities greater than eight fps may occur under fire flow conditions, for shorter section of mains or piping in pump and valve station facilities”. Long sections of mains with higher velocities greater than 10 fps during PHD or fire flow conditions should be checked using hydraulic transient (water hammer) analysis. For purposes of establishing design flow criteria, the District has concluded that “short sections” of water main shall be less than 50 lineal feet and “long sections” are lengths of 50 feet or more.

4.8.2 District Maximum Pipeline Velocity

For design purposes the District established a maximum pipeline velocity criterion of eight fps under MDD with fire flow conditions and also for PHD without fire flow conditions. In existing mains, peak velocities of up to 10 fps are allowed under MDD with fire flow conditions and for PHD without fire flow conditions. The District has followed these design standards since 2007.

4.9 PIPE SIZING AND MATERIAL

Design of water main projects, whether new water main construction or replacement, shall follow the following criteria and is ultimately governed by state law and the criteria established by the DOH WSDM.

- For new or replacement water mains, pipe size shall be a minimum 8-inches nominal inside diameter. Minimum pipe size shall be determined using the District's water system hydraulic model and include consideration of future land use per the water system plan using PHD without fire flow conditions and MDD with fire flow conditions, whichever is greater. Maximum design velocity under both scenarios shall be eight fps. In the case of PHD without fire flow conditions, the minimum pressures throughout the system must be greater than or equal to 30 psi. In the case of MDD with fire flow conditions, minimum pressures throughout the system must be greater than or equal to 20 psi.
- New or replacement water mains shall include cement lined, Class 52 ductile iron pipe with "lead-free" materials (not more than a weighted average of 0.25% lead as defined by Section 1417 of the Safe Drinking Water Act [SDWA]) except as noted below and as per District Standard Details and Technical Specifications (Appendix K). Pipe and fittings shall be domestic made.
- New or replacement construction of water mains in areas of corrosive soil conditions that may affect the service life of pipelines shall include cement lined, Class 54 ductile iron pipe with "lead-free" materials (not more than a weighted average of 0.25% lead as defined by Section 1417 of the SDWA) or zinc-coated Class 52 ductile iron. Areas of corrosive soil conditions shall be determined by the District.
- Minimum cover over pipes shall be 36-inches from the top of pipe to the finished grade, unless otherwise approved by District.
- Dead end mains are generally not accepted by the District, except in phased development projects or where no potential for future interconnection of facilities exists. Approved dead end mains that will not serve fire hydrants may be sized as hydraulically appropriate in residential areas and must be a minimum of 8-inches in commercial areas. Dead end mains supplying fire hydrants must be sized to satisfy, at a minimum, the highest potential design flow as determined by the land-use zoning of the properties the fire hydrant will serve.
- Whenever practicable, transmission and distribution pipelines and water service lines shall be at least 10 horizontal feet from any existing or proposed waste disposal or reclaimed water facilities. At utility crossings, at least 18 inches of vertical separation shall be maintained between the top of a sewer or reclaimed water main and the bottom of a water line (water main above sewer or reclaimed main). Separation between water and sanitary sewer or reclaimed pipelines shall be in accordance with the State Department of Ecology's "Criteria for Sewage Works Design" and WAC 173-219, respectively.

- Water source pumping facilities and storage facilities must be designed so that, in combination, they can supply the maximum instantaneous flow demand at any time in all parts of the system. The maximum instantaneous flow shall be the greatest of PHD without fire flow conditions or MDD with fire flow conditions.

4.10 VALVES

Valves perform many functions throughout a water system and are a necessary component in any water system. Valves allow isolation of zones and long stretches of water main, system flushing, and release of air from the pressurized system. The following criteria are required for the design and construction of valves:

- Gate valves shall be installed in a configuration that permits isolation of water main lines and as per District Standard Details and Technical Specifications (Appendix K). Gate valves shall be installed at intersections with normal maximum spacing of 500 feet in commercial, industrial, and multi-family areas; 800 feet in residential areas; and one-quarter mile in transmission mains. Additional isolation gate valves may be required by the District and will be determined on a case-by-case basis.
- Air entrainment, air, or combined air-vacuum relief valves are to be installed at appropriate points of high elevation in the system. System service lines may also serve as air relief in certain instances as determined by the District. All piping in the system shall be sloped a minimum of one-half percent to permit escape of any entrained air. One-half percent constitutes six-inches of vertical relief over a horizontal distance of 100 feet.
- Zone isolation valves shall be installed at pressure zone boundaries to permit future pressure zone realignment without the need for pipeline reconfiguration.
- A fire hydrant shall be installed on all dead end runs and at designated points of low elevation to provide a means for adequate flushing of the system. The blow-off assembly shall be installed in a utility right-of-way, except where a written access and construction easement is provided to the District.
- System pressure reducing valves (PRV) shall be installed as deemed necessary by the District to create new zones or expand existing zones and shall be set such that all services downstream of the PRV fall within the minimum and maximum pressures as discussed above.
- Individual or end-user pressure reducing valves are employed for individual customer pressure regulation and are the property and responsibility of the customer. Consistent with DOH and UPC requirements, when the District becomes aware of pressures in excess of 80 psi, the District shall advise the customer of the need for an individual PRV. Whether the customer or the District installs the

individual PRV, the customer is responsible for the maintenance and ownership of the individual PRV.

4.11 FIRE HYDRANTS

Fire hydrant locations and spacing shall comply with the minimum requirements established by municipal code of the cities of Shoreline and Lake Forest Park, the local fire marshal, or any other municipality (in the event an annexation warrants incorporation of another municipality's requirements). Fire hydrants shall meet the type, location, and spacing requirements of WAC 246-293-650 or of the agency having jurisdiction in the project area.

4.12 CROSS-CONNECTION CONTROL

Where the possibility of contamination of potable water exists, water services shall be equipped with an appropriate cross-connection control assembly in accordance with State requirements, District Resolution No. 2012.12.93 and 2018.12.37 and the "Cross-Connection Control Manual, Accepted Procedure and Practice", published by the Pacific Northwest Section of the American Water Works Association (AWWA) and the WAC 246-290-490. The need, size, and location of cross-connection assemblies shall be determined by the District. The District's 2012 Cross-Connection Control Program and updated sample letters are included in Appendix F.

4.13 WATER STORAGE

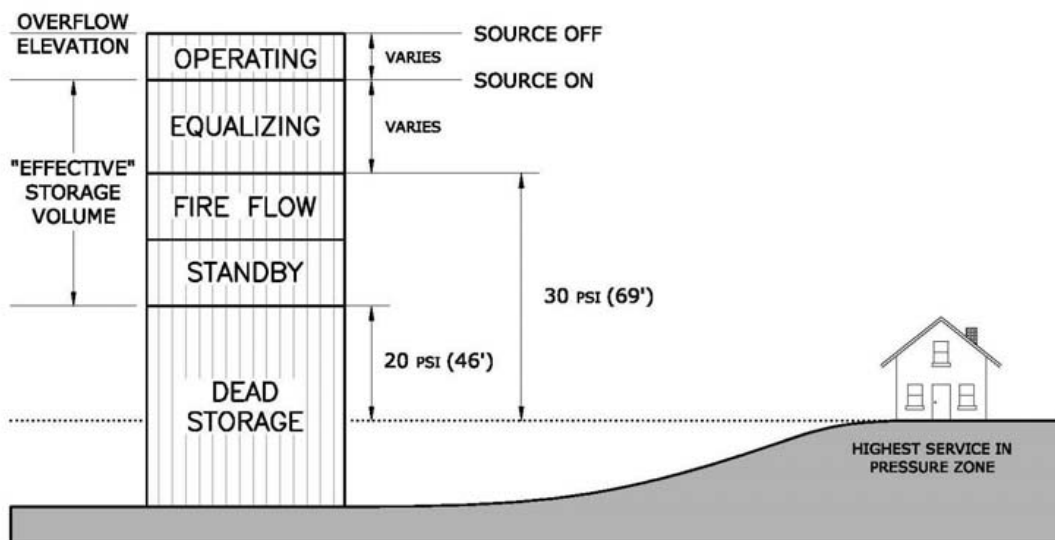
Storage requirements are based on the following five components: operational storage, equalizing storage, standby storage, fire suppression storage, and dead storage. Each storage component is listed in Chapter 7 of the DOH WSDM and is discussed in further detail below.

The three main components of storage, equalizing, standby, and fire suppression storage, must be evaluated in context of the operational storage requirements and dead storage constraints. The available or maximum volume of operational and equalizing storage refers to a volume of water above a water level in the storage facility that corresponds to the minimum hydraulic grade required to serve the highest elevation customer at the required pressure for regular service (i.e. 30 psi). The volume of water between 20 and 30 psi is available for emergency uses (standby and fire suppression). Storage volume below this minimum hydraulic grade is considered dead or unusable storage. See Figure 4-1 for a graphical representation of the storage elements. Once the minimum required volumes at a point in time are compared to the available capacity for each element (except for dead storage which is not ever available, by definition) it may be determined that there is "unallocated" storage available. If that unallocated storage is associated with operating and equalizing availability, some or all of that unallocated storage can

be used to address a deficiency, if any, of fire flow or standby storage, at that point in time.

Figure 4-1 represents the typical configuration for a storage facility providing direct service to an open distribution system. In such cases, the system pressure is directly a function of service elevation relative to reservoir water level. However, in some cases, including the District's 3.7 MG Reservoir, system pressure is a result of head added by booster pumps for delivery to the pressure zone and highest services. In such cases, the storage elements are defined by the minimum level necessary for adequate pressure at the pump inlet, rather than the minimum pressure for the highest service as indicated in Figure 4-1.

Figure 4-1
STORAGE COMPONENTS



The minimum requirements for each of the components of the total storage requirement are summarized below. The minimum amount of storage required shall be adequate to provide for operational and equalizing storage plus standby and fire suppression storage. The minimum recommended storage volume is equal to the sum of the operational, equalizing, standby and fire suppression storage components, plus dead storage volume. Section 5 of this WSP includes a complete analysis of the District's water storage requirements and existing capacities.

4.13.1 Operational Storage

The following definition and brief explanation is presented as reference information. Operational storage is the volume of water not always available to supply the system as this represents the range of water level between the supply "on" level set point and the "off" level set point. This volume varies according to the sensitivity of the water level sensors controlling the source pumps and the configuration of the tanks designed to provide the required volume while preventing excessive cycling of the pump motor(s). The "off" level set point is typically some vertical distance below the overflow elevation as a function of the operating range of the "off" sensor and as a reliability measure to assure filling is stopped before wasting water. This additional buffer volume is considered to be part of operational storage.

4.13.2 Equalizing Storage

Equalizing storage must be provided when source pumping capacities are unable to meet the periodic daily (or longer) peak water system demands. Typically this deficit is the difference between supply capacity, which should match or exceed MDD, and PHD. The equalizing storage must be stored at an elevation sufficient to meet these demands at a minimum delivery pressure of 30 psi. The amount of required equalizing storage is defined in the DOH WSDM.

4.13.3 Standby Storage

Standby storage is required in order to augment the available supply of water during a period of restricted flow from the supply source. Restriction of flow may be caused by a pumping equipment failure, supply line failure, maintenance or repair, or other condition, which causes a temporary interruption in supply. For single source systems, the minimum standby storage requirement is one day of MDD for a system, deliverable at 20 psi. For a multiple source system, the standby storage is calculated as one day of MDD, less the flow available with the largest source out of service, multiplied by the amount of time the remaining sources will be pumped each day. DOH also recommends that standby storage not be less than 200 gallons per ERU per day.

4.13.4 Fire Suppression Storage

Fire suppression storage must equal the amount of water required to accommodate fire demand, for a given duration, while maintaining a minimum system pressure of 20 psi. Fire flow requirements are determined by the local fire marshal having jurisdiction and generally conform to the procedures utilized by the Washington Surveying and Rating Bureau as set forth in a pamphlet entitled "Guide for Determination of Required Fire Flow" published by the Insurance Services Office, Municipal Survey Service and per the IFC (IFC Appendix B in particular).

Fire flow rates and durations, in the absence of a local fire authority, are governed by State regulations. North City Water District encompasses portions of the City of Shoreline and the City of Lake Forest Park. The local fire authorities within the District's service area include the Shoreline Fire Marshal and the Northshore Fire Marshal. Both Cities have adopted the 2015 IFC as part of City Code and follow the fire flow requirements as stated in the Code. Table 4-1 lists the fire flows and durations required by the District, which are consistent with the current IFC.

The DOH recommends and the District requires that sources be available to replenish fire suppression storage volumes within 72 hours of an emergency event.

TABLE 4-1
MINIMUM FIRE FLOW REQUIREMENTS

Zoning/Land-Use Type	Required Fire Flow Rate (gpm)	Required Fire Flow Duration (hr)	Equivalent FSS Volume (gallons)
Low Density Residential	1,000	2	120,000
Medium Density Residential	1,750	2	210,000
High Density Residential	2,500	2	300,000
Commercial/Business Park	3,000	3	540,000
Light Industrial	3,500	3	630,000
Schools	3,500	3	630,000
Unlimited*	4,500 (anticipated)	4 (anticipated)	1,080,000

Notes:

FSS – Fire Suppression Storage

*In areas where a Master Development Plan or a Subarea Plan have been adopted and fire flow requirements are presently undetermined by the appropriate City or Fire Marshal, the District anticipates fire flow requirements up to 4,500 gpm for 4 hours.

4.13.5 Dead Storage

Dead storage is the amount of water not available at the minimum design pressure to the highest elevation served by the storage facility. Dead storage is not considered when determining volumes available to provide operational, equalizing, standby or fire suppression storage.

4.13.6 Unallocated or Surplus Storage

Unallocated storage is that volume available at a point in time that is surplus to all the previously designated storage volumes, except for dead storage.

4.14 PUMP STATIONS

In order to ensure uninterruptible service, the following provisions are required for all new construction of pump stations or remodeling of existing pump stations:

- Pump stations shall contain multiple booster pumps of sufficient capacity to meet the largest of either PHD without fire flow conditions or MDD with fire flow conditions of the service area with the largest pump out of service.
- Pump stations that are crucial in maintaining system pressure or providing water service must be constructed with appropriate electrical wiring that allows an efficient connection to either a portable emergency power generator or permanent emergency power generator or other emergency backup power alternative that will allow uninterruptible service of the pump station.
- All pump stations shall be designed with appropriate security measures to notify the District by remote alert of station intrusion and tampering of equipment settings in addition to fire, power failure, or other emergency.

4.14.1 Pumping Analysis Criteria

DOH requires that booster pump stations be designed such that the facilities are able to supply the higher zone (zone pumped to) with the minimum required flow rate while maintaining minimum pressures in the lower zone (zone pumped from) under normal operating conditions and fire flow conditions. In addition, the DOH requires that pump facilities be able to satisfy three criteria related to different flow conditions, durations, and constraints. The three criteria are:

4.14.1.1 Normal Operating Conditions

Under normal operating conditions in a closed system (zone), a booster pump station is required to maintain a minimum pressure of 30 psi throughout the lower zone under PHD flow conditions while providing the greater flow rate of the PHD flow within the higher zone or the design flow rate of the booster pump station.

4.14.1.2 Fire Flow Operating Conditions

Under fire flow operating conditions in a closed system, a booster pump station is required to maintain a minimum pressure of 20 psi throughout the lower zone under the following conditions:

- a) MDD plus fire flow conditions in the lower zone in addition to the required PHD flow to the higher zone.
- b) PHD within the lower zone in addition to supply to the station equal to the MDD plus fire flow conditions to the higher zone.

4.14.1.3 Pump Capacity Criteria

The pump stations were analyzed according to the DOH Booster Pump Station checklist identified in Appendix A of the DOH WSDM.

4.15 GENERAL FACILITY PLACEMENT

All piping, pumping, source, storage, and other facilities shall be located in public rights-of-way, dedicated water system easements or on District-owned property. Water system easements shall be a minimum of 15 feet in width, and piping shall be installed no less than five feet from the easement's edge. Any exceptions to this minimum easement will be at the discretion of the District. Unrestricted access shall be provided to all public water system mains and their appropriate appurtenances and all public fire hydrants.

The location of utilities shall be in accordance with the standards and guidelines established by the appropriate criteria from the applicable jurisdictions. Where existing utilities or storm drains are in place, new facilities shall conform to these standards as nearly as practicable and yet be compatible with the existing installations. Where practical, there shall be at least five feet horizontal separation from other utilities, except sanitary sewer pipelines where the minimum separation shall be 10 feet.

4.16 STANDARD PLANS AND SPECIFICATIONS

In accordance with WAC 246-290-120, the District maintains standard plans or details and technical specifications on file with the DOH to satisfy DOH approval requirements for: the installation of hydrants, valves, fittings and meters; repair or replacement of system components with similar components; or maintenance or painting of surfaces not contacting potable water. The standard details and technical specifications also support a waiver from formal submittal and approval of specific distribution main improvements provided that construction of such projects is certified by a registered professional engineer as being in compliance with the standard details and technical specifications found in the DOH approved water system plan and provided that the District maintains documentation for DOH of the pressure test results, disinfection procedures used and tests performed, and water quality sample results obtained prior to placing the distribution pipeline into service. All other water system improvements projects require submittal to and approval by the DOH.

4.17 WATER QUALITY STANDARDS

The maximum contaminant levels allowed in drinking water supplies are as put forth by the DOH and the federal SDWA and are summarized in Table 4-2. The District recognizes that additional monitoring requirements are forthcoming and will comply with such requirements as they are implemented in the State of Washington. Similarly, the District recognizes the SDWA requires a variety of source monitoring for surface water supplies which is currently carried out by the Seattle Public Utilities and District staff to insure

NORTH CITY WATER DISTRICT

MINIMUM DESIGN CRITERIA

compliance. The District's current and projected water quality monitoring program is detailed in Section 7 (Operations and Maintenance) of this Plan and water quality analyses of existing sources are provided in the Appendices.

TABLE 4-2 WATER QUALITY - MAXIMUM CONTAMINANT LEVELS			
Inorganics	Primary MCL (mg/L)	Inorganic Chemicals	Secondary MCL (mg/L)
Antimony (Sb)	0.006	Chloride (Cl)	250.0
Arsenic (As)	0.010	Fluoride (F)	2.0
Asbestos	7 million fibers/liter	Iron (Fe)	0.3
Barium (Ba)	2.0	Manganese (Mn)	0.05
Beryllium	0.004	Silver (Ag)	0.1
Bromate	0.010	Sulfate (SO ₄)	250.0
Cadmium (Cd)	0.005	Zinc (Zn)	5.0
Chromium (Cr)	0.10		
Copper (Cu)	1	Physical Characteristics	Primary MCL
Cyanide	0.2	Turbidity	5 NTU (SPU Cedar System) 0.3 NTU (SPU Tolt System)
Fluoride (F)	4.0	Color	15 std color units
Lead (Pb)	1	Specific Conductivity	700 umhos/cm
Mercury (Ha)	0.002	Total Dissolved Solids	500 mg/L
Nickel (Ni)	0.1	Disinfection By-Products	Primary MCL (mg/L)
Nitrate (as N)	10.0	Total Trihalomethanes (TTHM)	0.080 ²
Nitrite (as N)	1.0	Haloacetic Acids-five (HAA5)	0.060
Selenium (Se)	0.05	Bromate	0.010
Sodium (Na)	1	Chlorite	1.0
Thallium (Tl)	0.002	Disinfectant Residual	Primary MRDL (mg/L)
Organic Chemicals	Primary MCL	Chlorine	4.0 (as Cl ₂)
Volatile Organic Chemicals	40 CFR 141.61(a)	Chloramines	4.0 (as Cl ₂)
Synthetic Organic Chemicals	40 CFR 141.61(c)	Chlorine Dioxide	0.8 (as ClO ₂)

Source: WAC 246-290-310

Notes: ¹ Although the State Board of Health has not established MCLs for copper, lead, and sodium, there is sufficient public health significance connected with copper, lead, and sodium levels to require inclusion in inorganic chemical and physical source monitoring. For lead and copper, the EPA has established distribution system related levels at which a system is required to consider corrosion control. These levels, called "action levels," are 0.015 mg/L for lead and 1.3 mg/L for copper and are applied to the highest concentration in ten percent of all samples collected from the distribution system. The EPA has also established a recommended level of twenty mg/L for sodium as a level of concern for those consumers that may be restricted for daily sodium intake in their diets.

² The MCL for TTHM is calculated on the basis of a running average of quarterly samples.

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NORTH CITY WATER DISTRICT

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SECTION 5

SYSTEM ANALYSIS



System analysis involves careful scrutiny of all parts of a water system including source, storage, pumping and network of water mains. Mature water systems are faced with many challenges including aging condition of system components, increasing demand through increased population, redevelopment from lower to higher density population, heightened need for conservation, natural hazards and increasing regulations. These factors place a strain on the existing water system while the District is charged with providing the highest quality water service at an affordable rate for its customers.

Fire flow demands commonly exert the most strain on a water system. Large volumes of water are extracted over extended periods of time from a single point in the system where a fire event occurs; the strain on the system is evident with high velocities in water mains, low pressures at high points in the system and large losses of pressure throughout the pipe network. The best way to protect the water system against the strains of fire or other emergency events is to ensure that the source, storage, pumping and network of water mains are optimally designed and operated.

The City of Shoreline has identified areas with significant redevelopment potential. Many of the District's older water system facilities, mostly water mains, were not designed to accommodate the increased fire flows associated with the proposed increased land use density. With the increased redevelopment activities, the District faces a significant challenge to upgrade its relatively aged and likely undersized water system facilities in these areas while providing cost-effective and efficient water service for its customers.

Water quality is also important in managing a water system. A few places have been identified in the service area where water remains in the system longer than the District would prefer. New connections to both the Tolt and the Northwest Sub-Regional transmission mains were previously identified as key projects to improve water quality:

- The new Supply Station 2, fill line and reservoir mixing project for the 2.0 MG Reservoir were completed in 2010.
- The Supply Station 4 project, a connection to Seattle Public Utilities (SPU's) Northwest Sub-Regional system, was completed in 2011.
- A new connection to the Tolt River Transmission Main, to be designated Supply Station 5, is anticipated to be completed in the next few years.

5.1 PRESSURE ZONE CONSIDERATIONS

Key to analysis of the water system is consideration of water flow throughout the system to improve circulation and available fire flow and reduce water age in isolated portions of the system. This is particularly important in the southern portion of the service area, where water circulation is limited and/or distance from source to delivery is greatest. The existing pressure zone configuration is outlined in Section 3 and shown graphically on Figures 3-1 and 3-2¹. Improvements related to proposed reconfiguration of the pressure zones are detailed with the distribution system analysis shown in Figure 5-1 and noted on the Water System Improvements Map and Capital Improvements Plan included in Section 6. In general, the improvements involve:

- Creation of a new 520 Pressure Zone to reduce portions of the 590 and 432 Pressure Zones service areas, to provide more appropriate pressure to customers in those areas. This will be accomplished through a series of projects as presented in Section 6.
- Conversion of the existing supply station at Booster Station 1 (BS-1) to be a gravity supply station.
- Addition of a water storage reservoir with overflow elevation of approximately 400 feet, to be filled from the existing supply station at BS-1 through a PRV and an altitude valve. The existing BS-1 will remain in service for continued supply to the 590 zone until such time as a new BS-1 is completed. A new BS-1 will be constructed adjacent to the new reservoir to provide additional supply to the 590 Pressure Zone, and backup supply to the 520 Zone through a PRV as needed.

The current and proposed future pressure zones are shown in Table 5-1 (see Table 3-2 for list of current zones). The forecast water use without conservation in the system is summarized from Section 2 in Table 5-2 and those demands, by zone group, are the basis for the system analysis used to complete this Section of the WSP.

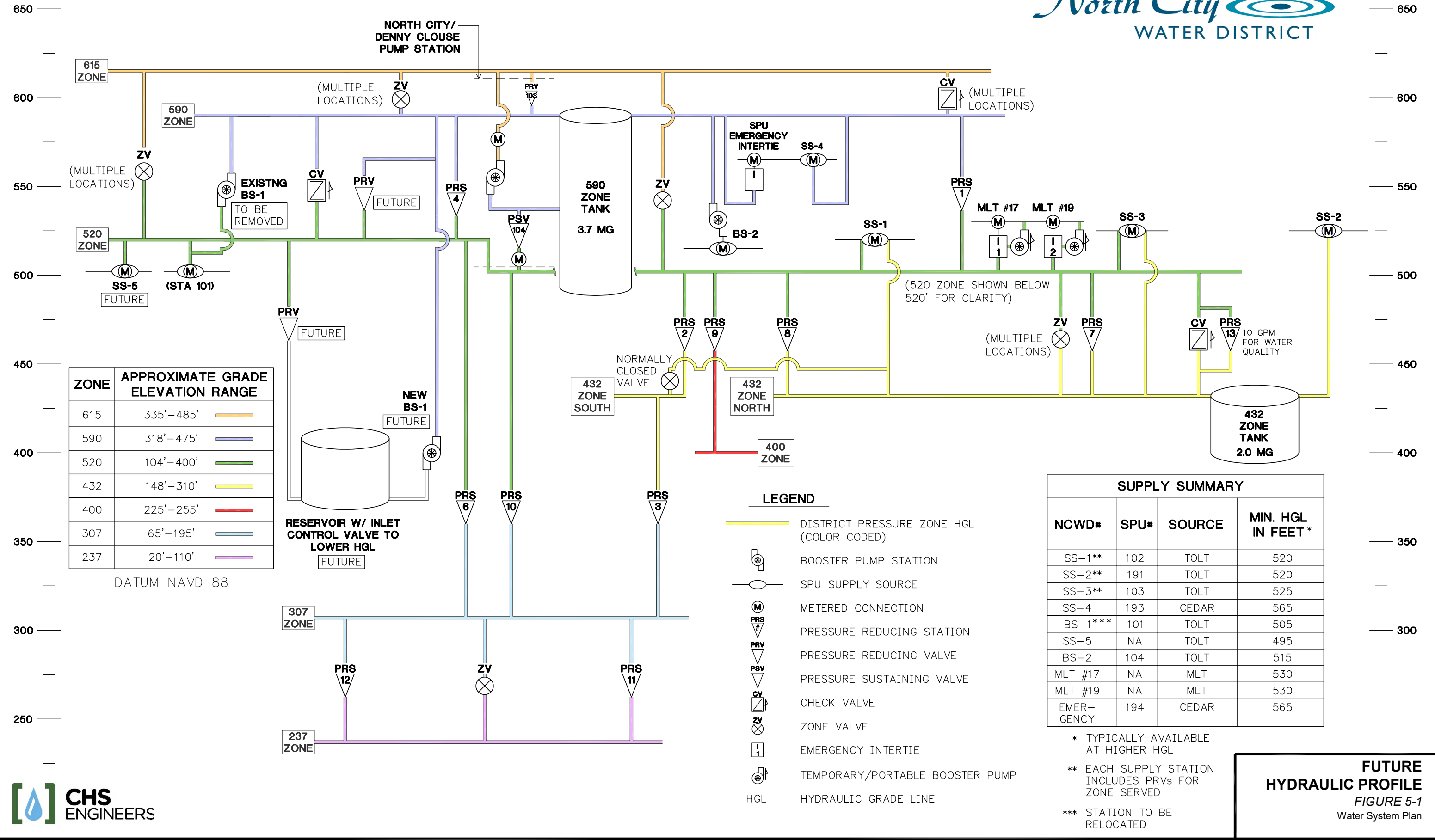
The lowest service pressures are at the highest elevations in the 432 Zone. Although the lowest pressures meet the DOH and District minimums, the District plans to configure the system to shift the south portion of the 432 Zone, including the area with lowest pressures, and combine it with the existing 502 Zone to create a 520 Zone. The 520 Zone will be served by the 3.7 MG Reservoir.

¹ Pressure zones are identified by their nominal highest hydraulic grade line elevation. For example, the 590 Pressure Zone or simply 590 Zone is that pressure zone with a nominal maximum hydraulic gradient at elevation 590 feet.

A summary of the distribution system hydraulic analysis in support of the zone adjustments is included in Appendix H.

TABLE 5-1 PRESSURE ZONES	
Current	Future
615	615
590	590
502	520 (new*)
432	432 (smaller**)
400	400
307	307
237	237
* New zone created from 502 Zone and from portion of south part of current 432 Zone, south of NE 178 th St. ** North portion, and small part of current south portion, north of NE 178 th St.	

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TABLE 5-2													
HISTORICAL AND PROJECTED WATER DEMANDS BY PRESSURE ZONE – WITHOUT CONSERVATION													
	2017	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2034	2039
2.0 MG Reservoir (Zone 432)													
ADD (MGD)	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.11	0.12
MDD (MGD)	0.17	0.18	0.18	0.18	0.18	0.18	0.18	0.19	0.19	0.20	0.20	0.21	0.23
PHD (gpm)	246	253	253	254	254	254	259	265	270	276	281	294	308
3.7 MG Reservoir (Zones 615, 590, 515, 502, 400, 307, 237 and a portion of 432)													
ADD (MGD)	1.61	1.63	1.63	1.64	1.64	1.65	1.67	1.68	1.70	1.71	1.73	1.78	1.83
MDD (MGD)	3.14	3.16	3.16	3.18	3.19	3.21	3.24	3.27	3.30	3.33	3.36	3.45	3.56
PHD (gpm)	3,448	3,470	3,477	3,494	3,509	3,527	3,558	3,590	3,621	3,653	3,683	3,788	3,906
TOTAL													
ADD (MGD)	1.70	1.72	1.72	1.73	1.73	1.74	1.76	1.78	1.80	1.81	1.83	1.89	1.95
MDD (MGD)	3.31	3.33	3.34	3.36	3.37	3.39	3.42	3.46	3.49	3.52	3.56	3.67	3.79
PHD (gpm)	3,694	3,723	3,730	3,748	3,763	3,781	3,818	3,855	3,891	3,929	3,964	4,081	4,214

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5.2 SOURCE ANALYSIS

The Washington State Department of Health (DOH) Water System Design Manual (WSDM) requires that “[All] public water system[s] must have sufficient source capacity to meet the demands of its customers as stipulated in WAC 246-290-222(4). The source(s), in accordance with WAC 246-290-130(1), must provide drinking water of the highest quality feasible. It is further required that the source(s) be sufficient to provide reliable service in accordance with the stipulations of WAC 246-290-420.”

The District system is supplied water by SPU through seven existing supply stations. Five supply directly into the District system at the hydraulic gradient available in the SPU system and two require the District to increase pressure for service within its pressure zones. Five stations receive water from the SPU Tolt delivery system and two receive water from the SPU Cedar delivery system, through the SPU Northwest Sub-Regional Supply System. One of the SPU Cedar supply stations is designated for emergency supply only.

Supply Station 2 (SS-2) provides lead supply to the north portion of the 432 Zone. SS-1 and SS-3 provide supply for the 502 Zone, supply the 400 Zone indirectly through a pressure reducing station and can provide additional supply for both the north and south portions of the 432 Zone. The 307 and 237 Zones can also be served by SS-1 and SS-3 indirectly through the south portion of the 432 Zone. Booster Stations 1 and 2 (BS-1, BS-2) provide pumped supply to the 590 Zone and, through the 3.7 MG Reservoir, to the 615 Zone Booster Pump Station (North City/Denny Clouse Pump Station) which provides pumped supply to the 615 Zone. The 615 Zone is a closed zone². SS-4 and a nearby SPU emergency intertie provide supply from SPU's Northwest Sub-Regional Supply System to the 590 Zone. The hydraulic grade line of the Northwest Sub-Regional Supply System is also 590 feet so pumping to the District is not necessary. Since supply from BS-1 and BS-2 require pumps and consume energy, the District takes all necessary measures to minimize water conveyance from the 590 Zone into lower zones. However, BS-1 and BS-2 supply the 3.7 MG Reservoir, which provides necessary storage for seven zones: 615, 590, 520 (proposed)/502 (current), 432 (south portion), 400, 307 and 237 Zones.

The Source Analysis and Storage Analysis presented below were conducted by grouping zones based on the system configuration presented above, and the demand forecast as indicated in Table 5-2. The Source Analysis is summarized in Table 5-3.

² As described in Section 3, the District considers closed zones as those that rely on booster pump for system pressure, without an in-zone reservoir, or a zone that relies on supply from a zone with higher pressure to determine its service pressure, without an in-zone reservoir.

DOH identifies the required source capacity as the total maximum day demand (MDD). This can be calculated on the basis of a source being available 24 hours a day. DOH recommends considering the types of supply systems and if a reduced time period, such as 20 hours, is appropriate for a given source to operate. The District's supply capacity is a maximum³ of 3,330 gpm. Supply at that rate over 24 hours yields 4.80 MGD whereas supply at that rate over 20 hours yields 3.97 MGD. Both supply values exceed the forecast MDD in year 2039 of 3.79 MGD (see Table 5-2). Therefore, the District has adequate supply available for the planning period. The additional capacity forecast to be available in 2039 under the two supply operating-duration scenarios is 698 gpm and 143 gpm, respectively.

Prior system planning under prior DOH requirements considered the impact of needing to replenish fire suppression storage within 72 hours, in addition to meeting system MDD. Both zone groups analyzed have schools located within their respective boundaries. According to District policy and the International Fire Code (IFC), a fire flow rate of 3,500 gpm for three hours duration must be provided to light industrial areas and schools, both of which requires a minimum fire suppression storage volume of 630,000 gallons (3,500 gpm for three hours). For certain subareas and special study areas within the City of Shoreline (within the 615 Zone), the District will require the flow requirements identified by IFC be met. Recently constructed projects have required fire flows of 3,500 gpm for three hours of duration. It is possible some of these subareas and special study areas may require fire flow rates of 4,500 gpm for four hours duration, which will require a minimum fire suppression storage volume of 1,080,000 gallons⁴. To replenish these volumes within 72 hours, the flow rates must be at least 146 gpm and 250 gpm, respectively. As noted above, the surplus supply capacity forecast for year 2039 is 698 and 143 gpm, for 24-hour and 20-hour supply durations, respectively. If the system's full 24-hour supply capacity is considered, the District can still meet the 72-hour fire suppression storage replenishment criteria. However, the District would fall short if of meeting this criterion if supply were limited to 20 hours. However, applying the 20-hour reliability criteria during an infrequent need to fully replenish fire suppression storage would be a very conservative approach.

Three emergency interties are maintained and operated by the District and are sources of supply under emergency conditions only. Therefore, the interties are not considered in the Source Analysis.

3 The SPU supply contract is a "full requirements contract" subject to specific limitations. Exhibit II to the contract presents the "maximum flow rate up to which the minimum hydraulic gradient applies".

4 See Storage Analysis – Fire Suppression Storage in Section 5.3 for more discussion of storage volumes.

The source capacity analysis is summarized in Table 5-3. Adequate source capacity is available through the 20-year planning period, relying only on the six SPU supply stations and corresponding contract supply rate of 3,330 gpm.

A proposed source addition is SS-5, as an additional point of service from SPU. SS-5 is proposed to supply the 520 Pressure Zone directly from SPU's Tolt River Transmission Main without pumping. The proposed source addition's cost estimate and proposed schedule is presented in Section 6.

Other relevant DOH recommendations should be considered in the sizing of the supply source booster pump stations and These criteria are discussed in Section 5.4.

5.2.1 615, 590, 520 (proposed), 502, 432, 400, 307 and 237 Pressure Zones

Under normal operating conditions, BS-1, BS-2 and SS-4 supply capacities will be capable of meeting the required source capacity of 2,881 gpm in the year 2039. SS-1 and SS-3 are capable of supplying the 502 Zone and 400 Zone, and 432 (south portion) and lower zones indirectly via pressure reducing stations; however, SS-1 and SS-3 will not be capable of refilling storage for the 502 lower zones. Storage for the 502 and lower zones is provided by the 3.7 MG Reservoir, which, in turn, is supplied by BS-1, BS-2 and SS-4. SS-2 will adequately serve the 432 Zone. The future 520 Zone will be supplied by SS-1, SS-3, future BS-1 (through future PRV), and by SS-5 once it is constructed. BS-1 (existing and future) will be able to supply the 3.7 MG Reservoir. The current supply station (BS-1/SPU 101) will be the source for the proposed future reservoir with overflow at a lower hydraulic grade line. BS-1 will be moved from the current location to downstream of the new reservoir, to provide ultimately the same supply service, with in-line additional storage.

TABLE 5-3
Source Analysis by Grouped Zones and Year

Year	Zones	ERUs	MDD (gpm)	FSS Replenishment Rate ³ (gpm)	Source (gpm)		
					Required ⁵	Existing/ Proposed ⁴	Surplus (Deficit)
2019	590 Zone Group ¹	10,573	2,193	250	2,443	3,001	558
	432 Zone Group ²	589	122	146	268	329	61
	Full System	11,162	2,315		2,565	3,330	765
2024	590 Zone Group ¹	10,749	2,230	250	2,480	3,004	525
	432 Zone Group ²	593	123	146	269	326	57
	Full System	11,342	2,353		2,603	3,330	727
2029	590 Zone Group ¹	11,234	2,330	250	2,580	2,998	418
	432 Zone Group ²	675	140	146	286	332	46
	Full System	11,909	2,470		2,720	3,330	610
2034	590 Zone Group ¹	11,559	2,398	250	2,648	2,997	349
	432 Zone Group ²	715	148	146	294	333	39
	Full System	12,274	2,546		2,796	3,330	534
2039	590 Zone Group ¹	11,927	2,474	250	2,724	2,997	273
	432 Zone Group ²	758	157	146	303	343	40
	Full System	12,685	2,631		2,881	3,330	449

1. 615, 590, 520/502, 432 (south portion), 400, 307, and 237 Zones include sources SS-1, SS-3, SS-4, BS-1, and BS-2.
2. the northern portion of the 432 zone is served by SS-2.
3. Fire Suppression Storage (FSS) Replenishment Rate is the rate required to replenish the largest fire flow demand and duration within a 72-hour period.
4. Current SPU contractual maximum supply rate under minimum supply hydraulic gradient of 3,330 gpm is presented as Existing/ Proposed Source supply rate and is apportioned between the sets of zones presented based upon the Required gpm per each zone.
5. Total Required Source supply rate includes only larger of two FSS Replenishment Rates (i.e., 250 gpm).

5.2.2 432 Pressure Zone.

The 432 Zone (north portion) is supplied directly from SS-2. The 432 Zone may also be supplied indirectly from SS-1 and SS-3 via pressure reducing stations integrated with those supply stations. The existing BS-1 and BS-2 are also capable of supplying the 432 Zone (south portion) through the 590 Zone via PRS-4.

SS-1 and SS-3 receive water at minimum contract hydraulic gradients from SPU of 520 feet and 525 feet, respectively, and are each reduced in pressure by PRVs to the 432 Zone (north and south portions) and existing 502/future 520 Zone. SS-2 receives water from SPU's Tolt River Transmission Main at minimum hydraulic gradient of 520 feet.

SS-4 will be able refill the 2.0 MG reservoir under ADD conditions if there is no flow from the Tolt supply line. Flows will be routed through the upper zones through PRVs into the reservoir and lower zones.

5.2.3 Emergency Interties

The District has one existing emergency connection with SPU (adjacent to BS-2 and SS-4) and two existing connections to the City of Mountlake Terrace Water System (MLT #17 and MLT #19). The two existing connections with the City of Mountlake Terrace serve as emergency water sources for both systems. The connections are able to gravity-flow through PRVs from the City of Mountlake Terrace to North City Water District and require pumping to convey water from North City Water District to the City of Mountlake Terrace. For more information on the two interties, refer to Section 3.

5.2.4 Recommended Source Improvements

North City Water District does not currently have nor is forecast to have a deficiency in source capacity (i.e., physical or contract capacity) through the year 2039. However, the following source improvement is proposed to improve source reliability:

1. Develop an additional supply station (SS-5) from the SPU Tolt River Transmission Main for the 590 Zone conversion to 520 Zone along 5th Avenue NE north of NE 145th Street. The new supply station would serve as the primary source of supply for the converted 520 Zone and would not require pumping. A contract modification would be required between the District and SPU. Construction of SS-5 is anticipated in the future and is presented in Section 6 as a specific project.
2. Formalize a contract between the District and SPU to address supply from SS-5.

5.3 STORAGE ANALYSIS

The District has approximately 5.7 million gallons (gross volume⁵) of water storage in two reservoirs. For the purpose of this analysis, the system is separated into two pressure zone groups. The 2.0 MG Reservoir serves the 432 Zone (north portion) and the 3.7 MG Reservoir serves the remainder of the zones.

The 2.0 MG Reservoir (in the north portion of the 432 Zone) receives water supply directly from SS- 2 (lead), SS-1 (lag) and SS-3 (lag) and water supply indirectly from the 502 Zone through PRSs 2, 7, 8 and 13.

The 3.7 MG Reservoir serves Zones 615, 590, 520 (proposed), 502, 432 (south portion), 400, 307 and 237. The reservoir is supplied by BS-1, BS-2, and SS-4.

Table 5-4 lists storage components by zone group and year and identifies each zone group's capability of providing adequate storage through the year 2039.

The DOH requires that water storage facilities be designed such that the following five storage components are considered: Dead Storage (DS), Fire Suppression Storage (FSS), Standby Storage (SB), Equalizing Storage (ES), and Operational Storage (OS). The DOH WSDM Section 7.1.1.4 and WAC 246-290-235(4) allow consolidation of the Standby and Fire Suppression Storages, unless the local fire authority requires such volumes to be additive. Consolidation of the Standby Storage and Fire Suppression Storage allows a system to use the greater of the two storage component volumes. The District presently allows consolidation, or nesting, of the Standby and Fire Suppression Storage. The District plans to transition to an additive approach in order plan to have more storage available for emergency situations. This change is reflected in Table 5-4 below. Additionally, the District plans to increase available storage by constructing an additional storage facility in the 590 Zone Group. This project is discussed further in Section 6, and not accounted for in Table 5-4.

5.3.1 Dead Storage Analysis

Dead storage (DS) is the amount of water in a tank or reservoir that is below the elevation required to supply all customers with the minimum design pressure. With completion of the NC/DC Pump Station in 2017 (assumed to always be operational with the permanent emergency generator located at the station), all of the 3.7 MG Reservoir volume is available for pumped supply to the 615 zone (and in turn back to the 590 zone through PRV) or directly to the 502 and lower zones through PRVs, for use as ES, SB or FSS storage. Therefore, there is no DS for the 3.7 MG Reservoir.

⁵ Nominal volumes are reported for reference, but actual volumes are considered for the storage analysis. The actual volume is 9,100 gallons or 0.2% less than the total nominal volume.

The 2.0 MG Reservoir base elevation is higher than the elevation to establish a minimum of 20 psi for the highest customer in the 432 Zone, so there is no DS in this reservoir.

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TABLE 5-4
STORAGE ANALYSIS BY GROUPED ZONES AND YEAR

Year	Zones ¹	ERUs	Grouped Zone Gross Vol. (MG)	Storage Component Volume (MG)				Effective Volume ⁸ (MG)	Storage Surplus (Deficit) ⁹ (MG)
				Dead ²	Standby 3,5	Fire Suppres. 4,5	Equaliz. ⁶	Operat. ⁷	
2020	590 Zone Group	10,573	3.7	0	0.73	1.08	0.05	0.60	3.04
	432 Zone Group	589	2.0	0	0.04	0.63	0.01	0.48	1.43
	Total	11,162	5.7	0	0.77	1.08	0.06	1.08	
2024	590 Zone Group	10,749	3.7	0	0.82	1.08	0.06	0.60	3.03
	432 Zone Group	593	2.0	0	0.05	0.63	0.01	0.48	1.43
	Total	11,342	5.7	0	0.86	1.08	0.07	1.08	
2029	590 Zone Group	11,234	3.7	0	1.08	1.08	0.08	0.60	0.84
	432 Zone Group	675	2.0	0	0.06	0.63	0.01	0.48	0.82
	Total	11,909	5.7	0	1.14	1.08	0.10	1.08	
2034	590 Zone Group	11,559	3.7	0	1.25	1.08	0.10	0.60	0.66
	432 Zone Group	715	2.0	0	0.08	0.63	0.01	0.48	0.81
	Total	12,274	5.7	0	1.33	1.08	0.11	1.08	
2039	590 Zone Group	11,927	3.7	0	1.44	1.08	0.12	0.60	0.45
	432 Zone Group	758	2.0	0	0.09	0.63	0.02	0.48	0.79
	Total	12,685	5.7	0	1.53	1.08	0.13	1.08	

1. Grouped Zone Gross Vol. includes total gross volume of storage facilities in grouped zone.

2. Dead Storage includes the stored volume that is not available to all customers at a minimum design pressure. The construction and operation of the North City Pump Station enabled the use of what had previously been dead storage in the 3.7 MG reservoir.

3. Standby Storage determined by the DOH-recommended minimum of 200 gallons/ERU, with a reduction based on the surplus supply available.

4. Fire Suppression Storage is a volume available at a minimum pressure of 20 psi to all customers and includes the volume consisting of the highest minimum required fire flow rate and duration for the zone group.

5. District currently considers Fire Suppression and Standby Storage to be nested. As a long term plan the District desires to un-nest Fire and Standby storage in order to have more storage available for emergency needs. As indicated in Section 6, the District intends to construct additional storage capacity. The table does not reflect the capacity of that additional facility.

6. Equalizing Storage – refer to Section 5.3.4.

7. Operational Storage – refer to Section 5.3.5.

8. Effective Volume is the total volume of the reservoir less any dead storage.

9. Storage Surplus is the Effective Volume, less Standby, Fire Suppression, Equalizing and Operating Storage volumes.

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5.3.2 Standby Storage Analysis

Standby Storage (SB), required by the DOH, provides storage in an event when sources of supply or supply capacity are temporarily unavailable or diminished. The system has multiple points of supply from SPU, and all but one station for normal supply is served by the SPU Tolt supply line. Should either the Tolt or Northwest Sub-Regional source become unavailable, the entire District supply must be and can be provided by the other source, including but not limited to supply from the SPU emergency intertie. The District understands, from its review of the SPU contract and planning documents and discussion with SPU that the full contract amount of 3,330 gallons will be available from either source, provided that one source or the other is operational⁶. The Northwest Sub-Regional source serving SS-4 and the SPU emergency intertie will be pumped by SPU to the gradient necessary (565 feet) for service to the District's 590 zone.

Generally, previous DOH requirements resulted in the SB volume necessary to supply the system ADD for two days, with the largest source of supply out of service if more than one source. The recently updated DOH WSDM revises that approach. The current primary SB equation directs the system to consider its local needs, conditions and customer expectations to determine how much volume per day and how many days. DOH recommends a minimum of one day of MDD. As discussed in Section 2, the MDD/ADD peak factor is 2.0. Therefore, the current DOH recommendation is essentially the same as two days of ADD.

DOH requirements then consider the needs of single source versus multiple source systems. DOH recommends more than one day of MDD for single source systems but leaves the determination of the appropriate volume to the purveyor. For multiple source systems, DOH will consider reduced SB volumes for the minimums described above, with justification. Considerations may include reduced SB if nested with FSS, but only if FSS is greater than SB or two or more sources with backup power, and storage and supply capacity to meet PHD at 20 psi or more, with largest source out of service. DOH also recommends a minimum of 200 gallons per ERU for SB volume for multi-source systems. Using either two days at ADD or one day at MDD results in approximately the same volume per ERU of about 290 gallons.

The District system has multiple sources of supply including two (SS-4 and SPU Emergency Intertie) from the Northwest Sub-Regional source. Under most

⁶ SPU Full Requirements Contract (2001), Resolution and Agreement adding Supply Station 4 (2010), Technical Memorandum for Supply Station 4 (2011), Modification to Exhibit 4II of Wholesale Water Supply Contract (2013), Amended Agreement for Wheeling Water Between the City of Seattle and North City Water District (2016), Modification to Exhibit II of Wholesale Water Supply Contract (2019), Appendix C-7, System Storage Level of Reliability, SPU *Water System Plan* (2019), and personal communication between District General Manager and SPU Representative (May 2018).

circumstances, the District anticipates that the SPU contractual maximum supply rate of 3,330 gpm under minimum supply hydraulic gradient will be available from either the Northwest Sub-Regional or Tolt source should the other source become unavailable. Under such conditions, no SB volume is necessary throughout the 20-year planning period. As demonstrated in Section 5.2, the contract supply amount exceeds the year 2039 forecast MDD by 698 gpm or 1.0 MG over 24 hours. Given the complexity of the supply system and transmission/distribution network, the system conditions for supply and storage for each reservoir zone group have been evaluated. To analyze the individual zone groups the 3,330 gpm contract amount was allocated to each zone based on the MDD forecast of the appropriate year, with the assumption that the full allocated amount would be available from either source (i.e. Tolt or Cedar). This approach also shows no required standby storage for the forecast period, as the capacity of the backup source matches the capacity of the primary source.

The next consideration is whether to follow the DOH recommendation for including a minimum of 200 gallons per ERU for SB volume. In year 2039, that recommended volume is forecast to be 2.54 MG. With the additional contract supply capacity available of 1.0 MG in year 2039, the District plans to decrease the recommended volume of SB, for analysis purposes, by the amount of additional supply capacity. For example, for year 2039, the minimum of 2.54 MG will be reduced by 1.0 MG to designate the minimum recommended SB volume at that time of 1.54 MG.

5.3.3 Fire Suppression Storage Analysis

Fire Suppression Storage (FSS), required by the DOH, is a volume of stored water to be used in emergency conditions such as during a fire event. The minimum volume for FSS is equivalent to the maximum fire flow rate for the duration required by the local fire authority. DOH requires that the water system must be capable of meeting fire flow requirements while maintaining a minimum pressure of 20 psi throughout the distribution system.

The minimum FSS volume for the District represents a fire event at high density residential or light industrial areas or a school, which incur the largest required fire flow demand and duration. The 2.0 MG Reservoir has a school located within its zones. At 3,500 gpm for a three-hour duration, the required FSS volume in the 2.0 MG Reservoir is 630,000 gallons. The 3.7 MG Reservoir also has a school within its pressure zones, which would require 630,000 gallons of FSS. Also included in the 3.7 MG Reservoir service area is the potential for higher density development. At an anticipated future fire flow rate of 4,500 gpm for a four-hour duration, the required FSS volume for the 3.7 MG Reservoir is 1,080,000 gallons. As stated in the beginning of this section, the District currently allows consolidation, or nesting, of the Standby and FSS. This analysis considers FSS and SB separately and additively throughout the planning period.

5.3.4 Equalizing Storage Analysis

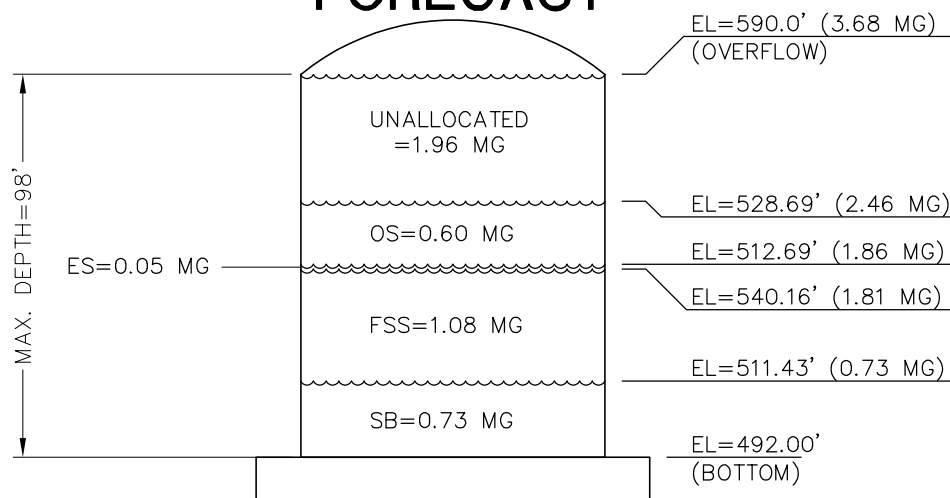
Equalizing Storage (ES) is a volume required by DOH when source pumping capacity cannot meet the peak hourly demand (WAC 246-290-235(2)). ES for systems without continuous pumping is based on a portion of the peak hourly demand (PHD). According to the contract with SPU, the maximum supply rate under minimum supply hydraulic gradient is 3,330 gpm. The ES is calculated for the overall system based on the full contract source, and the total PHD of the system. The individual zone groups have their own equalizing storage calculated from the zone groups' respective PHDs and the supply equal to the total contract amount apportioned by the annual MDD of each zone group. The required equalizing storage for the overall system and the individual Zone Groups increases slightly with the increase in demand through 2039 (see Table 5-4).

5.3.5 Operational Storage Analysis

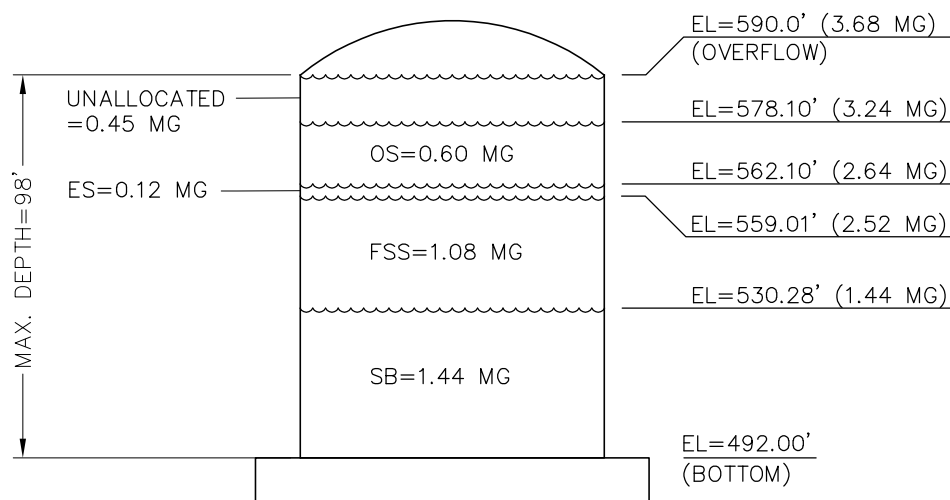
Operational Storage (OS) is the volume of the reservoir potentially unavailable due to the range of water level between supply on and off conditions. This volume is therefore presumed to be unavailable for ES, SB and FSS required volumes. For analysis of the District's facilities, the volume between the normal highest operating level and the overflow is also considered and calculated as OS.

The operational setpoints determined by the District for each reservoir results in an OS allowance of 0.60 MG in the 3.7 MG Reservoir, and an allowance of 0.48 MG in the 2.0 MG Reservoir. These allowances are not projected to change during the forecast period.

3.7 MG FOR 2020 DEMAND FORECAST



3.7 MG FOR 2039 DEMAND FORECAST



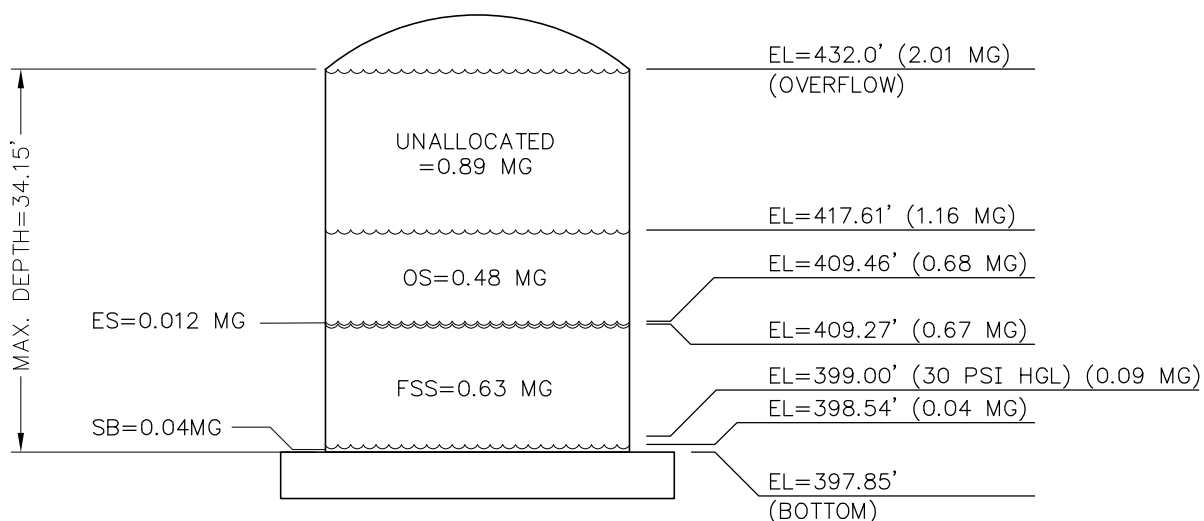
NOTES:

- DS IS 0 DUE TO TANK OUTLET AND A SERVICE CONFIGURATION. FULL VOLUME AVAILABLE TO SYSTEM THROUGH NORTH CITY PUMP STATION.

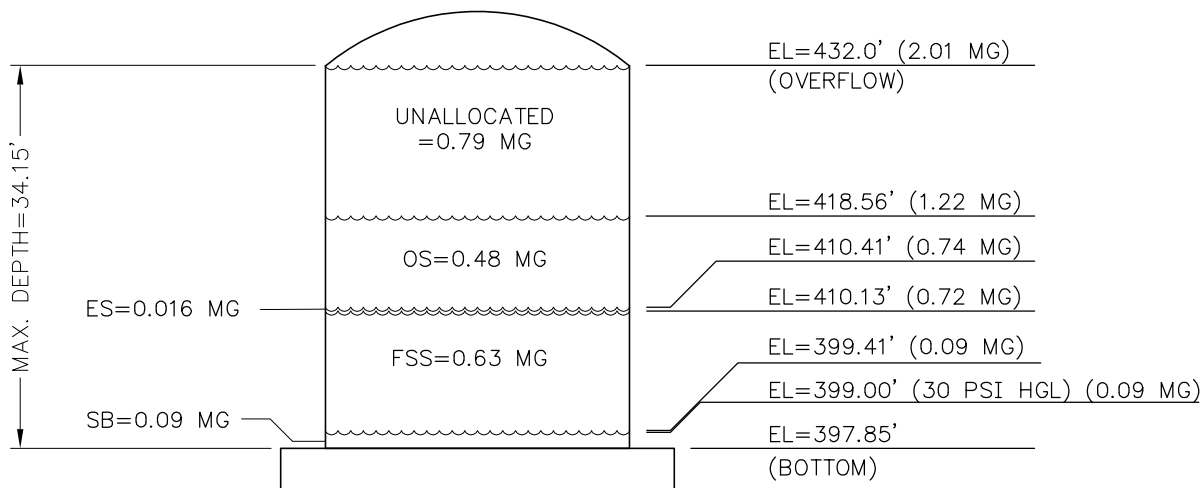
LEGEND:

OS=OPERATIONAL
STORAGE
ES=EQUALIZING STORAGE
FSS=FIRE SUPPRESSION STORAGE
SB=STANDBY STORAGE
DS=DEAD STORAGE

2.0 MG FOR 2020 DEMAND FORECAST



2.0 MG FOR 2039 DEMAND FORECAST



NOTES:

1. DS IS 0 DUE TO TANK OUTLET AND SERVICE CONFIGURATION.

LEGEND:

OS=OPERATIONAL STORAGE
 ES=EQUALIZING STORAGE
 FSS=FIRE SUPPRESSION STORAGE
 SB=STANDBY STORAGE
 DS=DEAD STORAGE

5.3.6 Recommended Storage Improvements

Both the 590 and 432 Zone Groups have sufficient storage for the forecast period, without nesting FSS with SB. This means that no storage improvements are strictly required to meet the requirements of the WSDM. However, the District is concerned with its ability to supply water in an extended duration emergency situation with no supply available. Therefore the District analyzed their storage capacity in terms of days of storage available in an emergency situation where no supply is available. The results of this analysis are summarized in Table 5-5.

TABLE 5-5		
ANALYSIS OF STORAGE FOR EXTENDED SUPPLY INTERRUPTIONS		
	590 Zone Group – 3.7 MG Reservoir	432 Zone Group – 2.0 MG Reservoir
<i>Per Analysis Summarized in Table 5-4</i>		
Standby + Unallocated Storage Volume (2039)	1.89 MG	0.88 MG
Days of ADD at 145 gpd/ERU	1.0 days	7.6 days
Days of MDD at 290 gpd/ERU	0.5 days	3.9 days
<i>Potential Additional Storage if FSS Not Utilized</i>		
Additional days of ADD provided by FSS	0.6 days	5.4 days
Additional days of MDD provided by FSS	0.3 days	2.8 days
<i>Additional Storage Provided by Future Reservoir</i>		
Additional Unallocated Storage Future Reservoir	1.52 MG	n/a*
Additional days of ADD provided by Future Reservoir	0.8 days	n/a*
Additional days of MDD provided by Future Reservoir	0.4 days	n/a*
<i>Maximum Storage Availability - all Scenarios</i>		
Days of ADD at 145 gpd/ERU	2.4 days	13.0 days
Days of MDD at 290 gpd/ERU	1.3 days	6.7 days
* The Future Reservoir is anticipated to be of similar capacity to the current 2.0 MG Reservoir, with similar allowance for OS volume. Future reservoir will increase storage in the 590 Zone Group and some of that volume could be used in the 432 Zone Group through the system and PRVs.		

The District plans to construct an additional storage facility to increase capacity in the 590 Zone Group to extend the duration that the District can serve the customers in the zone group.

Based on the analysis of days of available storage at the end of the planning period, an additional 1.52 MG of usable storage capacity would add approximately another day to the 590 Zone Group's storage capacity. Using the District's existing 2.0 MG Reservoir and preliminary planning by the District as a guide, recommended reservoir geometry was calculated for an additional storage facility. Per these calculations a 34-foot-tall, 100 foot diameter reservoir, with an allowance for OS depth that matches existing 2.0 MG Reservoir, will provide the additional 1.52 MG of usable (ES, FSS and SB) storage necessary to provide additional storage capacity for extended duration emergencies. The total nominal capacity of a reservoir with this geometry is 2.0 MG.

See Section 6 for more discussion of this project.

5.4 PUMPING ANALYSIS

The District operates three booster pump stations. BS -1 and BS-2 pump water from the SPU Tolt River Transmission Main to the 590 Zone and operate based on water levels in the 3.7 MG Reservoir. These stations operate as supply stations and pump to an open water surface. The NC/DC Pump Station boosts water from the 590 Zone to the 615 Zone through a multi-pump system equipped with variable frequency drives. During a large demand event in the 615 Zone, such as a fire event, the station has high flow pumps that will turn on to maintain pressure and meet demand in the 615 Zone. The 615 Zone is a closed zone, which means that the zone receives water supply from a storage facility open to atmospheric pressure through pumps to a closed pressurized system.

5.4.1 Pumping Criteria

The DOH requires that booster pump stations meet PHD and, also, for closed systems, meet fire flow plus MDD. BS-1 and BS-2 operate as open system booster pump stations and, also, as interties with SPU's Tolt Transmission Main. As such, BS-1 and BS-2 must meet the requirements identified in WAC 246-290. This intertie, because it comes from a separate water source, must be able to meet the MDD in conjunction with any storage facilities designed to accommodate peak demand periods on a daily or longer basis.

The District has only one booster pump station to be evaluated as a closed system booster pump station. The 615 Zone is a closed system because it does not have storage open to the atmosphere. For closed systems, where the booster pump station transfers water to a higher-pressure zone closed to the atmosphere, a booster station must be able to meet peak hourly demand at 30 psi minimum at all service connections. For reliability, the DOH recommends the BPS meet peak hourly demand when the largest capacity booster pump is out of service. Also, a closed system BPS must meet fire suppression requirements when the largest capacity booster pump that

is routinely used is out of service. In addition, if a closed system requires fire flow, the BPS must have backup power unless specific reliability requirements are met.

For open systems, where the booster pump station transfers water to a higher-pressure zone and the water surface is open to the atmosphere (i.e., BS-1 and BS-2), equalizing storage may be utilized to meet peak hourly demand and fire suppression storage may be utilized to meet fire flow demand. At a minimum, an open system BPS must meet maximum day demand and, also, must meet average day demand with the largest pump out of service for the system or specific pressure zone.

The NC/DC Pump Station meets the needs of the 615 Zone and provides standby and fire flow to multiple zones using what was previously dead storage. This station meets the criteria identified in the following section.

5.4.2 Pumping Analysis

The District recently completed the NC/DC Pump Station at the 3.7 MG Reservoir site to replace the former 615 Zone Booster Pump Station. The new pump station was designed to:

- Meet peak hourly demand at 30 psi minimum at all service connections. The pump station provides this capability when the largest pump is out of service.
- Meet fire flow plus maximum day demand.
- Meet fire suppression requirements when the largest capacity booster pump that is routinely used is out of service.
- Meet fire suppression requirements while maintaining 20 psi at all service connections.
- Have a permanent onsite backup power source.
- Provide capability to use the entire storage volume of the 3.7 MG Reservoir, to provide standby and fire flow for the 615, 590, 520 (proposed), 502, south portion of 432, 400, 307 and 237 Zones.

5.5 WATER DISTRIBUTION SYSTEM ANALYSIS

The District has approximately 96 miles of water main, not including individual customer service lines. The system is predominantly cast iron and ductile iron pipe, which make up approximately 77 percent and 22 percent of the system, respectively. Water main sizes vary from 2-inches to 20-inches in diameter, although 72 percent of the system consists of 6-inch and 8-inch diameter pipe. Refer to Section 3.5 for more detail on the existing distribution system. As part of this WSP, the District's water system hydraulic model was calibrated to field collected data as required by WAC 246-290-230(1).

The District's existing hydraulic model was reviewed and updated by BHC Consultants to provide current information regarding new system improvements and operational data on flows and facility operations. This was the third calibration effort for this hydraulic model. Field data was collected, and the model calibrated to match hydrant flow test data over a range of conditions (reservoir levels, pumps on/off). District telemetry data was used to verify the model was correctly predicting the pressures that were measured in the flow tests. A memorandum summarizing the model calibration is included in Appendix H.

Updated land use and flow demands were used in the updated hydraulic model. The updated hydraulic model is operated with facility settings that represent a “worst-case” scenario for MDD plus fire flow demand and PHD at current year and future year (2039). For example, water storage tank levels represent a drawdown of the full volume of each reservoir, as each reservoir has its full contents available for ES, SB and FSS storage volumes at 30 psi or greater (with pumping at the 3.7 MG Reservoir). This setting ensures that the system is analyzed at a point where stored volumes are limited as are system pressures as specified in the WSDM.

The purpose of analyzing the existing system is to determine areas of the system that require improvements to meet the current and projected demands of the system under the various constraints discussed above. Those areas requiring improvements at current and future conditions in the year 2039 are identified and reported in Section 6 – *Capital Improvement Planning*. The analysis led to consideration of a significant reconfiguration of the existing pressure zones, increasing the level of service and providing operational redundancy. A water age analysis was also performed, to compare the water age for the current system to that anticipated for the reconfigures distribution system and pressure zones. The proposed improvements ensure the District meets the following steady-state flow conditions for the current year and through 2039:

- Peak Hour Demand in each pressure zone and throughout the water system, under conditions that deplete all equalizing storage volume and assumes all sources are operating.
- Maximum Day Demand with and without fire flow events.

Those mains that did not meet the District design standards (identified in Section 4) were identified for improvements (Section 6).

5.6 SCADA SYSTEM ANALYSIS

The District maintains a SCADA system to manage water system activities and to keep record of system information. The District is currently in the process of updating the SCADA system to include:

- Add telemetry controls to the two emergency supply stations with City of Mountlake Terrace.

NORTH CITY WATER DISTRICT

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NORTH CITY WATER DISTRICT

SECTION 6

CAPITAL IMPROVEMENT PLANNING



6.1 OBJECTIVES

Capital improvement planning is a critical aspect of the Water System Plan (WSP) as it identifies which improvements are necessary to maintain the capacity and integrity of the water system for current and future customers. The planning process is focused on meeting the forecast demand as developed in Section 2 for the planning period. Improvements recommended in this section were identified in or arise from the system analysis documented in Section 5. These improvements are recommendations for planning purposes and may not be constructed and/or funded by the District. Rather, the proposed list of improvements is a basis for the District to plan and budget for facility maintenance and future improvements, as necessary in response to anticipated increasing demands. **The recommendations of this Section will support the District's annual budgeting process.** The rate of growth and area of increased development in a specific year is not known, but the District will be ready to implement projects, or direct privately-funded improvements, when and where increased development occurs. The schedule and scope of projects actually to be implemented will be based on the recommendations in this Section, but revised as appropriate given the conditions at that time. See Tables 6-2 and 6-3 for a list of recommended improvements, the Capital Improvement Plan (CIP)¹ and the corresponding facilities plans (Figures 6-1 and 6-2). The CIP identifies projects that are associated by the location and type of improvement, or common issue to be addressed by several projects. Specific projects determined to be necessary for local service as developer extensions and for new developments are not included in this CIP and will be determined at the time of application by the developer for water availability.

6.2 PROJECT COST ESTIMATES AND SCHEDULES

In order to provide long range planning of proposed water system improvements, detailed cost estimates are required. These cost estimates are based on a variety of factors, including: documented costs of performing similar kinds of work in the recent past; engineering judgment; the availability of labor; the time of year of construction; market conditions; and other factors affecting construction costs at the time that the work is performed. The planning level estimates provided in the WSP are intended to be conservative estimates which will be refined during the design process. It is important to

¹ The District's WSP, with CIP and annual updates of the District's capital budget are all intended to constitute the District's capital facilities plan as required by the State Growth Management Act.

realize that the actual design of the improvements and possible changes made during the design could significantly alter the cost of the project from the estimates presented in this WSP. Prior to the implementation of any recommended project, any scope or permit requirement changes should be reviewed and the cost estimate updated to reflect updated conditions.

The project cost estimates presented in the CIP are based on 2020² construction costs and include an allowance for allied costs to present total estimated project costs. These costs include construction costs plus a contingency of 10 percent plus overhead costs such as project administration, engineering, legal fees, taxes, etc. Overhead costs have been computed at 35 percent of construction cost. Total allied costs are estimated at 45 percent of estimated construction cost. Implementation of projects beyond year 2020 will need to include consideration of cost escalation to the year of construction.

6.3 CAPITAL IMPROVEMENT PLAN

The CIP for the District is presented in Tables 6-1, 6-2 and 6-3. As the District prepares and updates its CIP, it considers the needs of the system in several categories. Using this approach helps identify which projects are associated and/or necessary in a particular sequence to meet a given objective for the system or its management. Table 6-1 presents these categories. Table 6-2 presents all capital projects or programs identified for implementation throughout the 20-year planning period, including the recommended project start date and estimated project cost in 2020 dollars. The project ID numbers correspond to the District's 2020-2022 adopted budget. The project numbers beginning with 100 were identified as a result of the hydraulic modeling and are shown on Figures 6-1 and 6-2. These numbers differ from project numbers in previous water system plans. Table 6-3 presents a summary for those projects planned within the first 10 years of the planning period, also in 2020 dollars.

As reflected in Figures 6-1 and 6-2, the CIP includes projects anticipated to be completed by the District and projects anticipated to be privately funded. The CIP and supporting facilities plan figures include the system modifications associated with revising the 432 and 502 Pressure Zones to reduce the size of the 432 Zone and create the proposed 520 Zone. The proposed pressure zone configuration is indicated on Figure 5-1 and shown in plan on both Figures 6-1 and 6-2. Additional details regarding specific improvements are presented in Section 5 of the WSP.

² January 2020 ENR Construction Cost Index for Seattle is 12,122.

6.3.1 Project Scheduling

Projects as presented in Tables 6-2 and 6-3 have been scheduled based on known conditions at the time of completion of this WSP and are expected to change. The schedule is based on a number of variables including development conditions and requests, economic conditions and available funding from District rates, charges and/or assistance funding that may be available from state or federal sources. The District utilizes an annual budgeting process that includes review of project prioritization and scheduling. Scheduling is based on a variety of factors and wherever possible, the District strives to accomplish pipeline projects in conjunction with street overlay improvements and other proposed infrastructure improvement projects. By coordinating with other jurisdictions, costs savings are often realized through reduced project area restoration. Project scheduling mainly considers system performance and water pressures. Based on field work orders, the District is able to monitor the condition of pipelines and facilities and prioritize replacements based on known conditions.

Another factor for consideration is accomplishing District projects in coordination with developer financed improvements to the system. This approach provides a way for the District to work with developers on achieving the improvements within specific areas of the District. As discussed in previous sections, the District has coordinated with the land use planning efforts of the cities of Shoreline and Lake Forest Park to identify which areas of the District are likely to experience the highest levels of growth and redevelopment.

TABLE 6-1 PROJECT CATEGORIES	
Category	Description
A	Projects necessary to create the new 520 Zone
B	Projects necessary to accommodate proposed improvements by Sound Transit in vicinity of District facilities
C	Projects necessary to implement the recommended ShakeAlert Phase I and II actions and projects
D	Ongoing or periodic capital, equipment or planning and management activities
E	Ongoing annual activities within the system
F	Projects identified by the hydraulic modeling work to increase fire flow and reduce flow velocity
G	Miscellaneous projects planned within the next six years

TABLE 6-2 CAPITAL IMPROVEMENT PLAN						
Start Year	Year of Completion	Budget ID #	Category	Capital Improvement	Project Description	Estimated Project Cost (2020)
2020	2021	4	G	Maintenance Building	Complete construction on a new maintenance facility. Previously completed tasks include purchase of property, permitting, and design.	\$ 4,757,760
2020	2020	5	G	Maintenance Building Furnishings	Furnishings for new maintenance building.	\$ 129,000
2020	2028	7	D	Water System Plan Updates	This WSP will be submitted for approval for a period of 10 years. Two additional WSP updates are scheduled within the planning period.	\$ 600,324
2020	2030	8	G	GIS Project	Purchase ESRI software for one GIS station for the District. Annual costs will depend on the version purchased. North City Water District staff will work on scanning the district documents (\$15,000 - Scanner, \$6,000 - scanner software), locating valves, hydrants, water mains and meter boxes.	\$ 489,703
2020	2020	11	G	2.0 MG Reservoir Capital Improvements	The 2.0 MG Reservoir is beginning to develop leaks and should be assessed to apply an epoxy coating. Water quality within the tank shall also be reviewed and possibly add a PAX mixer, similar to the mixer installed in the 3.7 MG reservoir.	\$ 209,016
2020	2020	12	G	Supply Station at 2.0 MG Reservoir	Facilities and equipment will be gathered, fabricated and staged to implement a temporary customer water supply filling station at the 2.0 MG Reservoir, to facilitate supply if the transmission or distribution system is not able to meet the needs of all customers.	\$ 19,659
2020	2040	15	G	Supply Station at 3.7 MG Reservoir	Facilities and equipment will be gathered, fabricated and staged to implement a temporary customer water supply filling station at the 3.7 MG Reservoir, to facilitate supply if the transmission or distribution system is not able to meet the needs of all customers.	\$ 19,659

Start Year	Year of Completion	Budget ID #	Category	Capital Improvement	Project Description	Estimated Project Cost (2020)
2020	2031	38	E	Meter Replacement	The replacement of water service meters is an on-going capital effort and cost with significant efforts budgeted for 2020 and 2021. Automated meters were installed in 2014. For planning purposes, it is anticipated that all meters (presently about 8,100) will need to be replaced every 15 years. This effort is proposed over a three year period, to reduce budget and labor impacts.	\$ 3,095,507
2020	2039	39	E	Service Replacement	The replacement of water services is an on-going capital effort and cost.	\$ 1,068,140
2020	2039	40	E	Hydrant Replacement	The replacement of fire hydrants is an on-going capital effort and cost.	\$ 391,588
2020	2039	41	E	Valve Replacement	The replacement of water valves is an on-going capital effort and cost.	\$ 498,745
2020	2039	42	E	Technology Additions & Replacement	The replacement and upgrade of telemetry and communication equipment, including computers and software and cybersecurity measures, is an on-going capital effort and cost for the District.	\$ 684,688
2020	2039	43	E	Tools & Equipment	The completion of smaller capital procurements and infrastructure improvements is an on-going capital effort and cost for the District. An additional allowance is included every six years for replacement of printers.	\$ 277,200
2020	2039	44	G	Engineering and Modeling Reports	Upgrade Cross-Connection Control Plan, Hazard Mitigation, WIFA Risk and Resiliency Plan, Emergency Response Plans	\$ 894,753
2020	2027	14	G	Acquire additional land	The District will be relocating both booster stations to above ground locations.	\$ 1,100,000
2021	2021	6	C	Communications	New 2-way radio communication system for District staff with base units in the administration and maintenance buildings and mobile units in each District vehicle.	\$ 50,000

Start Year	Year of Completion	Budget ID #	Category	Capital Improvement	Project Description	Estimated Project Cost (2020)
2021	2023	10	G	System-wide - R&R PRV Stations	This ongoing program consists of the rehabilitation or replacement of old and deteriorating pressure reducing valves (PRVs) throughout the service area. The number of pressure reducing valves that are rehabilitated is estimated to be 2 to 3 per year based on the annual program budget and the rehabilitation costs.	\$ 234,937
2021	2021	13	G	Alarms & Cameras at three buildings	Replacement alarm sensors and cameras will be installed at the NC/DC Pump Station and the administration building and new sensors and cameras will be installed at the new maintenance building.	\$ 389,369
2021	2021	16	C	ShakeAlert projects	Several system-wide and site specific projects are recommended to implement the ShakeAlert system within the District, as detailed in Appendix L.	\$ 129,174
2021	2021	17	C	Shunt trip breakers for BS 1 and 2	Install shunt trip breakers in the two supply booster stations to activate in response to a seismic event.	\$ 86,738
2021	2039	18	G	Telemetry	Phase I-upgrade telemetry software in 2020. Phase II - add telemetry to two emergency supply stations with Mountlake Terrace in 2021. Scheduled updates every 10 years thereafter.	\$ 381,406
2021	2022	21	A	102-Connect northern end of 25th Ave	Install 8" water main to connect 590 Zone dead-end piping created by zone separation.	\$ 63,733
2021	2021	22	A	103-Remove PRV-5	Remove PRV-5	\$ 16,845
2021	2022	23	A	104-Install 8" water mains for looping	Install 400 feet of 8" water mains on NE 155th Street between 30th and 32nd Ave NE.	\$ 249,176
2021	2022	24	A	105a-Install new 8" main - 32rd/NE 158	Install 100 feet of 8" water mains on 32nd Ave NE at NE 158th St	\$ 106,758

Start Year	Year of Completion	Budget ID #	Category	Capital Improvement	Project Description	Estimated Project Cost (2020)
2021	2022	26	A	106-Relocate PRV-2	Relocate PRV from 25th to 28th Ave NE and NE 178th Street to maintain 432 hydraulic grade line for piping loop.	\$ 318,561
2022	2023	20	A	101-Install new 8" main to connect 590 Zone	Install 1000 lf of 8" water main NE 160th St/15th & 28th Ave connecting 590 Pressure Zone	\$ 569,318
2022	2023	25	A	105b-Install new 8" main - 33rd/NE 158	Install 80 feet of 8" water mains on 33rd Ave at NE 158th Street	\$ 96,875
2022	2023	29	B	114 -Jack & Bore SR522 Crossing	Jack & bore 8" pipe under Bothell Way to loop dead-end piping. This project supports improved resiliency and redundant supply path within the transmission/distribution system.	\$ 1,227,605
2022	2023	31	B	115-Replace outdated mains Bothell Way	Replace outdated existing 6" CI pipe with 8" watermain.	\$ 1,124,657
2024	2030	3	D	Vactor Truck	Replace District Vactor Truck every 7 years	\$ 1,060,900
2024	2025	36	F	131-Replace existing 6" on NE 200th St	Replace existing 6" with 8" at 25th Ave NE & NE 200th. Provide piping from PRV-7 to 12" in 25th Ave NE. Install 12" main in NE 200th, parallel to existing 6" & add 8" main.	\$ 807,814
2025	2027	9	G	Asset Management	Purchase Asset Management software for one workstation for the District. Annual costs will depend on the version purchased.	\$ 246,990
2025	2026	27	A	107-Install 12" main from Fircrest to 25th Ave NE	Install 12" water main to create southern 590 Zone loop for water quality and to maintain fire flow capacity. Install check valve and 8" fire flow PRV (#14) at 590-520 Zone boundary at 25th & NE 160th St.	\$ 1,007,918
2025	2025	35	F	121a-Replace lines on Forest Park Drive N	Replace existing 4" and 6" mains with 12" main on Forest Park Drive NE - North	\$ 26,523

Start Year	Year of Completion	Budget ID #	Category	Capital Improvement	Project Description	Estimated Project Cost (2020)
2026	2026	19	A	100-Install individual PRVs new 520 zone	Install individual PRVs to 400 properties to form new pressure zone.	\$ 453,147
2027	2029	34	C	119-New BS1 & 2 MG concrete reservoir	Install new BS-1 and associated yard piping. Install new 2.0 MG concrete reservoir. This project supports improved resiliency and redundant storage capacity within the supply and storage system.	\$ 9,510,897
2029	2030	28	A	108-New NS 520 Zone transmission	Create new north-south 520 Zone transmission, replacing 4" & 6" pipe in existing 520 Zone and paralleling 6" 590 Zone pipe to the south. This project supports improved resiliency and redundant storage capacity within the supply and storage system.	\$ 2,313,839
2029	2030	32	F	116-Replace outdated mains in Sheraton Beach	Replace outdated existing 6" CI pipe with 8" watermain.	\$ 2,238,436
2030	2030	30	C	114a-Replace WM in Sheraton Beach	Replace 1952 6" water mains with 8" DI water mains.	\$ 3,538,684
2030	2031	33	F	117-Install 8" 590 Zone piping to connect dead	Install 8" 590 Zone piping to connect dead-end.	\$ 786,890

Start Year	Year of Completion	Budget ID #	Category	Capital Improvement	Project Description	Estimated Project Cost (2020)
2032	2033	45	C (also A)	118-Install 12" gravity discharge line from SPU Tolt water main to relocate Booster Station 1	Install 2900 ft of 12" discharge line from SPU/Tolt pipeline connection to relocated BS-1. This project supports improved resiliency and redundant supply path within the transmission/distribution system.	\$ 2,321,223
2032	2033	45	F	120-Install new hydrant on 520 Zone piping	Install new hydrant on 520 Zone pipe across NE 202nd St. Paint existing hydrant E1-10 red to designate it as a low flow hydrant. This project supports improved resiliency and redundant supply path within the transmission/distribution system.	\$ 64,130
2032	2033	45	F	121b-Replace existing 6" mains on Forest Park Drive NE/South	Replace existing 6" mains with 12" main on Forest Park Drive NE - North. This project supports improved resiliency and redundant supply path within the transmission/distribution system.	\$ 292,728
2032	2033	45	F	122 - Replace existing 6" mains on 28th Ave NE & Ballinger Way	Replace 6" main with 12" main on 28th Ave NE & Ballinger Way. This project supports improved resiliency and redundant supply path within the transmission/distribution system.	\$ 927,880
2034	2035	45	F	123 - Replace existing 4" and 6" mains on 11th Ave NE/170th & 175th St	Replace existing 4" and 6" mains on 11th Ave NE. This project supports improved resiliency and redundant supply path within the transmission/distribution system.	\$ 926,430

Start Year	Year of Completion	Budget ID #	Category	Capital Improvement	Project Description	Estimated Project Cost (2020)
2035	2036	45	F	124-Replace 4" main on NE 185th St	Replace existing 4" main with 8" on NE 185th St. This project supports improved resiliency and redundant supply path within the transmission/distribution system.	\$ 705,650
2035	2036	45	F	125-Replace 4" main on NE 183rd St	Replace existing 4" main with 8" on NE 183th St & 29th Ave NE. This project supports improved resiliency and redundant supply path within the transmission/distribution system.	\$ 903,486
2036	2037	45	F	129-Replace 6"&8" line on 19th & Ballinger	Replace existing 6" & 8" mains with 12" mains on 19th Ave NE & Ballinger Way NE. This project supports improved resiliency and redundant supply path within the transmission/distribution system.	\$ 264,032
2036	2037	45	F	130-Install new hydrant on NE 185th St	Install new hydrant on 12" main across NE 185th St. District to paint existing hydrant red to designate it as a low flow hydrant.	\$ 58,686
2037	2038	45	F	127-Replace 4" main on 24th Ave NE	Replace existing 4" main with 8" on 24th Ave NE. This project supports improved resiliency and redundant supply path within the transmission/distribution system.	\$ 917,127
2037	2038	45	F	128-Replace 6" line on NE 171st St	Replace existing 6" main with 12" on NE 171st St. This project supports improved resiliency and redundant supply path within the transmission/distribution system.	\$ 280,765
2038	2039	45	F	126-Replace 4" main on 36th Ave NE	Replace existing 4" main with 8" on 35th Ave NE & NE 158th PL. This project supports improved resiliency and redundant supply path within the transmission/distribution system.	\$ 913,000
2039	2040	37	F	135-Replace 6" on NE Serpentine PL/10th Ave	Replace 6" main with 12" main in NE Serpentine PL at 10th Ave NE in the 590 Zone.	\$ 128,802
2039	2040	45	F	132-Replace 6" on NE 165th St	Replacing 6" main with 8" between cross and 6"x8" reducer, just upstream of PRV. This project supports improved resiliency and redundant supply path within the transmission/distribution system.	\$ 44,221

Start Year	Year of Completion	Budget ID #	Category	Capital Improvement	Project Description	Estimated Project Cost (2020)
2039	2040	45	F	133-Install new hydrant on 15th Ave NE-520 zone	Install new hydrant on existing 12" main in 15th Ave NE. District to paint existing hydrant B11-39 red to designate it as a low flow hydrant. This project supports improved resiliency and redundant supply path within the transmission/distribution system.	\$ 34,657
2039	2040	45	F	134-Install new hydrant on NE 169th St	Install a new hydrant on the existing 12" line on NE 169th Street in front of 1525 or 1603 NE 169th Street. This project supports improved resiliency and redundant supply path within the transmission/distribution system.	\$ 39,648
2039	2040	45	F	136-Replace 6" on NE Serpentine PL/12th Ave	Replace 6" main with 12" main in NE Serpentine PL at 12th Ave NE in the 590 Zone. This project supports improved resiliency and redundant supply path within the transmission/distribution system.	\$ 256,337
2039	2040	45	F	137-Replace 6" on NE 146th St	Replace 6" main with 8" (860') and 12" (480'). This project supports improved resiliency and redundant supply path within the transmission/distribution system.	\$ 1,028,812
2039	2040	45	F	138-Replace 8" on 20th Ave NE & 145th St	Replace 8" main with 12" or add hydrant on 12" main in NE 145th St & paint hydrant C1-22 red to meet 2,500 gpm fire flow. This project supports improved resiliency and redundant supply path within the transmission/distribution system.	\$ 81,048
2039	2040	45	F	139-Replace 6" on NE 155th St	Replace 6" main with 8" (355') and 12" (965') to meet 2,500 gpm fire flow. This project supports improved resiliency and redundant supply path within the transmission/distribution system.	\$ 1,012,744
2039	2040	45	F	140-Install new hydrant on 15th Ave-615 zone	Install new hydrant on existing 520 zone 12" main in 15th Ave NE. Paint existing hydrant C5-4 red to designate it as a low flow hydrant or remove it. This project supports improved resiliency and redundant supply path within the transmission/distribution system.	\$ 34,332

Start Year	Year of Completion	Budget ID #	Category	Capital Improvement	Project Description	Estimated Project Cost (2020)
2039	2040	45	F	141-Replace 6" on 14th Ave NE/NE 195th St	Replace 6" main in 14th with 8" (720') and 12" (400') between 15th Ave NE and NE 198th Street. Replace 8" main on 15th with 12" (80'). This project supports improved resiliency and redundant supply path within the transmission/distribution system.	\$ 915,153
2039	2040	45	F	142-Connect dead ends on 20th PL NE	Connect dead-ends and replace existing 4" main with 8". This project supports improved resiliency and redundant supply path within the transmission/distribution system.	\$ 467,863
2039	2040	45	F	143-Replace 6" on 14th Ave NE/Forest Park	Replace 6" with 8" main on 14th Ave NE. This project supports improved resiliency and redundant supply path within the transmission/distribution system.	\$ 711,434
2039	2040	45	F	144-Replace 6" on NE 172nds St	Replace 6" with 12" main on NE 172nd Street. This project supports improved resiliency and redundant supply path within the transmission/distribution system.	\$ 325,583
2039	2040	45	F	145-Install 8" on Ballinger Way in 432 zone	Install 590' of 8" main to create a loop. This project supports improved resiliency and redundant supply path within the transmission/distribution system.	\$ 416,620
TOTAL CAPITAL IMPROVEMENT PLAN - \$ 55,345,321						

Notes:

1 - Project costs are in 2020 dollars. The ENR Construction Cost Index for Seattle in January 2020 is 12,122.

2 - CIP is presented through year 2039. The full costs for projects proposed to be started in 2039 but to be completed in 2040 are reported as 2039 costs. The cost of annual programs anticipated to continue beyond 2039 are not included.

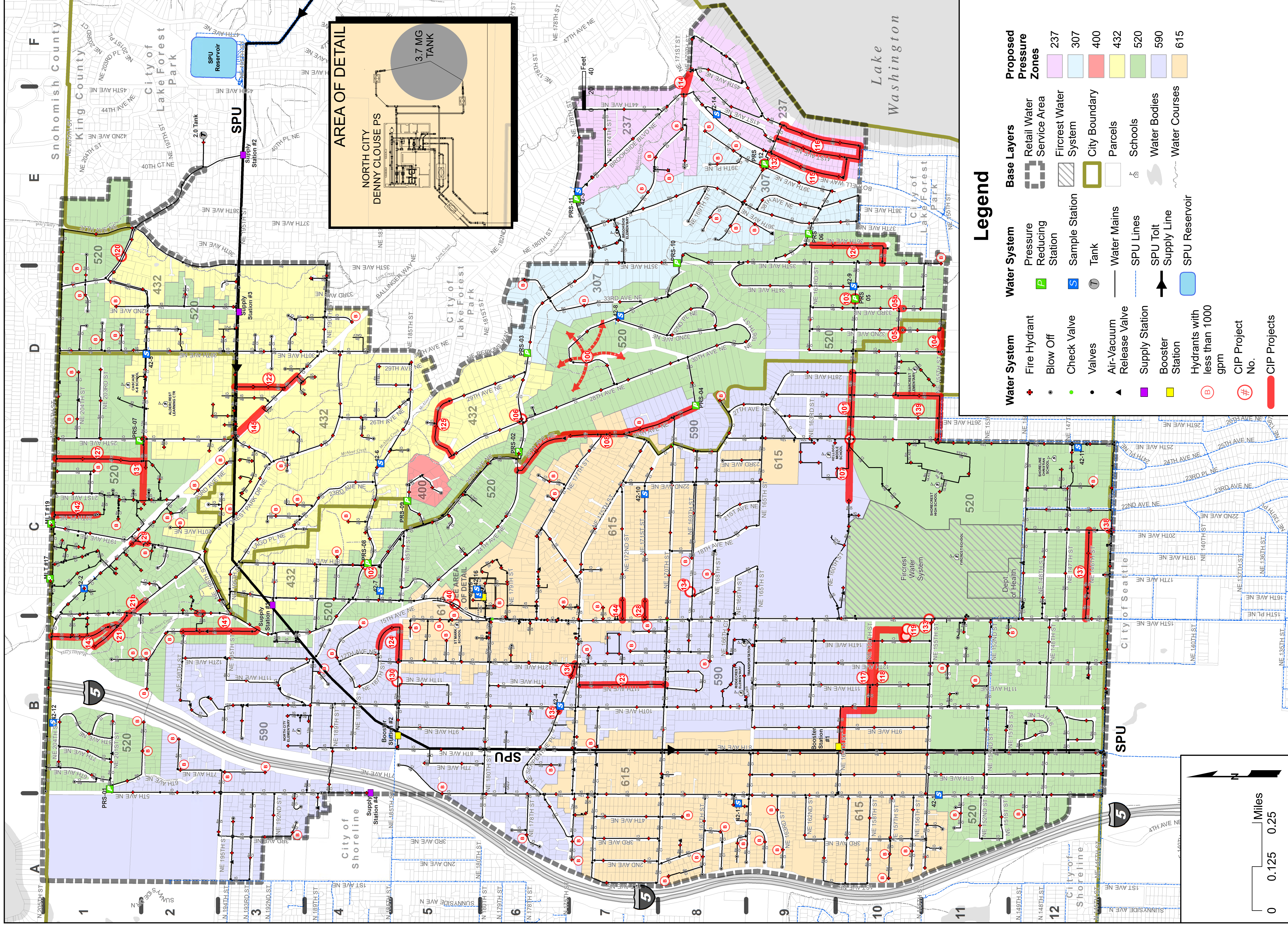
TABLE 6-3
10 YEAR CAPITAL IMPROVEMENT PLAN

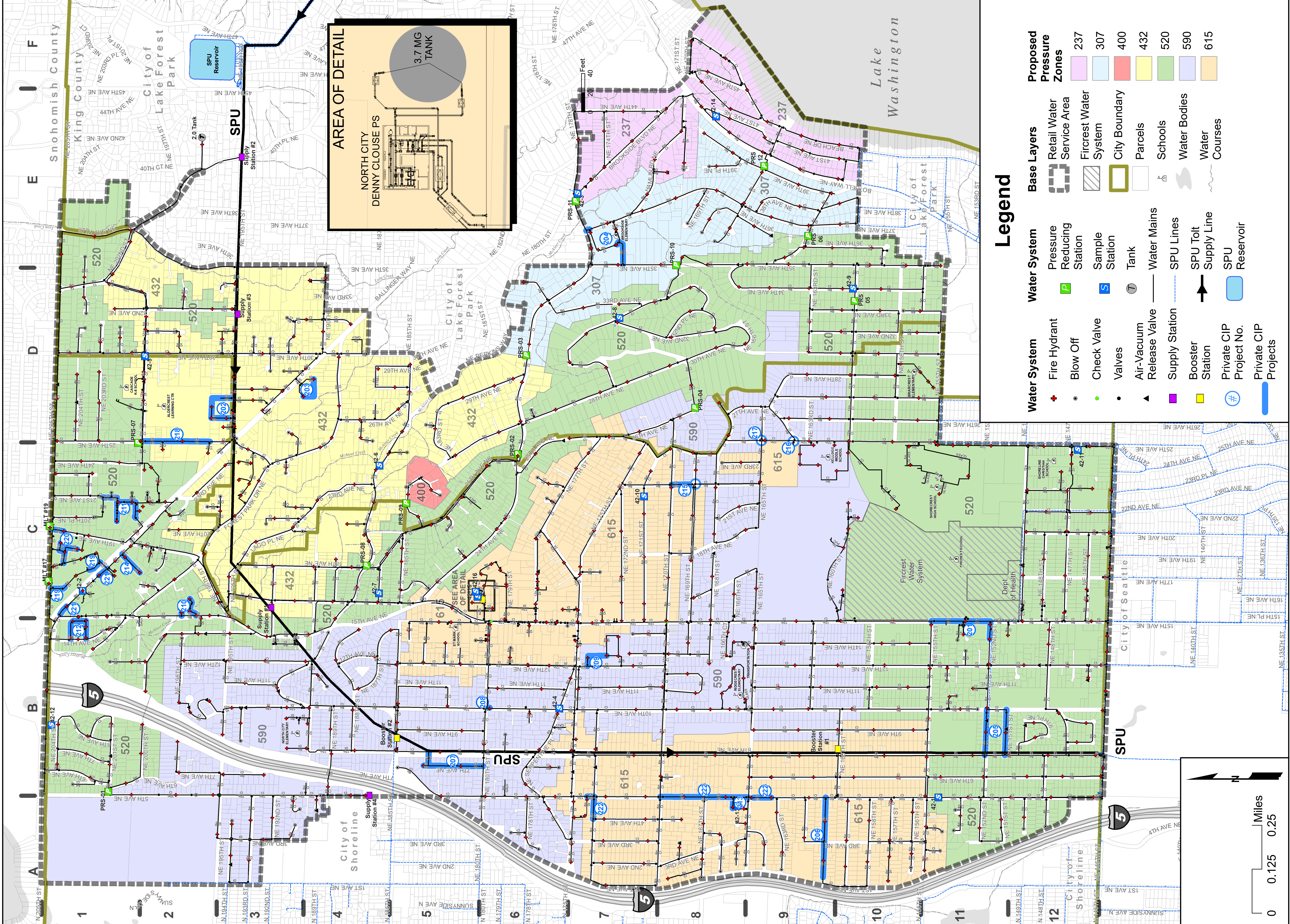
Project No.	Category	Project Name	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
4	G	Maintenance Building	4658	100	0	0	0	0	0	0	0	0
5	G	Maintenance Building Furnishings	129	0	0	0	0	0	0	0	0	0
7	D	Water System Plan Updates	80	0	0	0	0	0	0	265	256	0
8	G	GIS Project	2	168	148	130	34	5	0	0	0	0
11	G	2.0 MG Reservoir Capital Improvements	209	0	0	0	0	0	0	0	0	0
12	G	Supply Station at 2.0 MG Reservoir	20	0	0	0	0	0	0	0	0	0
15	G	Supply Station at 3.7 MG Reservoir	20	0	0	0	0	0	0	0	0	0
38	E	Meter Replacement	131	129	0	0	0	0	0	0	0	945
39	E	Service Replacement	53	53	53	53	53	53	53	53	53	53
40	E	Hydrant Replacement	20	20	20	20	20	20	20	20	20	20
41	E	Valve Replacement	25	25	25	25	25	25	25	25	25	25
42	E	Technology Additions & Replacement	129	14	30	25	26	27	28	28	29	30
43	E	Tools & Equipment	12	12	12	12	12	22	12	12	12	12
44	G	Engineering and Modeling Reports	40	140	21	0	115	8	106	0	0	115
14	G	Acquire additional land	550	0	0	0	0	0	0	550	0	0
6	C	Communications	0	50	0	0	0	0	0	0	0	0
10	G	System-wide - R&R PRV Stations	0	87	89	59	0	0	0	0	0	0
13	G	Alarms & Cameras at three buildings	0	389	0	0	0	0	0	0	0	0
16	C	ShakeAlert projects	0	129	0	0	0	0	0	0	0	0
17	C	Shunt trip breakers for BS 1 and 2	0	87	0	0	0	0	0	0	0	0
18	G	Telemetry	0	82	28	0	0	0	0	0	0	0
21	A	102-Connect northern end of 25th Ave	0	22	41	0	0	0	0	0	0	0
22	A	103-Remove PRV-5	0	17	0	0	0	0	0	0	0	0
23	A	104-Install 8" water mains for looping	0	71	178	0	0	0	0	0	0	0
24	A	105a-Install new 8" main - 32rd/NE 158	0	34	73	0	0	0	0	0	0	0
26	A	106-Relocate PRV-2	0	86	232	0	0	0	0	0	0	0
20	A	101-Install new 8" main to connect 590 Zone	0	0	151	419	0	0	0	0	0	0
25	A	105b-Install new 8" main - 33rd/NE 158	0	0	31	65	0	0	0	0	0	0
29	B	114 -Jack & Bore SR522 Crossing	0	0	334	893	0	0	0	0	0	0
31	B	115-Replace outdated mains Bothell Way	0	0	309	816	0	0	0	0	0	0

Project No.	Category	Project Name	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
3	D	Vactor Truck	0	0	0	0	530	0	0	0	0	0
36	F	131-Replace existing 6" on NE 200th St	0	0	0	0	238	570	0	0	0	0
9	G	Asset Management	0	0	0	0	0	102	102	43	0	0
27	A	107-Install 12" main from Fircrest to 25th Ave	0	0	0	0	0	268	740	0	0	0
35	F	121a-Replace lines on Forest Park Drive N	0	0	0	0	0	27	0	0	0	0
19	A	100-Install individual PRVs new 520 zone	0	0	0	0	0	0	453	0	0	0
34	C	119-New BS1 & 2 MG concrete reservoir	0	0	0	0	0	0	0	1381	4864	3266
28	A	108-New NS 520 Zone transmission	0	0	0	0	0	0	0	0	0	633
32	F	116-Replace outdated mains in Sheraton Beach	0	0	0	0	0	0	0	0	0	617
10-YEAR CIP - By Year (2020-2029)			6,077	1,716	1,776	2,519	1,054	1,126	1,538	2,378	5,259	5,717
10-YEAR CIP - Total (2020-2029)			\$29,160									
All costs in 1000s of dollars.												

NORTH CITY WATER DISTRICT

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NORTH CITY WATER DISTRICT

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NORTH CITY WATER DISTRICT

**SECTION 7
OPERATIONS PROGRAM**

North City Water District Operations and Maintenance (O & M)/Engineering/Information Systems/Water Quality program consists of the following three elements: Normal Operations; Emergency Operations and Preventive Maintenance. This Section is intended to provide a summary of these three primary elements of the overall operations procedures of the District. Sufficient detail is provided to give the reader an overview of operations activities but more detailed information is provided in District O & M Manuals, and emergency planning documents that are considered confidential for security reasons.

North City Water District maintains a highly-qualified staff of management, administrative and field personnel, as well as all equipment and materials required to carry out day-to-day functions of the District, preventative maintenance activities and “routine emergencies”. Routine emergencies include pipeline breaks, hydrant damage, and errant construction activities that can sometimes damage a water system. A list of qualified contractors and equipment specialists is maintained for emergency conditions that the District is not equipped to handle on its own. An area-wide Mutual Aid Agreement (Washington WARN) is in place to provide a mechanism for loaning staff expertise, equipment, materials, and supplies between utilities within the region in the event of a substantial emergency such as an earthquake or severe storm. The District is a member of WARN.

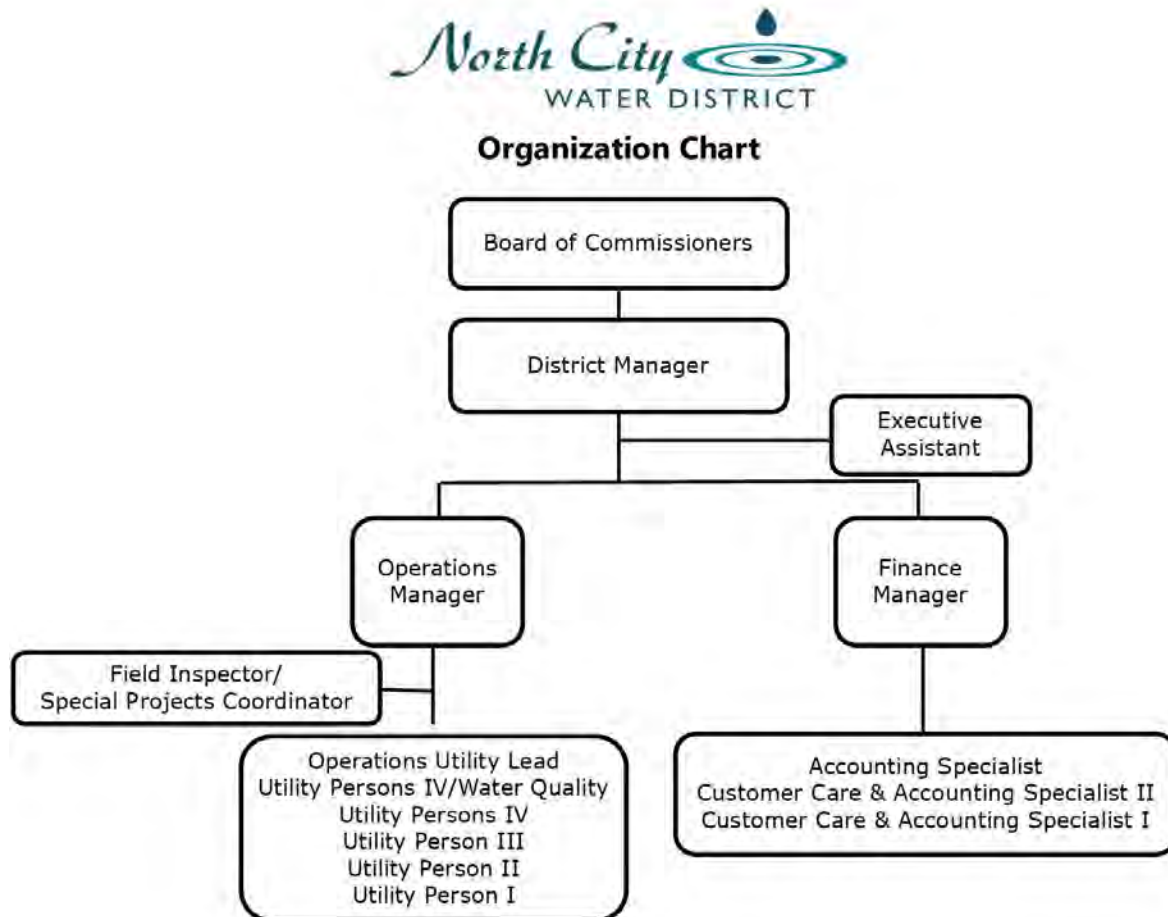
In addition to regular operations, preventative maintenance and emergency response, this section provides an overview of the water quality monitoring program for the District. Please note that while the District relies on Seattle Public Utilities (SPU) for its water supply under normal operating conditions, the District is ultimately responsible for the water quality within the system. A cooperative approach is taken to water quality monitoring with responsibilities shared between SPU and the District. This provides a comprehensive and cost effective approach to routine sampling and ensures that upstream water quality parameters are taken into account in the analysis of water received by and delivered by the North City system.

7.1 DISTRICT PERSONNEL

North City Water District operates under the authority of three elected commissioners and functions under the direction of the District Manager, who is responsible for overall operation of the District and carrying out the policies and direction of the Board of Commissioners. The Water System Operations Manager reports to the District Manager and is responsible for water quality, cross connection control and all other aspects of

water system operations. In addition, the District relies on the services of Consulting Engineers, Legal Counsel and other contractors contracted as needed. The current Organization Chart is shown on Figure 7-1.

Figure 7-1



7.2 PERSONNEL RESPONSIBILITIES

The key responsibilities of the water operations and maintenance staff are summarized in Table 7-1.

TABLE 7-1 PERSONNEL RESPONSIBILITIES	
Position	Key Responsibilities
Board of Commissioners	Sets policy for the District and confirms that policy is implemented by the District staff. Establishes priorities and goals for the District Manager. Hires the District Manager to implement the policies and to manage District staff, administration and operation.
District Manager	Acts as the Chief Executive Officer of the District. Responsible for overall management of the District. Acts as the Public Information Officer and supervises the implementation of District policies and programs. Leads the Management Team and supervises the operational and financial aspects of the District.*
Operations Manager	Responsible for the overall operation of the water system and implementation of Capital Improvement Projects. Supervises the Operations Utility Lead and Utility Persons and plans the improvements and maintenance of the District water system for optimal operations. Member of the Management Team.*
Finance Manager	Responsible for the overall financial and administrative aspects of the District including budgeting, rates, and general accounting. Supervises the Accounting Specialist, Customer Service Specialist and Executive Assistant. Member of the Management Team.*
Accounting Specialist	Under limited supervision performs all duties related to general, bookkeeping and accounting including payroll, general ledger entries, reconciliations, and accounts payable. Assists the Finance Manager with special projects related to financial operations as assigned.
Customer Service & Accounting Specialist	Under general supervision and direction of the Finance Manager performs all duties related to customer service including utility billing, receipting, collections, and general administrative duties as assigned.
Executive Assistant	Under limited supervision performs administrative support tasks for the Board of Commissioners and management team. Work performed may include a broad range of responsibilities involving and maintaining confidential information, compiling reports, furnishing information, scheduling meetings and preparing agendas, responding to routine correspondence, administrative support for the cross connection control program and researching background material.
Operations Utility Lead Utility Person	Under general supervision and direction of the Operations Manager performs meter reading and general maintenance and improvements to the water system including hydrants, meters, valves, mains, and pressure reducing valves. Works with system telemetry system and performs other water related work for the benefit of the District.
* Management Team Members are involved in the day-to-day decision-making processes and are part of the budget process for system improvements. They also play a key role during system troubleshooting, emergency response situations, implementation of system upgrades.	

7.3 PROFESSIONAL CERTIFICATIONS

Washington State Law (WAC 246-292) requires the District's system to be operated by one or more certified operators. In addition, specialty certification is required for backflow device testing. Table 7-2, Personnel Certifications, shows the current certifications of the District's operations and maintenance staff.

TABLE 7-2 PROFESSIONAL CERTIFICATIONS		
Name	Position	Registrations and Certifications
Diane Pottinger	District Manager	WDM4
Dennis Clouse	Operations Manager	WDM4
Mike Oberstadt	Operations Utility Lead	WDM4, WDS1, CCS
Bob Heivilin	Utility Person IV/Water Quality	WDM4, WDS1, CCS, BAT
Toby Bigger	Field Inspector/ Special Projects Coordinator	WDM3
Jesse Foss	Utility Person IV	WDM2
Harold Berge	Utility Person III	WDM2
Jon Nichols	Utility Person I	WDM1
Certification Definitions: WDM - Water Distribution Manager WDS - Water Distribution Specialist CCS - Cross Connection Control Specialist BAT - Backflow Assembly Tester		

It is District policy to maintain a well-qualified, technically trained staff. The District annually allocates funds for personnel training, education, certification, and membership in professional organizations, such as the American Water Works Association (AWWA). The investment in training results in improved safety, skills, and confidence.

7.4 EQUIPMENT AND SUPPLIES

The District has several types of equipment available for daily routine operation and maintenance of the water system stored at its maintenance and storage facility. If additional equipment or specialized equipment is required for specific projects, the District will rent or contract with a local contractor for the services needed. An inventory of supplies in sufficient quantities for normal system operation and maintenance and short-term emergencies is stored at the maintenance facility. A list of equipment and supplies used in the normal operation of the water system is shown in Table 7-3.

**TABLE 7-3
EQUIPMENT AND SUPPLIES**

EQUIPMENT	SUPPLIES
Backhoes	P.P.E. (Personal Protective Equipment)
Dump Truck	Meter Boxes
Utility Trucks	Ductile Iron Pipe
Trash Pump	Water Meters
Vacuum Excavator	Hydrants
Air Compressors	Copper Pipe
Cut-off SAW	Paint
Freeze Unit	Miscellaneous Fittings and Couplings
Portable Generator	Disinfectant Supplies
Pneumatic Hole-hogs	Water Quality Monitoring Supplies
Gas Detectors	Safety Equipment
Ventilator	First Aid Supplies
Compactor	Emergency Supplies
Temporary RP devices	
Hydraulic Shoring Shield	
Safety Cones and Signs	
Fire Flow Test Equipment	
Water Quality Test Kits	
Assorted Hand and Power Tools	

7.5 ROUTINE OPERATIONS

Routine operations involve the analysis, formulation, and implementation of procedures to ensure that the facilities are functioning efficiently and meeting pressure requirements and other demands of the system. The District's maintenance procedures are excellent, with prompt customer service and response ensuring that customers receive high quality water service and limited interruptions.

7.5.1 Continuity of Service

North City Water District has the structure, stability, authority, and responsibility to assure that water service will be continuous. For example, periodic changes in the members of the Board of Commissioners or staff would not have a pronounced effect on the District's customers or quality of service.

7.5.2 Routine Water Quality Sampling

The Department of Health (DOH) has adopted federal regulations that specify minimum monitoring requirements for water systems. The sampling requirements depend on the population served, source type, and treatment provided. The specific requirements are

contained in WAC 246-290-300 and the minimum monthly routine coliform sampling requirements are summarized in Table 2 of that regulation. SPU currently performs all routine coliform sampling throughout the District's distribution system which reduces regional water quality monitoring costs and maintains a regional water quality perspective to determine effectiveness of current treatment at the regional level. A minimum of 30 samples are taken each month. A further discussion of the water quality monitoring program is contained in the District's Coliform Monitoring Plan (Appendix G) and a summary of monitoring results is reported annually to District customers in the Consumer Confidence Report (CCR) and monthly to DOH.

North City Water District maintains responsibility for the quality of water within the transmission, storage and distribution system. Water quality is ensured by testing in accordance with all current requirements and a schedule agreed to by the District and DOH. In addition, hydraulic modeling is used and updated to verify adequate water circulation and therefore, water quality. Water quality sampling requirements are summarized in Table 7-4. The District currently receives the majority of its supply, under normal operations, from the City of Seattle Tolt River Source. The rest of the supply will be from the Cedar River Source via SPU's Northwest Sub-Regional System. A copy of SPU's current water quality data from the source and District specific water quality data is summarized in the CCR. This information is presented to North City Water District customers annually in accordance with the EPA requirement for preparing and distributing CCRs. A copy of the most recent CCR is included in Appendix E.

The Disinfection By-products (DBP) Monitoring regulation requires additional testing to determine the likelihood or presence of disinfection by-products within the water system. These by-products are formed as water ages, and chlorine dissipates and precipitates from the drinking water supply. The District completed a Coliform Monitoring Plan. DBP monitoring results will be analyzed to determine if re-chlorination facilities or additional system looping is required to achieve more efficient distribution of water in accordance with water consumption patterns. The District has 16 water quality monitoring stations and will continue to monitor the water quality of the system. SPU performs sampling and DBP monitoring within the District on a quarterly basis. The schedule for 2020 is included in Appendix G as a representative outline of the DBP sampling frequency.

**TABLE 7-4
WATER QUALITY TESTING**

LOCATION	TEST	LAST TESTED	SCHEDULE	COMMENTS
Throughout Water System	Bacteriological	On-Going	SPU draws a minimum of 30 samples per month by agreement with DOH	SPU does initial testing; follow-up sampling done by North City Water District
Throughout Water System	TTHM & HAA5	Quarterly	Monitoring Plan Submitted to EPA	Stage 2 testing in accordance with DBP Monitoring Program
Throughout Water System	Lead/Copper	2017	Every three years	Tested in 2017 and every three years thereafter.
Throughout Water System	Asbestos			No AC Main Within North City Water District – Not Required

7.5.3 Cross-Connection Control

The District has adopted a cross-connection control program to comply with WAC 246-290-490 pertaining to contamination of potable water due to cross connections. Backflow prevention devices are required at service connections where a potential for contamination exists. The Appendices include a copy of the District's current Cross-Connection Control Program. Several of the District's staff are certified Cross-Connection Control Specialists, as shown previously in Table 7-2.

7.6 MAPPING AND AS-BUILT DRAWING RECORDS

Maintenance of drawings is essential to maintenance crews, planners, developers and anyone else needing to know how the water system is laid out throughout the District. The drawing records are stored in an organized file and are maintained by the Operations Department. A GIS-based master drawing of the water system is also maintained by the Operations Department to provide an accurate water system map for use by all District personnel. The drawing is created from as-built records and contains water main information such as pipe size, material, and year installed. The District has recently completed the valve and hydrant database which will be integrated with the GIS system in the future.

7.7 LOCATION OF RECORDS

The following identifies the location where the District stores records:

- Bacteriological Analysis, Chemical Analysis: North City Water District Administration Building.
- Daily Source Meter Reading: North City Water District Administration Building.
- Project Reports, As-Builts, Construction Drawings: North City Water District Administration Building.
- Water System Plan: District Management Team. District Manager, Operations Manager and Finance Manager's Offices.
- Hazard Mitigation Plan, Emergency Response Plan, Coliform Monitoring Plan and Vulnerability Analysis: District Manager and Operations Manager's Offices.

7.8 SAFETY PROCEDURES AND EQUIPMENT

Safety is the concern and responsibility of all water Operations and Maintenance staff. To maintain the highest level of safety, the District has taken steps toward educating its staff and providing resources to ensure a safe working environment. The District strives to improve its safety program on an on-going basis. The AWWA publishes a manual titled "Safety Practices for Water Utilities (M3)", that describes safety programs and provides guidelines for safe work practices and techniques for a variety of water utility work situations. One of the District's Water System Technicians serves as the Safety Coordinator.

Table 7-5 identifies procedures to be followed for the most common operation and maintenance tasks for the water system

TABLE 7-5 SAFETY PROCEDURES	
ACTIVITIES	PROCEDURES
Working in Confined Spaces	Follow state requirements for confined space entry.
Working Around Heavy Equipment	Obtain proper training and follow all safety procedures.
Working On or Around Water Reservoirs	Follow proper safety harness procedures for working on tall structures.

A copy of "Safety Data Sheets" (SDSs, formerly known as "Material Safety Data Sheets", MSDSs) for the chemicals used in the operations and maintenance of the water system are available anytime for District Staff to review via electronic database. Paper copies of SDSs are also maintained at each District facility. The data sheets identify the chemical name, hazardous ingredients, physical data, fire and explosion hazard data, health

hazards, spill and disposal procedures, user protection information, handling, and storage precautions, as well as other information about the product.

All water system employees have basic first aid and CPR training, and all staff assigned for field duties have traffic flagger certification. All vehicles owned and operated by the District are required to have first aid kits. First aid kits are also located at the District's Administration and Water Maintenance Facilities.

North City Water District follows all appropriate OSHA and WISHA regulations in its day-to-day operations and complies with the following state requirements:

- WAC 296-62-145 to 14529 Part M - Entry into confined spaces. WAC 296-155-650 to 66411 Part N - Shoring of open ditches
- WAC 296-155-429 - Lockout-Tagout for work on energized or de-energized equipment or circuits
- WAC 296-155 Part C I - Fall restraint for access to the top of the District's water reservoirs. MUTCD - Traffic control for work in the public right-of-way

7.9 EMERGENCY OPERATIONS

The District is well equipped to accommodate short-term system failures and abnormalities. Its capabilities are summarized in the following descriptions.

7.9.1 Multiple Supply Capability

The District installed a permanent supply station connecting to the Cedar River Supply in 2011. Loss of operation of its main supply stations from the Tolt can be supplied entirely by this supply station (SS-4) and an emergency intertie station at the same location. There are also two emergency interties with the City of Mountlake Terrace could be used to supply water on an emergency basis.

7.9.2 Multiple Reservoirs

The 3.7 MG Reservoir serves the District's existing 615, 590, 502 and 400 Zones. The 2.0 MG Reservoir serves the 432, 307 and 237 Zones. The reservoirs and their associated transmission mains, the booster and supply stations, and pressure reducing valves provide the capability to distribute water throughout the system when one of the reservoirs is out of service. In the event the SPU Tolt Transmission Main is out of service between SS-2 and SS-1, the second supply line (from the Northwest Sub-Regional system) can supply water to the entire District. PRS 13 will provide water to the 2.0 MG Reservoir if needed (water would be supplied from SS-4 to the North City/Denny Clouse Pump Station then it would supply the 502 Zone which would then feed the 432 Zone and be a source of supply for the 2.0 MG Reservoir. The 2.0 MG Reservoir can supply water to the 432 and lower zones.

7.9.3 Distribution System

The District has attempted to loop water mains wherever possible to improve water circulation and reliability.

7.9.4 Emergency Equipment

The District is equipped with the necessary tools to deal with common and significant emergencies associated with water main failures. If a more serious emergency should develop, such as a major weld rupture or collapse, the District may hire a local contractor to make repairs to alleviate the emergency condition.

7.9.4.1 Emergency Telephone

Key or "on-call" personnel can be reached any time by the District's internal phone system, Police Department, Fire Department and 911.

7.9.4.2 On-Call Personnel

The on-call utility person is equipped with a cell phone, service vehicle and is typically able to respond to emergency calls within 60 minutes. A list of emergency telephone numbers is provided to each on-call employee. New employees are not placed on-call until they are familiar with the water system and maintenance procedures.

7.9.4.3 Material Readiness

Some critical repair parts, tools, and equipment are on-hand and kept in operational condition. As repair parts are used, they are re-ordered. Inventory is kept current and is adequate for most common emergencies, which can reasonably be anticipated. The District has access to an inventory of repair parts, including parts required for repair of each type and size of pipe within the service area.

7.9.5 Cross Training

District operations and maintenance employees are trained in all areas of the District. By cross training, the District is able to draw from a pool of workers that are qualified to deal with water related issues in the event of an emergency. This places the District in a position of readiness enabling it to effectively deal with almost any problem that arises.

7.10 EMERGENCY RESPONSE PROGRAM

The "North City Water District Emergency Response Plan" identifies procedures that would be carried out in the event of a serious emergency or disaster situation. The District has also prepared a Vulnerability Analysis that identifies potential areas of the water system that might be vulnerable to intentional damage. Copies of these plans are kept on file

with the District and are considered confidential under the provisions of the Homeland Security Act.

The District's annual work allocation and budget account for the field crew to have some unexpected events. These unplanned events require immediate attention by staff. Field crews are accustomed to responding to these events on an on-call basis. In the event of a regional emergency, the District has identified that staff will follow the Incident Command Structure (ICS). Staff and the Commissioners completed ICS-100, -200 and -700 training in February 2020. The District Manager and Operations Manager have completed additional ICS-300 and -400 training. The District expects to update and adopt a Business Continuity Plan in the near future.

The District has previously adopted a water shortage contingency response plan. The District plans to review and update the plan in context of the current understanding of water supply conditions and considering the SPU "Water Shortage Contingency Plan" updated in March 2018.

The federal America's Water Infrastructure Act (2018) requires public water systems serving more than 3,300 people to complete a Risk and Resiliency Assessment and an updated Emergency Response Plan. The District must certify completion of its Assessment by June 30, 2021 and completion of its updated response plan by December 30, 2021. The Assessment must consider the vulnerability of the District's system and operations to malevolent attacks including cyberattacks and vulnerability to interruptions or damage due to natural hazards.

7.11 PUBLIC NOTIFICATION

The federal Safe Drinking Water Act (SDWA) and WAC 246-290-330 require purveyors to notify their customers if any of the following conditions occur:

- Failure to comply with a primary MCL described under WAC 246-290-310.
- Failure to comply with a surface water treatment technique.
- Failure to comply with monitoring requirements under WAC 246-290.
- Failure to comply with testing requirements.
- Failure to comply with a DOH order.
- Failure to comply with a variance or exemption schedule from DOH.
- If system is identified as a source of waterborne disease outbreak.
- If DOH issues the system a category red operating permit.
- If DOH issues an order.
- If the system is operating under a variance or exemption.

Specific notice content, distribution channels, and time limit requirements as specified in WAC 246-290-330 must be in compliance when notification is required.

7.12 PREVENTIVE MAINTENANCE

Maintenance schedules that meet or exceed manufacturer's recommendations have been established for all critical components in the water system. The schedule presented in Table 7-6 is used as a minimum for preventive maintenance:

The District Manager and Operations Manager have determined that the District's current operations and maintenance staff of six is sufficient to provide the normal level of operation and maintenance activities identified herein. Contracting out certain non-scheduled maintenance items may be necessary in unique circumstances.

**TABLE 7-6
PREVENTIVE MAINTENANCE SCHEDULE**

Storage Facilities	
Weekly (Friday)	Check security and inspect facilities for proper operation.
As Needed	Clean and check interior condition, vents, hatches, etc. (every 3 to 4 years). Repaint interior and exterior as needed on tanks (estimated every 15 to 25 years).
Water Mains	
As Needed	Leak detection survey.
Annually	Flush mains and dead-end lines (or as needed due to water quality complaints or known problem areas).
Supply and Pump Stations	
Weekly	Observe and record motor current draw (three phases); check packing; log and record volume delivered and pump motor hours; check motor oil level; measure and record discharge pressure; check motor noise, temperature, vibration.
Weekly	Check security.
Annually	Change motor oil.
As Needed	Calibrate flow meter; maintain electrical and mechanical equipment; paint structures and piping.
Pressure Reducing Stations and Emergency Interties	
Annually	Flush and check all valves and screens; check pressure settings; rebuild and paint as necessary.
Isolation Valves	
Bi-annually	Operate full open/closed; uncover where buried; clean out valve boxes and repair as necessary.

Hydrants

Bi-annually	Operate and flush; check drain rate; lubricate as necessary; measure pressure; paint as necessary.
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Meters

Varies	Time and measure volume of meter-delivered flow; dismantle, clean, and inspect all parts, replace worn or defective parts; retest meter for accuracy. Frequency varies based on meter size.
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Air and Vacuum Release Valve and Blow-off Assemblies

Bi-annually	Flush and inspect.
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Telemetry and Control System

Daily	Check master and RTU's for proper operation; repair as necessary.
As Needed	Software maintenance, system backups and software upgrades

Equipment/Rolling Stock

Daily	Check all fluid levels and brakes.
As Needed	Replace fluids and filters in accordance with manufacturer's recommendations (or more frequently depending on type of use).

Tools

As Needed	Clean after each use; lubricate and maintain as necessary.
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Optimum schedule of preventative maintenance is presented. Actual schedule of maintenance may vary depending on previous staff experience, history of facilities and unanticipated needs of the District.

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NORTH CITY WATER DISTRICT

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NORTH CITY WATER DISTRICT

SECTION 8

FINANCING AND IMPLEMENTATION



8.1. INTRODUCTION

The purpose of this section is to assess financing options for implementation of the Water System Plan (WSP) and Capital Improvement Plan (CIP) identified in Section 6. A ten-year proposed budget is also provided that identifies the overall revenue requirements compared to anticipated income. This section is not intended to be a rate analysis, but is provided as a cursory review of revenue requirements and identification of potential funding sources, to confirm the feasibility of implementing the CIP, if necessary to respond to anticipated growth as well as complete recommended system improvements. A Connection Charge Study was completed in 2017 and will be updated with the completion of the comprehensive planning efforts. A Cost of Service Rate Review was completed in December 2019. References to both these studies are included in this section.

8.2. OVERVIEW OF FINANCIAL OPERATION

The provision of water service is essential to the preservation of public health, safety and protection of the environment. Because these systems must maintain a high level of integrity, they require a much greater capital investment to operate and maintain than most other public services. Most water utility costs are fixed, due to the nature of funding large capital improvements, and the relatively stable costs of operating labor, insurance and other expenses which do not vary with water use. Fixed costs, which are incurred whether or not customers consume water, are associated with making the service available at the point of customer use. A smaller proportion of a utility system's cost is variable and changes with the volume of water consumed and/or used (i.e. the cost of purchased water, power for pumping, etc.).

As a publicly owned and operated utility district, the District is not burdened with competing interests for funds and is able to dedicate 100% of revenues to the operation maintenance and improvement of the utility. North City Water District strives to maintain reasonable water rates through the efficient management of funds and careful financial planning. In addition, the District is able to keep rates low because public utilities: 1) do not pay federal income taxes, 2) receive lower interest rates on financing through tax-exempt bonds and state revolving fund low-interest loans, and 3) do not have to pay dividends to stockholders. Operating revenue in excess of operating expenses, and debt service on financing, can be re-invested into the utility system. This reduces the need to secure outside funding for capital improvements, reduces financing costs and results in lower utility rates.

8.3. FINANCIAL CONSIDERATIONS

The financial records of the District have been reviewed to determine the financial capability of the District to provide a high quality level of service and complete the recommended improvements identified in the Capital Improvement Plan contained in Section 6 of this document. The District's 2018 financial statement is summarized in Table 8-1 and identifies the District's overall operating expenditures.

TABLE 8-1	
2018 FINANCIAL STATEMENT SUMMARY	
Operating Revenues	
Water Sales	\$ 6,832,672
Other revenue	408,724
Total Operating Revenue	7,241,396
Operating Expenses	
Operating Expenses	6,202,413
Net Income	1,038,983
Other Income and Expenses	
Non-Operating Revenues (Expenses)	(221,319)
Capital Contributions	
Capital Contributions	725,174
Change in Net Position	\$ 1,542,838
Changes in Net Position	
Beginning of Year Net Position	\$ 32,014,417
Change in Net Assets	1,542,838
Net Position before Prior Period Adjustment	33,557,255
Prior Period Adjustment	(604,116)
End of Year Net Position	\$ 32,953,139

Tables 8-2 and 8-3 indicate budgeted expenditures through the year 2024 and for the period 2024-2029, respectively. Major considerations utilized in estimating these expenditures include:

- Administration, operation, maintenance, and the day-to-day expenses of operating the system, including the purchase price of water supply (all as discussed in Section 7) and costs associated with treatment and water quality monitoring.

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FINANCING AND IMPLEMENTATION

- Debt service requirements to provide for repayment of interest and principal for all outstanding loans and bonds used to complete previous system improvements.
- Financing of capital improvements that are required to provide adequate service to the projected population within the retail water service area. These improvements are detailed in Section 6 of the WSP.
- Financing of renewal and replacement of existing facilities that have been in service longer than their typical useful life and have become obsolete. These replacements are generally limited to undersized and/or leaking lines and appurtenances and are detailed in the Appendices.
- Other requirements or special projects that are anticipated within the planning period.

TABLE 8-2
PROJECTED BUDGET 2019-2024

	2019	2020	2021	2022	2023	2024
Beginning of Year Balance	\$11,490,458	\$9,793,449	\$6,090,645	\$ 6,497,347	7,813,573	\$ 7,054,216
Water Sales	\$7,012,327	\$7,352,826	\$7,646,939	\$7,952,816	\$8,270,929	\$8,601,766
Non-Rate Revenue	428,758	415,425	426,822	439,622	452,842	466,495
Total Revenue	7,441,085	7,768,251	8,073,760	8,392,439	8,723,771	9,068,261
Expenses	-4,872,943	-5,134,478	-5,367,805	-5,621,145	-5,871,059	-6,133,802
Net Revenue	2,568,141	2,633,773	2,705,956	2,771,294	2,852,712	2,934,459
Connection Charges	199,670	242,646	607,353	35,662	174,871	36,674
Investment Interest Income	135,215	111,799	96,113	110,056	129,199	117,972
Other Non-Operating Revenues (Expenses)	234,170	-131,000	-133,000	1,365,000	-138,000	-141,000
Debt Service	-964,866	-781,498	-881,623	-881,498	-885,085	-882,185
Junior Lien Debt Service	-255,558	-252,326	-249,301	-246,275	-243,250	-240,224
Planned CIP	-3,613,783	-5,526,198	-1,738,796	-1,838,012	-2,649,805	-1,158,524
End of Year Balance	\$9,793,449	\$6,090,645	\$6,497,347	\$7,813,573	\$7,054,216	\$7,721,388

Note:

Even though 2019 is complete, the budget values are reported, as actual figures are not yet available.

TABLE 8-3
PROJECTED BUDGET 2025-2029

	2025	2026	2027	2028	2029
Beginning of Year Balance	\$7,721,388	\$8,908,149	\$9,205,866	\$8,763,202	\$14,436,981
Water Sales	\$8,945,837	\$9,303,670	\$9,675,817	\$10,111,229	\$10,566,234
Non-Rate Revenue	480,597	495,164	510,212	526,247	542,818
Total Revenue	9,426,434	9,798,834	10,186,029	10,637,475	11,109,052
Expenses	-6,418,695	-6,718,517	-7,034,142	-7,421,645	-7,777,303
Net Revenue	3,007,739	3,080,317	3,151,886	3,215,830	3,331,749
Connection Charges	598,810	37,746	393,598	38,971	294,735
Investment Interest Income	127,994	146,526	152,502	148,116	230,767
Other Non-Operating Revenues(Expenses)	-144,000	-147,000	-150,000	9,897,000	-106,000
Debt Service	-883,985	-880,335	-881,385	-1,471,984	-1,468,234
Junior Lien Debt Service	-237,199	-234,174	-231,148	-228,123	-225,097
Planned CIP	-1,282,598	-1,705,364	-2,878,117	-5,926,032	-6,206,404
End of Year Balance	\$8,908,149	\$9,205,866	\$8,763,202	\$14,436,981	\$10,288,497

8.4. WHOLESALE WATER SUPPLY COSTS

A significant portion of the District's operating expenses is the wholesale water costs associated with purchase of water from the Seattle regional water supply system (SPU). In 2001, the District and Seattle entered into a new, 60-year wholesale water supply agreement, a copy of which is included in Appendix D. The terms of the contract do not change the configuration of how the District receives its water supply from Seattle. The District has five connections to the regional system with two backup connections, any of which could entirely provide the contracted amount of 3,330 gpm. The two most recent connections are on Seattle's Northwest Sub-Regional System which is a separate wheeling agreement. There are three potential changes to the SPU contracts in the coming two years: (1) The 60 year contract has provisions to be reviewed every 20 years, which is expected to be done in 2020 and 2021. (2) The rates are reviewed every three years and are expected to be reviewed in 2020 for the 2021-2023 period. (3) The wheeling agreement was last reviewed in January 2016 and will be reviewed every five years. The wheeling rate for the 2019-2023 period is \$0.07/hundred cubic feet (ccf).

8.5. FUNDING SOURCES

The following funding sources are utilized by the District for funding of operating expenses and capital improvements.

8.5.1 Water Sales

Income from water sales is the District's primary source of revenue and is utilized to finance all expenses that are not otherwise funded by developer extensions, assessments, or general facility charges/connection charges. Typical expenses financed from water sales include: operation and maintenance; water supply; water quality analysis; administrative, accounting and collection expenses; taxes; debt service requirements; system renewal and replacement; and, other general operating expenses.

The District adopted a new rate structure in December 2019 (see Table 8-4). These rates include a separate irrigation class in order to encourage water conservation. Because this rate structure is designed to encourage conservation and, if effective, will reduce consumption and sales, it is imperative that water sales and revenues be closely monitored to insure that water rates and revenues are sufficient.

The District's revenues and expenses are reviewed periodically throughout the year to insure that operations are conducted in a financially responsible manner. Annual budgets are prepared in order to estimate expenditures for the following year. Water rates are then reviewed to determine adequacy of projected revenues to cover anticipated expenditures. The District completed a Cost of Service Water Rate Review in December, 2019. This review included a long-term analysis of the District's infrastructure cost needs and funding capabilities, and a cost-of-service analysis.

TABLE 8-4
WATER RATES EFFECTIVE JANUARY 1, 2020

Customer Class	Bi-Monthly Base Rate	All ccf	1-4 ccf	5-10 ccf	11-24 ccf	25+ ccf
Single-Family¹	\$51.47		\$2.54	\$3.99	\$5.45	\$6.90
Non-single Family	\$51.47	\$4.43				
Irrigation	\$44.58	\$7.70				
Sprinkler Meters	\$10.30					
Fire Protection Rate per ERU	\$ 9.29					

¹Single-Family customers are billed bi-monthly.

8.5.2 Connection Charges

Connection Charges, also known as General Facility Charges, are authorized by RCW 57.08.005(10) and levied against newly connecting customers in order to cover their equitable share of the cost of the water system. The District requires developers of property within the District to install those water system facilities that are necessary for domestic and fire protection service to the property. Connection Charges are determined and assessed in accordance with state regulations governing such charges. The Board of Commissioners adopted new connection charges in July 2017 (Resolution 2017.07.13). These charges, along with the rates, will be adopted periodically as needed. Current District Connection Charges are summarized in Table 8-5. The connection charges will be updated following adoption of this WSP. SPU increased their Facilities Charge from \$895 to \$965 per ERU beginning in 2019. A 1" and smaller meter is identified to be 1.12 ERU, for new retail service connections beginning January 1, 2019. Both the District connection charge and SPU Facilities Charge increase with larger water meters, corresponding to increased capacity measured in ERU capacity.

TABLE 8-5 DISTRICT CONNECTION CHARGES			
Description	Meter Equivalent Charge	Fire Charge Per Meter	Charge Square Foot
Low Density – Single Family	\$4,786	\$724	
High Density – Non-Single Family	\$4,786	--	\$1.22
Adopted 2017.			

8.5.3 Utility Local Improvement District (ULID) Financing

Utility local improvement districts (ULIDs) are a means by which improvements can be financed by those property owners directly benefiting from the system improvements. This method of financing must be supported by the majority of property owners and may be initiated either by petition or by District resolution. ULID financing is generally used for local facility improvements in areas not previously served or where existing facilities are not adequate to support the type of development proposed for an area. Financing is typically by bond sales or loans with the costs of improvements typically allocated and assessed against the benefiting property owners within the ULID area. Revenue from rates, however, can also be used for the repayment of bonds required to finance a ULID improvement, allowing for District-wide participation for portions of ULID projects.

8.5.4 Developer Financing

Financing by a developer is used when proposed development would extend service to previously unimproved property or property that is redeveloped and requires improvements to the existing water system.

8.5.5 Combination Financing by Developers and the District

It may be necessary in some instances to require a property developer to construct facilities that are oversized for the current development in order to provide for the comprehensive development of the overall water system. In these instances, the District may enter into an agreement to reimburse the developer for the extra costs associated with increasing the size of the facilities over that required to serve the property proposed for development. Oversizing should be considered when it is necessary to construct any pipeline over 8-inches in diameter in single-family residential areas. Construction of any pipeline in multi-family, commercial or industrial areas that is larger than the size required to serve the current development proposal is also typically considered oversizing.

8.5.6 Bond Financing

Bond financing can be achieved by the sale of either general obligation or revenue bonds. Revenue bonds issued by the District do not require voter approval and may be financed by revenue from water sales, connection charges, latecomer charges and other funds. Bond financing is utilized by the District for system-wide improvements. The District's most recent bond rating is Aa3.

8.5.7 State and Federal Grants and Loans

Grant financing has become increasingly scarce for utility systems in recent years but is still available for some specific instances. The District stays abreast of available grant funding through its memberships in various organizations and ongoing work with State and Federal agencies and applies for funding as appropriate.

The District takes advantage of grant and loan programs established to provide funding for water system improvement projects. These include the Drinking Water State Revolving Fund (DWSRF) loan program, periodic specific issue funding grants offered through State and Federal government such as DOH, and the State Department of Commerce Public Works Trust Fund (PWTF) loan program. When funds are available, the PWTF loan program offers different types of loans including emergency, pre-construction and construction loans.

The DWSRF funds a variety of water system upgrade projects, but priority is given to projects that address water quality issues and source improvements. Loans are available for up to 100% of total project costs, with a 1% loan origination fee assessment. The interest rate fluctuates with the term of the loan and varies with market conditions. In 2019, rates were 2.25% with a lower interest rate option if the project is completed

within two years following contract execution. Projects must complete the construction competitive bid process within 18 months of contract execution. The District obtained close to \$4 million in DWSRF loans in 2013.

Other DOH-sponsored funding in recent years has included grants for drinking water system repairs and consolidation. These grants are for infrastructure improvements required to facilitate consolidation, restructuring, and receivership projects and must be publicly owned.

Previously, the District has been successful in obtaining PWTF loans to fund water system improvements. Loans were available for Pre-Construction, Construction, and Capital Facilities Planning activities. The Pre-Construction loan was offered for design, engineering, preparing bid documents, environmental studies and acquiring rights-of-way for eligible facilities. PWTF Construction loans have historically been available for projects that repair, replace and improve public infrastructure systems, including domestic water and sanitary sewer systems. The first loans since 2009 using funds from the Public Works Assistance Account were issued in August 2019 at interest rates ranged from 1.58 to 0.79% based on if the loans are pre-construction or construction loans and the financing health of the community. The District has no outstanding PWTF loans in 2020.

8.6. CAPITAL IMPROVEMENTS TYPES

Capital improvements can be divided into two primary types: General Facilities; and Local Facilities. Both of these can be financed in a variety of ways that are outlined below.

8.6.1 General Facilities

General facilities include those system facilities that benefit the overall system or a large portion of it. General system facilities in the District include meter sources, interties, storage reservoirs, pump stations and transmission mains as well as building construction, communications, required reports, geographic information system (GIS), emergency water supply and distribution projects. These are the most difficult type of facilities to finance because of the large costs associated with the facilities or systems. These facilities are sized according to District standards. The District periodically reviews its connection charges to insure that they are adequate to cover each customer's equitable share of general system facilities. General system facilities typically financed are as follows and may be utilized independently or in combination:

- Requiring the initial developer of a large property requiring specific general facilities to pay for the improvements with a latecomer arrangement as additional areas develop;
- District funding of improvements and assessing a connection charge to each property owner within the defined benefiting area as development occurs. These

charges must cover all costs incurred, including interest on money and an allowance at an amount that will amortize the investment.

- District-obtained grants of low interest loans to assist in the construction of improvements, with payback by rates, connection charges or other funds available to the District.

8.6.2 Local Facilities

Local facilities such as water distribution lines and appurtenances benefit a smaller area than general facilities and the costs for these improvements can be directly attributable to the properties that receive direct benefit from the improvements. Generally, local facilities are identified as the water lines serving a particular property, but may include other specific facilities required to provide service such as pump stations, pressure regulating valves or system interties which provide backup service to the peripheral areas of the District. Local facilities are typically financed by one or more of the following:

- Formation of a ULID
- Water System Extension Agreement and financing
- Special Assessment Charges
- District financing of improvements with local facilities charges utilized to offset costs as customers connect
- Latecomer agreement
- Grants and outside assistance to reduce local costs, including District assistance where appropriate

8.7. PROJECTED FUNDING: CAPITAL IMPROVEMENT PLAN PROJECTS

The District completed a Cost-of-Service Rate Review in November 2019. The following summary lists how the key findings/decisions included in the study are carried forward in this WSP:

- The capital investment analysis showed that if the District were to continue to renew and replace infrastructure at its current pace and fund it with a combination of new debt, rates, and connection charges, it will be able to maintain the current level of service with rate increases slightly above inflationary levels due to expected rate increases from SPU. As new bond sales or loans are considered, the District evaluates the potential cost savings of concurrently retiring or refinancing existing debt.
- The Board of Commissioners intend to use a funding option that uses debt, rates, and capital reserves to fund operating and capital costs with the objective of maintaining capital reserves between \$4 and \$8 million.
- The customer classes will be maintained as Single-Family, Multi-family, Non-Residential and Irrigation, in accordance with Municipal Water Law tracking requirements.

8.8. SCHEDULING AND FINANCING RECOMMENDATIONS

The Capital Improvement Plan in Section 6 indicates the District's proposed capital improvements plan through the year 2039 and indicates both approximate costs and potential sources of funding for each project. Generally, as each project is implemented, the District will need to determine the most appropriate means for financing the improvements or studies. Consideration of financing options should include determination of available grant or low interest loan financing as an initial step. If grants or low interest loans cannot be obtained, consideration of using Connection Charges, Local Facilities charges and rate revenues should be made to determine if funds are available from cash on hand. Any shortfalls in these funding sources may be obtained from the sale of bonds.

Project scheduling is also indicated in Tables 6-1 and 6-2. Some projects, such as the pipeline improvements identified as part of the District's steel main replacements, circulation improvements and replacement of undersized mains, are not specifically scheduled. These projects are typically scheduled on an annual basis in order to coordinate construction with the planned street overlays and other projects of other jurisdictions. This will result in less disruption to traffic within the District and often times can lower overall project costs.

8.9. DEVELOPER EXTENSION POLICIES

The District, as a municipal corporation, has a responsibility to the public to ensure that water mains installed in public streets and easements are constructed in accordance with currently accepted standards for public works. All of the improvements that are required for service to property within new plats of residential, commercial and industrial developments will be designed and constructed in accordance with the District's adopted developer extension policies and construction standards and financed by the developing property owners. The requirements for developer extension projects are set forth in a document titled "Design Development and Construction Standards for Extensions to the Water System", which is available from the District under separate cover and by reference is hereby incorporated into this WSP. The requirements set forth in that document are intended as a contract with the developer, incorporating minimum standards which are prerequisite to acceptance by the District of facilities which are to become part of the District's water system.



2020 Water System Plan

March 2020



NORTH CITY WATER DISTRICT

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NORTH CITY WATER DISTRICT

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February 27, 2020

To: Attached Distribution List

**Subject: DNS and SEPA Checklist
North City Water District - 2020 Water System Plan**

Dear Interested Party:

On behalf of North City Water District, please find enclosed the SEPA Environmental Checklist prepared in anticipation of the proposed action of adoption of the District's 2020 Water System Plan. The Plan was completed in accordance with the requirements of the State Department of Health.

After review of the Environmental Checklist, North City Water District (as lead agency) has determined that this proposal does not have a probable significant adverse impact on the environment.

Enclosed please find a copy of the Determination of Non-significance and distribution list. If you have any questions regarding this Determination, please contact North City Water District at 206-362-8100 or me at 425-637-3693.

Sincerely,
CHS Engineers, LLC

A handwritten signature in blue ink that reads "Rodney Langer".

Rodney Langer, P.E.
Principal

Enclosures: Determination of Non-significance
Environmental Checklist
Distribution List

c: Diane Pottinger, P.E., North City Water District

DETERMINATION OF NON-SIGNIFICANCE WAC 197-11-970

Description of Proposal: The proposed adoption of the North City Water District 2020 Water System Plan (WSP). The 2020 WSP addresses future water systems needs within the District's water service area boundaries as described in the Plan. The WSP puts forth a recommended Capital Facilities Plan in accordance with the design criteria and system analysis developed as part of the WSP.

Location of Proposal, including Street Address, if any: North City Water District is generally located north of the City of Seattle (NE 145th Street) and south of the King/Snohomish County Line. Most of the District's service area lies east of Interstate 5 and extends to Lake Washington on the east. The service area includes portions of the City of Shoreline and City of Lake Forest Park.

Lead Agency: North City Water District

The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21C.030(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public on request.

☐ There is no comment period for this DNS.

☒ This DNS is issued under 197-11-340(2); the lead agency will not act on this proposal for 14 days from the date below. Comments must be submitted by March 17, 2020.

Responsible Official: Diane Pottinger, P.E.

Position/Title: District Manager **Phone:** (206) 362-8100
Email: DianeP@northcitywater.org

Address: North City Water District
Post Office Box 55367
1519 NE 177th St
Shoreline, Washington 98155

Date: 2/21/2020

Signature:

Diane Pottinger

SEPA ENVIRONMENTAL CHECKLIST

Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for applicants: [\[help\]](#)

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for Lead Agencies:

Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of checklist for nonproject proposals: [\[help\]](#)

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the [SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS \(part D\)](#). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements –that do not contribute meaningfully to the analysis of the proposal.

A. background [\[help\]](#)

1. Name of proposed project, if applicable: [\[help\]](#)
North City Water District 2020 Water System Plan
2. Name of applicant: [\[help\]](#)
North City Water District

3. Address and phone number of applicant and contact person: [\[help\]](#)

North City Water District	Ms. Diane Pottinger, P.E.
1519 NE 177 th Street	District Manager
PO Box 55367	206-362-8100
Shoreline, WA 98155	

4. Date checklist prepared: [\[help\]](#)
January 2020

5. Agency requesting checklist: [\[help\]](#)
North City Water District

6. Proposed timing or schedule (including phasing, if applicable): [\[help\]](#)
A recommended Capital Facilities Plan through 2039 is included in Section 6 of the Plan. Specific timing of improvements will depend on the availability of funding, the pattern of growth and water system requirements.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain. [\[help\]](#)
Please refer to Section 6 of the Plan for detailed information regarding future improvements contemplated for the water system. The Water System Plan does not propose land use expansion or changes and only considers the water system improvements which are required to meet the existing and future population of the water service area, as outlined in the WSP.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal. [\[help\]](#)
None known.

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain. [\[help\]](#)
None known.

10. List any government approvals or permits that will be needed for your proposal, if known. [\[help\]](#)
Approvals from the State of Washington Department of Health, Department of Ecology, King County, and the Cities of Lake Forest Park and Shoreline are required in accordance with RCW 57.16.010.

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.) [\[help\]](#)

This proposal contemplates the adoption of the North City Water District 2020 Water System Plan. The Plan addresses future water systems needs within the District's water service area boundaries as described in the Plan. The Plan puts forth a recommended Capital Facilities Plan in accordance with the design criteria and system analysis developed as part of the Plan.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist. [\[help\]](#)

As indicated in Figure 1-1 (Vicinity Map) and Figure 2-1 (Service Area Map), North City Water District is generally located north of the City of Seattle (NE 145th Street) and south of the King/Snohomish County Line. Most of the District's service area lies east of Interstate 5 and extends to Lake Washington on the east. The service area includes portions of the City of Shoreline, City of Lake Forest Park.

B. ENVIRONMENTAL ELEMENTS [\[help\]](#)

1. Earth

a. General description of the site [\[help\]](#)
(circle one): ☐ Flat, ☐ rolling, ☐ hilly, ☐ steep slopes, mountainous,
other _____

b. What is the steepest slope on the site (approximate percent slope)? [\[help\]](#)
Not applicable. Will be addressed on a project-specific basis.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils. [\[help\]](#)
Not applicable. Will be addressed on a project-specific basis.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe. [\[help\]](#)
Not applicable. Will be addressed on a project-specific basis.

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill. [\[help\]](#)
Not applicable. Will be addressed on a project-specific basis.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe. [\[help\]](#)
Not applicable. Will be addressed on a project-specific basis.

- g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)? [\[help\]](#)

Not applicable. Will be addressed on a project-specific basis.

- h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any: [\[help\]](#)

Not applicable. Will be addressed on a project-specific basis.

2. Air

- a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known. [\[help\]](#)

Not applicable. Will be addressed on a project-specific basis.

- b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe. [\[help\]](#)

Not applicable. Will be addressed on a project-specific basis.

- c. Proposed measures to reduce or control emissions or other impacts to air, if any: [\[help\]](#)

Not applicable. Will be addressed on a project-specific basis.

3. Water

- a. Surface Water: [\[help\]](#)

- 1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into. [\[help\]](#)
Lake Washington, along with its numerous tributary streams, are located within the District's boundary. This proposal, however, does not directly impact surface water.

- 2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans. [\[help\]](#)
Not applicable. Will be addressed on a project-specific basis.

- 3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material. [\[help\]](#)
Not applicable. Will be addressed on a project-specific basis.

- 4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known. [\[help\]](#)
The District purchases all its water supply from Seattle Public Utilities (SPU) and has a long-term contract that provides the District with water from SPU's Tolt River diversion and from the Cedar River via the SPU distribution system. In addition, the District maintains two emergency interties with the City of Mountlake Terrace, which are fed via a surface water diversion from the Sultan River (via Alderwood Water District and the City of Everett).

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

[\[help\]](#)

Specific projects recommended in the WSP may lie within the 100-year floodplain. This will be addressed on a project-specific basis.

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge. [\[help\]](#)

No.

b. Ground Water:

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known. [\[help\]](#)

No.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve. [\[help\]](#)

Not applicable.

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow?

Will this water flow into other waters? If so, describe. [\[help\]](#)

Not applicable. Will be addressed on a project-specific basis.

2) Could waste materials enter ground or surface waters? If so, generally describe. [\[help\]](#)

Not applicable. Will be addressed on a project-specific basis.

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

Not applicable. Will be addressed on a project-specific basis.

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:

Not applicable. Will be addressed on a project-specific basis.

4. **Plants** [\[help\]](#)

a. Check the types of vegetation found on the site: [\[help\]](#)

☒ deciduous tree: , , aspen, other

☒ evergreen tree: , , , other

☒ shrubs

☒ grass

- ☐ pasture
☐ crop or grain
☐ Orchards, vineyards or other permanent crops.
☐ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
☐ water plants: water lily, eelgrass, milfoil, other
☒ other types of vegetation

- b. What kind and amount of vegetation will be removed or altered? [\[help\]](#)
 Not applicable. Will be addressed on a project-specific basis.
- c. List threatened and endangered species known to be on or near the site. [\[help\]](#)
 Not applicable. Will be addressed on a project-specific basis.
- d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any: [\[help\]](#)
 Not applicable.
- e. List all noxious weeds and invasive species known to be on or near the site.
 Not applicable. Will be addressed on a project-specific basis.

5. Animals

- a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site. Examples include: [\[help\]](#)
- birds: , , , , other: _____
 mammals: , , , , , other: _____
 fish: , , , , , other: _____
- b. List any threatened and endangered species known to be on or near the site. [\[help\]](#)
 Bald Eagle and Chinook Salmon, but they will not be affected by this Plan.
- c. Is the site part of a migration route? If so, explain. [\[help\]](#)
 The Greater Puget Sound Region is part of the Pacific flyway for migratory birds.
- d. Proposed measures to preserve or enhance wildlife, if any: [\[help\]](#)
 Not applicable. Will be addressed on a project-specific basis.
- e. List any invasive animal species known to be on or near the site.
 Not applicable. Will be addressed on a project-specific basis.

6. Energy and natural resources

- a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc. [\[help\]](#)
 Not applicable, but operation of the District's water system requires electricity and fuel. The District will make every effort to utilize energy efficient equipment as improvements to the water system are implemented.

- b. Would your project affect the potential use of solar energy by adjacent properties?

If so, generally describe. [\[help\]](#)

No.

- c. What kinds of energy conservation features are included in the plans of this proposal?

List other proposed measures to reduce or control energy impacts, if any: [\[help\]](#)

7. Environmental health

- a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal?

If so, describe. [\[help\]](#)

Not applicable. Will be addressed on a project-specific basis.

- 1) Describe any known or possible contamination at the site from present or past uses.

Not applicable. Will be addressed on a project-specific basis.

- 2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

Not applicable. Will be addressed on a project-specific basis.

- 3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

Not applicable. Will be addressed on a project-specific basis.

- 4) Describe special emergency services that might be required.

Not applicable. Will be addressed on a project-specific basis.

- 5) Proposed measures to reduce or control environmental health hazards, if any:

Not applicable. Will be addressed on a project-specific basis.

b. Noise

- 1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)? [\[help\]](#)

None.

- 2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site. [\[help\]](#)

None. Will be addressed on a project-specific basis.

- 3) Proposed measures to reduce or control noise impacts, if any: [\[help\]](#)

Not applicable. Will be addressed on a project-specific basis.

8. Land and shoreline use

- a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe. [\[help\]](#)

Primary land use is urban residential, with commercial and open space areas located throughout the District. The existing land use within the District is identified on Figure 2-2 (Land Use) of the 2020 WSP.

The proposal will not affect current land uses; will be addressed on a project-specific basis.

- b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use? [\[help\]](#)
No.
- 1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:
No.
- c. Describe any structures on the site. [\[help\]](#)
Not applicable. Will be addressed on a project-specific basis.
- d. Will any structures be demolished? If so, what? [\[help\]](#)
Not applicable. Will be addressed on a project-specific basis.
- e. What is the current zoning classification of the site? [\[help\]](#)
The current zoning classifications within the District vary, but are predominately single-family residential together with multifamily residential and commercial areas (see Figure 2-2).
- f. What is the current comprehensive plan designation of the site? [\[help\]](#)
Future land use designations within the District vary, but are predominately single-family residential together with limited multifamily and commercial.
- g. If applicable, what is the current shoreline master program designation of the site? [\[help\]](#)
Primarily designated Shoreline Residential with limited areas of Urban Conservancy along Lake Washington shoreline within the City of Lake Forest Park.
- h. Has any part of the site been classified as a critical area by the city or county? If so, specify. [\[help\]](#)
Critical areas are present throughout the District. This Water System Plan proposal will not directly impact any of these areas. This will be addressed on a project-specific basis.
- i. Approximately how many people would reside or work in the completed project? [\[help\]](#)
None.
- j. Approximately how many people would the completed project displace? [\[help\]](#)
None.

- k. Proposed measures to avoid or reduce displacement impacts, if any: [\[help\]](#)
Not applicable.

- l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any: [\[help\]](#)
This WSP was developed to address the future water system needs of the North City Water District, based on existing and projected land use and population, as determined by the Comprehensive Land Use Plans of the jurisdictions within which the District serves.

- m. Proposed measures to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance, if any:
Not applicable. Will be addressed on a project-specific basis.

9. Housing

- a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing. [\[help\]](#)
Not applicable.
- b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing. [\[help\]](#)
Not applicable.
- c. Proposed measures to reduce or control housing impacts, if any: [\[help\]](#)
Not applicable.

10. Aesthetics

- a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed? [\[help\]](#)
Not applicable. Will be addressed on a project-specific basis.
- b. What views in the immediate vicinity would be altered or obstructed? [\[help\]](#)
Not applicable. Will be addressed on a project-specific basis.
- c. Proposed measures to reduce or control aesthetic impacts, if any: [\[help\]](#)
Not applicable. Will be addressed on a project-specific basis.

11. Light and glare

- a. What type of light or glare will the proposal produce? What time of day would it mainly occur? [\[help\]](#)
Not applicable. Will be addressed on a project-specific basis.
- b. Could light or glare from the finished project be a safety hazard or interfere with views? [\[help\]](#)
Not applicable. Will be addressed on a project-specific basis.
- c. What existing off-site sources of light or glare may affect your proposal? [\[help\]](#)

Not applicable. Will be addressed on a project-specific basis.

- d. Proposed measures to reduce or control light and glare impacts, if any: [\[help\]](#)

Not applicable. Will be addressed on a project-specific basis.

12. Recreation

- a. What designated and informal recreational opportunities are in the immediate vicinity? [\[help\]](#)
Hamlin Park is the largest formal recreation facility in the District. Numerous other park and recreational facilities, both designated and informal, are located throughout the District.
- b. Would the proposed project displace any existing recreational uses? If so, describe. [\[help\]](#)
No.
- c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any: [\[help\]](#)
Not applicable.

13. Historic and cultural preservation

- a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers located on or near the site? If so, specifically describe. [\[help\]](#)
Not applicable. Will be addressed on a project-specific basis.
- b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources. [\[help\]](#)
Not applicable. Will be addressed on a project-specific basis.
- c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc. [\[help\]](#)
Not applicable. Will be addressed on a project-specific basis.
- d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.
Not applicable. Will be addressed on a project-specific basis.

14. Transportation

- a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any. [\[help\]](#)
Not applicable. Will be addressed on a project-specific basis.
- b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop? [\[help\]](#)

Not applicable. Will be addressed on a project-specific basis.

- c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate? [\[help\]](#)

Not applicable. Will be addressed on a project-specific basis.

- d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private). [\[help\]](#)

No. Will be addressed on a project-specific basis.

- e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe. [\[help\]](#)

Not applicable.

- f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates? [\[help\]](#)

Not applicable.

- g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.

Not applicable.

- h. Proposed measures to reduce or control transportation impacts, if any: [\[help\]](#)

Not applicable.

15. Public services

- a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe. [\[help\]](#)

Not applicable.

- b. Proposed measures to reduce or control direct impacts on public services, if any. [\[help\]](#)

Not applicable.

16. Utilities

- a. Circle utilities currently available at the site: [\[help\]](#)

☒ electricity, ☒ natural gas, ☒ water, ☐ refuse service, ☐ telephone, ☐ sanitary sewer, ☐ septic system,
other _____

- b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed. [\[help\]](#)

This proposal establishes a plan for the future development of the water system within the District's service area boundaries.

C. Signature [\[HELP\]](#)

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.



Signature: _____

Name of signee _____ Rodney Langer, P.E. _____

Position and Agency/Organization _____ Project Manager, CHS Engineers, LLC _____

Date Submitted: _____ February 20, 2020 _____

D. Supplemental sheet for nonproject actions [\[help\]](#)

(IT IS NOT NECESSARY to use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

Capital improvement projects identified in the WSP will likely result in temporary construction-related impacts, including production of noise and emissions to the air from construction equipment.

Proposed measures to avoid or reduce such increases are:

Compliance with local noise ordinances and requirements related to dust control, temporary erosion and sedimentation control, vehicle emissions, etc.

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

Potential impacts will be evaluated on a project-specific basis and will be dependent on a variety of factors, including project type, size and location.

Proposed measures to protect or conserve plants, animals, fish, or marine life are:

Appropriate measures to protect or conserve plants, animals, fish or marine life will be identified and implemented on a project-specific basis.

3. How would the proposal be likely to deplete energy or natural resources?

Construction of new water system facilities identified in the WSP will require the use of construction materials typical to this type of work.

Proposed measures to protect or conserve energy and natural resources are:

Efficient planning and design of utilities will assist in the conservation of water. A Water Use Efficiency Plan is included in Appendix B to the WSP. In addition, energy efficient equipment for new and upgraded facilities will be utilized to the fullest extent possible.

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

Projects identified in the plan may be located/occur within or adjacent to the types of areas listed above. Efforts will be made during project design to avoid areas that would be sensitive to the type of development activity. However, in circumstances where no other feasible location exists, projects will be compliant with all applicable Federal, State and local sensitive area requirements.

Proposed measures to protect such resources or to avoid or reduce impacts are:

Any future work associated with North City Water District's water system will be consistent with the regulations and policies governing the protection of such resources.

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

The District's WSP is based on the population projections and land use designations included in the current Comprehensive Land Use Plans for the jurisdictions within which the District serves, as required by State law. Neither the WSP, nor projects included in the WSP Plan, will affect land and shoreline use inconsistent with existing plans.

Proposed measures to avoid or reduce shoreline and land use impacts are:

Not applicable. The District has no land use or shoreline regulatory authority.

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

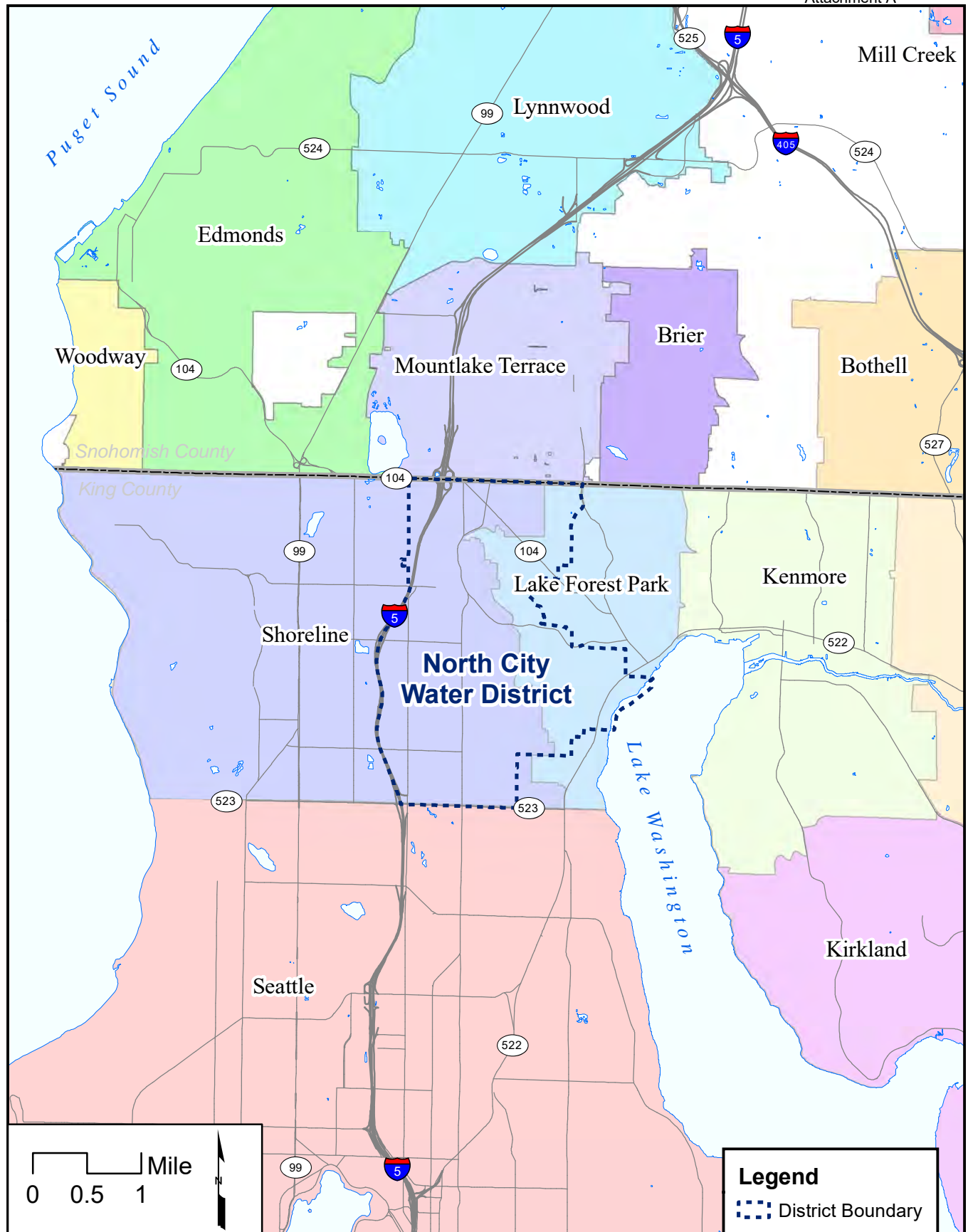
This proposal will not increase demands on transportation or public utilities, but will provide a guideline for future development of the District's water system, based on projected growth.

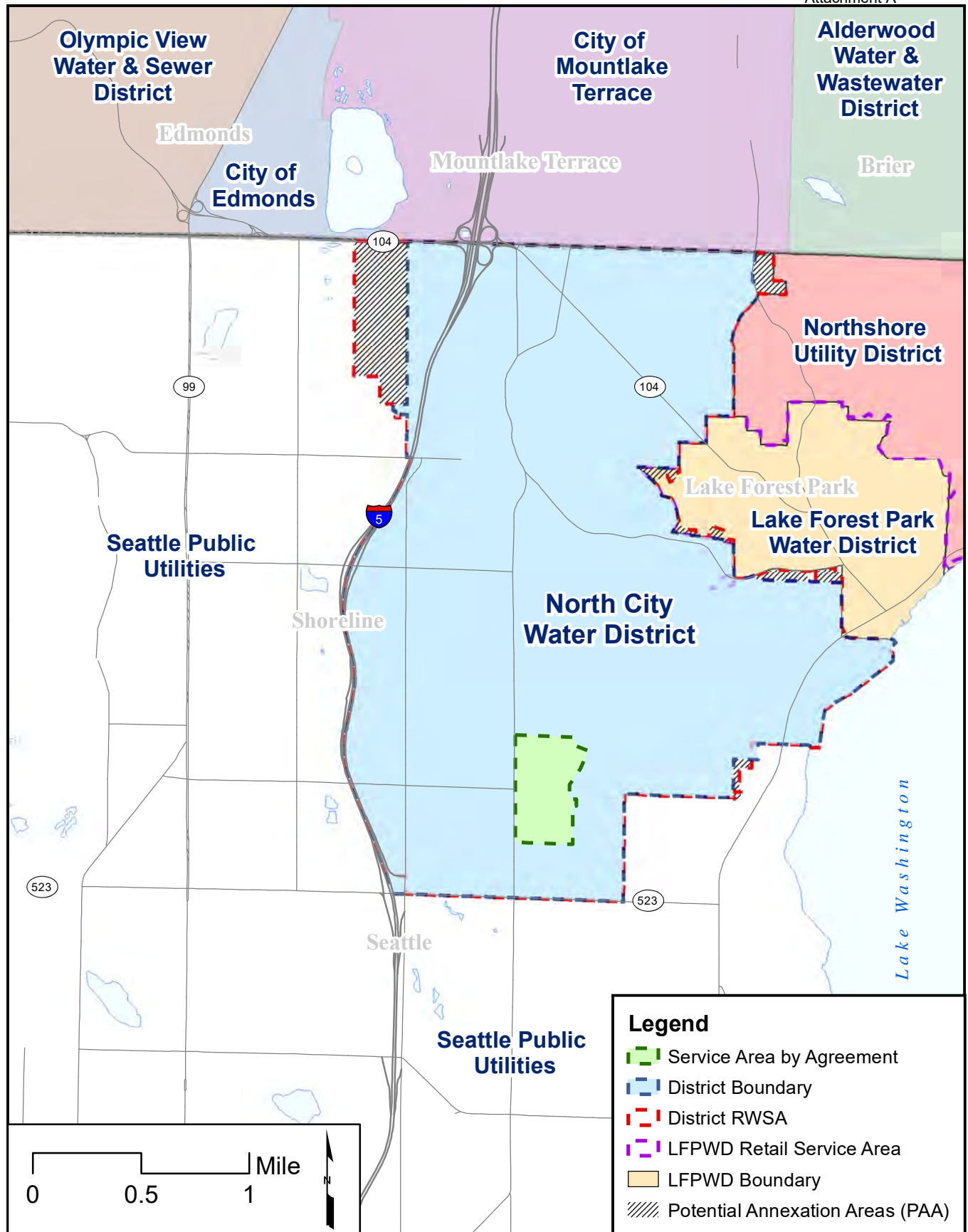
Proposed measures to reduce or respond to such demand(s) are:

Not applicable.

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

This proposal will not conflict with any such laws.





**NORTH CITY WATER DISTRICT
2020 Water System Plan
THRESHOLD DETERMINATION DISTRIBUTION LIST**

Department of Ecology, NWRO
3190 - 160th Avenue S.E.
Bellevue, Washington 98008-5452

Washington State Department of Ecology
SEPA Unit – email only:
separegister@ecy.wa.gov

Washington State Dept. of Natural Resources
SEPA Center
1111 Washington Street SE
Post Office Box 47000
Olympia, Washington 98504-7000

King County Utilities Technical Review Committee
Attention Mr. Jae Hill
Department of Local Services – Permitting
35030 SE Douglas Street, Suite 210
Snoqualmie, WA 98065-9266

City of Shoreline, Planning Dept
Attn: Rachael Markle, Planning Director
17500 Midvale Avenue North
Shoreline, Washington 98133-4905

SEPA Coordinator
King County Dept. of Permitting and
Environmental Review
35030 SE Douglas St. Suite 210
Snoqualmie, Washington 98065-9266

Shoreline Emergency Mgmt. Coord
Attn: Jason McMillan, MEP
17500 Midvale Avenue North
Shoreline, Washington 98133-4905

Seattle Public Utilities; Attn: Kelly O'Rourke
700 5th Avenue, Suite 4900
P.O. Box 34018
Seattle, WA 98124-4018

Washington State Department of Health
NW Regional Office Drinking Water
Attention: Brietta Carter, P.E.
20435 72nd Avenue S Suite 200
Kent, Washington 98032

Shoreline Fire District
Attn: Fire Marshal's Office
17525 Aurora Ave N
Shoreline, WA 98133

Mr. Peter Mills
Tulalip Tribal Council
6700 Totem Beach Road
Marysville, Washington 98270

Ms. Karen Walter
Muckleshoot Indian Tribe
39015 172nd Avenue SE
Auburn, Washington 98092

U.S. Army Corps of Engineers
Chief, Regulatory Branch
PO Box 3755
Seattle, Washington 98124-3755

Mr. Rod Dembowski
King County Council
King County Courthouse
516 Third Avenue, Room 1200
Seattle, WA 98104

Ronald Wastewater District
Attn: Douglas Wittinger, Administrator
17505 Linden Avenue North
Post Office Box 33490
Shoreline, Washington 98133-0490

City of Lake Forest Park
Attn: Steve Bennett, Planning & Building
Director
17425 Ballinger Way NE
Lake Forest Park, WA 98155

Northshore Fire Department
Attn: Fire Marshal Jeff LaFlam
7220 NE 181st Street
Kenmore, WA 98028

SEPA Coordinator
Seattle Dept. of Planning & Development
700 5th Avenue, Suite 2000
P.O. Box 34019
Seattle, Washington 98124-4019

NORTH CITY WATER DISTRICT

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**NORTH CITY WATER DISTRICT
RESOLUTION 2019.07.26**

**A RESOLUTION ADOPTING GOALS IN CONNECTION WITH THE DISTRICT'S
WATER USE EFFICIENCY PROGRAM**

Background

1. RCW 57.08.005 authorizes North City Water District ("District") to provide water service to property within and outside the District's corporate boundaries and provides the District with full authority to regulate and control the use, content, distribution and price thereof.
2. In January of 2007 the Washington State Department of Health ("DOH") issued a Water Use Efficiency Rule that the District is required to comply with.
3. Originally, the Water Use Efficiency Rule, required the District to adopt Water Use Efficiency Goals every six years. The Board of commissioners adopted two goals as part of the 2007 Water Use Efficiency Program (Resolution 2008.01.04) and one goal as part of the 2013-2018 Water Use Efficiency Program (Resolution 2013.11.45)
4. As part of the District's Comprehensive Water System Plan, District staff has prepared a 2019-2028 Water Use Efficiency Program and recommends that the Board of Commissioners formally adopt certain goals in order to comply with the DOH rule.
5. Notice of a public hearing on July 16, 2019 regarding the District's proposed water efficiency goals was published in the District's 2018 Consumer Confidence Report and in the *Daily Journal of Commerce* on July 1, 2019 for the purpose of inviting public comment on the goals prior to their adoption. These water efficiency goals were discussed with the Board of Commissioners at the open public meeting held on July 16, 2019, and 1 members of the public provided comments.

Action

IT IS RESOLVED THAT:

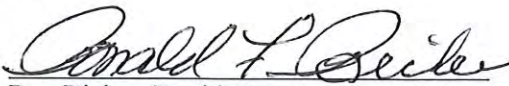
6. The Board of Commissioners hereby adopts the following goals for the ten-year period from 2019-2028 in connection with its Water Use Efficiency Program:
 - A. North City Water District will continue to support community education about the District and water issues.
 - B. As part of the Saving Water Partnership ("SWP"), North City Water District supports the regional goal of keeping the total average annual retail water use of SWP members under 110 mgd through 2028, despite forecasted population growth.

Resolution 2019.07.26

Page 2

ADOPTED by the Board of Commissioners of North City Water District at an open public meeting on this 16th day of July, 2019.

ATTEST:

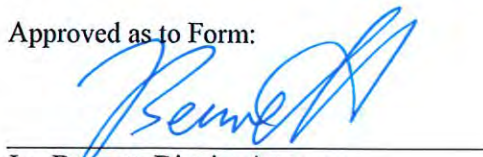


Ron Ricker, President



Charlotte Haines, Vice President

Approved as to Form:



Joe Bennett, District Attorney



Patricia M. Hale, Secretary

Water Use Efficiency/Conservation Plan

1. BACKGROUND

The Washington State Department of Health (DOH) revised its requirements for water conservation planning as a result of the 2003 Municipal Water Law. In January 2007, DOH issued a new Water Use Efficiency Rule for municipal water providers with which to comply. Seattle, and the utilities that purchase water from Seattle, formed the Saving Water Partnership (SWP) in 1999 to work together to conserve water. Regional conservation efforts were designed as a strategic approach to prolong the time before a new water supply source will be required and conservation requirements are part of the 60 year contract signed by the District in 2001. Regional goals were set in 2007 by the SWP and again in 2012. The District has been supportive of the regional conservation efforts since first introduced. The District adopted both the regional goal and set a local goal in 2008 (Resolution 2008.01.04) following a public hearing on January 2008. The District also adopted the updated regional goal in 2013 (Resolution 2013.11.45) following a public hearing on November 5, 2013. The updated regional goal states:

“As part of the Seattle Public Utilities’ Saving Water Partnership (SWP), Shoreline Water District intends to reduce per capita water use from current levels so that the total average annual retail water use of the members of the Saving Water Partnership is less than 105 million gallons a day (mgd) from 2013 through 2018, despite forecasted population growth.

To meet the regional goal, the District promoted and participated in Saving Water Partnership programing and developed a robust customer outreach program to provide education and support to ratepayers. Since the first goals were established in 2008, the District’s water savings results have been significant. Comparing usage in 2008 to usage in 2018, water use decreased by 13 percent while the number of accounts increased 1.6 percent. The District’s water loss has consistently been under 10% since that period, except for 2014 when the District was doing system improvements in the 3.7 MG reservoir.

Monitoring water use has long been part of the daily operations of the District. In the mid-1960s, the District’s water loss was over 25% and while many of the ratepayers were not happy with the Board of Commissioners at that time, the Board voted to replace nearly 70% of the water system at that time with cast iron water mains. Ratepayers paid an additional \$1/month for five years to cover the bond costs for this program.

District customers have taken advantage of the different regional conservation measures since they were first offered in 2000. Since 2011, District customers specifically helped conserve water by the following programs, the annual summary of which is reported each year in the District’s consumer confidence report:



After several months of discussions regarding conservation, the Saving Water Partnership adopted a new regional conservation goal in September 2017. The new goal is to “*Keep the total average annual retail water use of SWP members under 110 MGD through 2028 despite forecasted population growth by reducing per capita water use*”. The SWP also voted to re-evaluate the programs every two years from 2019-2028 to determine if the programs effective and whether or not funding is sufficient. The Saving Water Partnership has allocated \$1.9 million per year (in 2017 dollars) for regional conservation programs that will be split between capital improvement programs and operations/maintenance.

The District has been supportive of public education efforts above and beyond the regional conservation efforts and affirmed their support of community outreach, education and involvement by passing Resolution 2017.12.33. The District’s conservation program utilizes both the resources available from the regional programs as well as local resources. The District’s current water use efficiency program was designed around the third edition of the Water Use Efficiency Guidebook (2017). The District’s current conservation and public outreach efforts include the following programs:

NORTH CITY WATER DISTRICT

Water Use Efficiency

Operations and Maintenance			Capital Improvement Program	
Youth Education	General Education & Outreach	Technical Assistance	System Measurements	Rebates*
Fix a leak week challenge	Savvy Gardner Classes*	Bills showing consumption history	Source Meters are installed on each of the supply stations	Clothes Washer
Nature Vision Classes*	Quarterly Newsletters	Appropriately sized services using fixture unit counts from the Uniform Plumbing Code	Meters are also installed on each of the three emergency connections Terrace	Toilet
	Booths at local events such as: Healthy Kids Day, Earth Day, STEM festival, Science Fairs, Million Step Challenge, Arts Festival, Solarfest, neighborhood picnics, North City Jazz Walk, Ridgecrest Ice Cream Social, Celebrate Shoreline, Picnic in a Park		Automatic Meters on Individual Services meters	Irrigation Rebates
			Hydrant meters for temporary use	Irrigation Timer Rebased

*supplies and tracking are provided as part of the regional program. Funded at \$1.9 million at the regional level in 2017 dollars.

Regional conservation program

The District will continue to track water use as well as provide educational information to customers on a regular basis. As stated earlier, the District has observed a 13% water reduction in the last 10 years, the majority of which occurred prior to 2013. There has been little development within the District since the 1990s. However, since the City of Shoreline changed the land use and zoning in 2015, there has been a dramatic increase in the number of single family house being converted into multiple single family residents on a single lot or lots, or becoming a multifamily structure. The individual residences went from 161 gal/day in 2008 to 134 gal/day in 2013 to 132 gal/day in 2018. The three year leakage has changed from 4.7% for 2006-2008 to 4.5% for 2016-2018.

2. OPERATIONS AND MAINTENANCE

Youth Education

Fix a Leak Week Challenge - the District began a Fix a Leak Week challenge in 2012 when mailers were sent to all water purveyors in the Saving Water Partnership area north of the Ship Canal Bridge. The District decided to challenge the youth in the Shoreline-Lake Forest Park schools, to use the dye strips to test their toilets at home, with their parents. All the District asked was to have the parents sign the flier saying they had done the test with their students. In the program's first year, 544 students returned signed fliers in 10 of 12 schools. Since then, the District has developed educational material to assist the teachers to encourage students to become "Leak Detectives" by searching for leaks and alerting an adult to get the leaks repaired. In 2018, 678 students tested 1,287 toilets and found 145 leaking toilets.



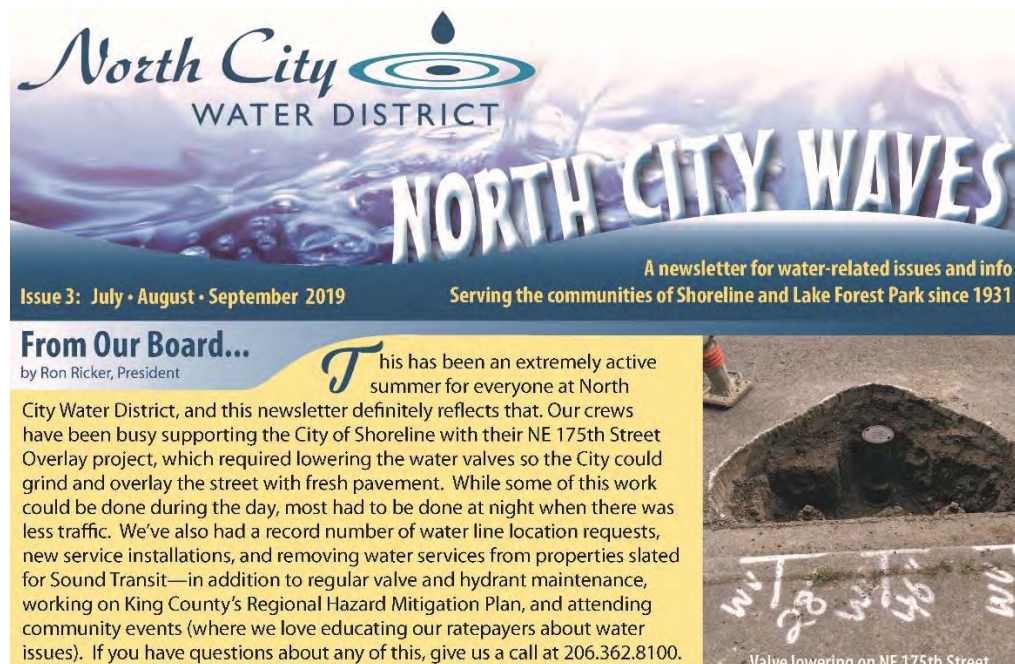
District staff also actively promotes the regionally funded education classes offered through the Saving Water Partnership, by Nature Vision, a local environmental education organization. The schools within the boundaries of each Saving Water Partnership member utility are allocated a certain number of classes annually based on the utilities number of connections. Occasionally, the demand for these classes within the North City Water District service area has exceeded the allocation. In those specific years, the District has funded the request for additional classes.

General Education & Outreach

Educating the public about smart water use can be done a variety of ways. One of the key ways that the District has done this is by hosting one of the many Savvy Gardner classes that are available through the Saving Water Partnership. Since 2013, the District has hosted one to three classes each year that promote healthy, sustainable gardens that do not demand excessive watering, pesticides and fertilizers.



The District newsletter remains a mainstay for communication regarding water use efficiency. The District mails newsletters to each customer (business and residential) four times a year. Included in the newsletters are updates to District projects, ongoing public outreach efforts and a general overview of District activities. The second newsletter each year serves as the District's consumer confidence report. This is a requirement of US EPA and reporting requirements have been part of the National Primary Drinking Water Regulations since 1998. More and more utilities across the nation are moving to providing these annual reports electronically, however, hard copy newsletters remain the preference of North City Water District customers at this time. Mailing paper copies of these newsletters and reports is currently the most effective way to reach all of the District residents. Copies of the newsletters are also provided to both City Councils in Lake Forest Park and Shoreline as well as the Washington State Legislative Representatives, many of whom are not customers of the District.



Some of the regional education programs the District is participating in include:

- Garden hotline to answer questions about water-efficient gardening and other topics.
- Landscape professionals training
- Gardening brochures and fact sheets.
- Regional conservation hotline (206) 684-SAVE
- Regional website water saving ideas, www.savingwater.org
- Regional Language Interpretation Line

The District has been asked to attend a variety of events where the public has wanted to learn more about water. The District has a booth with educational materials and hands on activities that vary depending on the event. District staff and commissioners have been available to attend these events, answer questions and share their knowledge with the community.



The crews have adapted a water cooler with taps resembling the distinctive yellow and green fire hydrants in North City. Providing a cool drink on a warm day or evening has served to be both a conversation starter and an opportunity to provide education about the benefits of drinking water from the tap instead of plastic bottles.



Technical Assistance

Every other month bills are sent to each property owner and if arranged, to the renters, showing their specific water use.

Appropriately sized water services are key to making sure residents can get the needed water volume but not be oversized. As part of standard operating procedures, District staff carefully reviewed the number of fixtures in proposed developments and make recommendations if the size of service requires changing. This practice was most recently adopted into the District's code as a requirement (Resolution 2019.09.31), ensuring that future customers will continue to get the same education when requesting service.

Some of the regional technical assistance programs include:

- Educating residential and commercial customers on irrigation efficiency issues.
- Educating commercial customers on indoor efficiency issues.

3. CAPITAL IMPROVEMENT PROGRAM

The District regularly replaces/upgrades components of the water system in accordance with the current water system plan. The District is fortunate to not have any asbestos-cement (AC) mains, which typically leak more than ductile iron or cast iron. With over 99% of the water mains being cast or ductile iron pipe, the District can focus its main replacement projects on road upgrade projects or reducing number of the smaller-diameter, high velocity water mains.

System Measurements

The District has installed water meters at each of each sources with Seattle which meets the requirement from the WUE rule. The District also has meters on each of the emergency interties, even though they are exempt from the rule. District staff visit the meters and record the water use on a monthly schedule. These meters are in addition to and provide back up to the meters provided by SPU to measure the amount of water delivered to the District.

The District has installed new radio read meters on individual water services for all existing services. This is also in compliance with the WUE rule. The radio read meters are now read by a vehicle read unit which allows a staff member to read the meter without having to depart the vehicle. In 2019, the District began the transition to a fixed based system with a radio repeater located on the 3.7 MG reservoir. The majority of the meters will be able to be read by the new fixed based system but the District will have to replace the older units with new radio transceivers that can be read by the new system.

The District has hydrant meters available for use for contractors that require water use for a short period of time. These meters are read when the meters are removed and no longer deployed for that temporary use.

The District tracks the water purchased from SPU and sold each month, by customer class as well as non-revenue water consumption. This information is transferred to Seattle each February and is reported annually in the consumer confidence report.

Rebate programs

Clothes washer rebates and toilet rebates for single and multi-family customers are just some of the many rebate programs that District offers as part of the SWP. Water irrigation system and water timer rebates for single, multi-family and commercial customers have all been used District ratepayers. SPU administers this program and reports the information annually to the District.

FUTURE PERFORMANCE MEASURES

The District expects to continue with the ongoing water use efficiency measures and report the results annually with the Washington State Department of Health.

Incentives

The District has a tiered rate structure with four tiers; 0-4 CCF, 5-10 CCF, 11-24 CCF and 25 and greater CCF following the 2019 Cost of Service Review. The cost per CCF increases with the higher tiers, encouraging conservation.

The District regularly completes a cost of service study to ensure the appropriate level of revenue to be collected from ratepayers and the appropriate rate structure is established to collect those revenues equitably. The District completed its Cost of Service Review in late 2019.

NORTH CITY WATER DISTRICT

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Water Right Self-Assessment

Mouse-over any link for more information. Click on any link for more detailed instructions.

<u>Water Right Permit, Certificate, or Claim #</u> *If water right is interruptible, identify limitation in yellow section below	<u>WFI Source #</u> If a source has multiple water rights, list each water right on separate line plus Well No.	<u>Existing Water Rights</u> Qi= Instantaneous Flow Rate Allowed (GPM or CFS) Qa= Annual Volume Allowed (Acre-Feet/Year) This includes wholesale water sold				<u>Current Source Production – Most Recent Calendar Year</u> Qi = Max Instantaneous Flow Rate Withdrawn (GPM or CFS) Qa = Annual Volume Withdrawn (Acre-Feet/Year) This includes wholesale water sold				<u>10-Year Forecasted Source Production (determined from WSP)</u> This includes wholesale water sold				<u>20-Year Forecasted Source Production (determined from WSP)</u> This includes wholesale water sold					
		<u>Primary Qi</u> Maximum Rate Allowed	<u>Non-Additive Qi</u> Maximum Rate Allowed	<u>Primary Qa</u> Maximum Volume Allowed	<u>Non-Additive Qa</u> Maximum Volume Allowed	<u>Total Qi</u> Maximum Instantaneous Flow Rate Withdrawn	<u>Current Excess or (Deficiency) Qi</u>	<u>Total Qa</u> Maximum Annual Volume Withdrawn	<u>Current Excess or (Deficiency) Qa</u>	<u>Total Qi</u> Maximum Instantaneous Flow Rate in 10 Years	<u>10-Year Forecasted Excess or (Deficiency) Qi</u>	<u>Total Qa</u> Maximum Annual Volume in 10 Years	<u>10-Year Forecasted Excess or (Deficiency) Qa</u>	<u>Total Qi</u> Maximum Instantaneous Flow Rate in 20 Years	<u>20-Year Forecasted Excess or (Deficiency) Qi</u>	<u>Total Qa</u> Maximum Annual Volume in 20 Years	<u>20-Year Forecasted Excess or (Deficiency) Qa</u>		
		S1-136018CL		5,386 GPM		3,000 AF/YR		0 GPM	5,386 GPM	0.0 AF/YR	3,000 AF/YR	0 GPM	5,386 GPM	0.0 AF/YR	3,000 AF/YR	0 GPM	5,386 GPM	0.0 AF/YR	3,000 AF/YR

Column Identifiers for Calculations:	A	B	C	=A-C	D	=B-D	E	= A-E	F	=B-F	G	=A-G	H	=B-H
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[illegible]

Water Right Self-Assessment (cont.)

Mouse-over any link for more information. Click on any link for more detailed instructions.

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	WFI Source # If a source has multiple water rights, list each water right on separate line	Quantities Allowed In Contract		Expiration Date of Contract	Currently Purchased (2018) Current quantity purchased through intertie				10-Year Forecasted Purchase (2029) Forecasted quantity purchased through intertie				20-Year Forecasted Purchase (2039) Forecasted quantity purchased through intertie			
		Maximum Qi	Maximum Qa		Maximum Qi	Current Excess or (Deficiency) Qi	Maximum Qa	Current Excess or (Deficiency) Qa	Maximum Qi	Future Excess or (Deficiency) Qi	Maximum Qa	Future Excess or (Deficiency) Qa	Maximum Qi	Future Excess or (Deficiency) Qi	Maximum Qa	Future Excess or (Deficiency) Qa
		Instantaneous Flow Rate	Annual Volume		Instantaneous Flow Rate		Annual Volume		10-Year Forecast		10-Year Forecast		20-Year Forecast		20-Year Forecast	
1. City of Seattle Meter Station 101	Seattle Public Utilities	See Additional Comment 1	No limit	1/1/2062	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2. City of Seattle Meter Station 102	Seattle Public Utilities	See Additional Comment 1	No limit	1/1/2062	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3. City of Seattle Meter Station 103	Seattle Public Utilities	See Additional Comment 1	No limit	1/1/2062	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4. City of Seattle Meter Station 104	Seattle Public Utilities	3,330 GPM	No limit	1/1/2062	2,108 GPM	1,222 GPM	1,753 AF/YR	n/a	2,470 GPM	860 GPM	2,050 AF/YR	n/a	2,631 GPM	699 GPM	2,184 AF/YR	n/a
Ballinger Village Emergency Intertie	City of Montlake Terrace	Unspecified	No limit	After Two Year’s Notice	None	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19th Avenue NE Emergency Intertie	City of Montlake Terrace	Unspecified	No limit	After Two Year’s Notice	None	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Interties	TOTALS =	3,330 GPM	n/a		2,108 GPM	1,222 GPM	1,753 AF/YR	n/a	2,470 GPM	860 GPM	2,050 AF/YR	n/a	2,631 GPM	699 GPM	2,184 AF/YR	n/a
GRAND TOTALS=		3,330 GPM	n/a		2,108 GPM	1,222 GPM	1,753 AF/YR	n/a	2,470 GPM	860 GPM	2,050 AF/YR	n/a	2,631 GPM	699 GPM	2,184 AF/YR	n/a

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:

1 -Meter Stations 101-104 are governed by one contract, see Meter Station 104 for the contract maximum and all water supply under this contract.

RESOLUTION NO. 573

RESOLUTION OF THE BOARD OF WATER COMMISSIONERS OF WATER DISTRICT NO. 42, KING COUNTY, WASHINGTON, APPROVING THE REGISTERING OF THE DISTRICT'S WATER RIGHT CLAIM ON PORTION OF SEATTLE'S RIGHT TO FLOWAGE OF THE CEDAR RIVER AND SOUTH FORK TOLT RIVER BY FILING CLAIM WITH DEPARTMENT OF ECOLOGY, PURSUANT TO RCW CHAP. 90.14.

WHEREAS, the attorney for Water District No. 42 prepared a "Water Right Claim" to portion of Seattle's right to the flowage of the Cedar River and South Fork^b of the Tolt River, which claim was signed, sworn to by the President of the Board between Board meetings, as previously directed by the Board; and

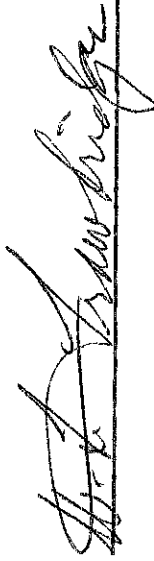
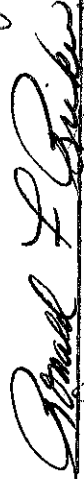

WHEREAS, said claim was timely filed with the Department of Ecology at Olympia on June 26, 1974, such filing being evidenced by said Department signing a receipt on Form 3811 for an envelope containing said claim, which bore MAIN U.S. POSTOFFICE registered mail No. 79356, dated June 25, 1974, at Seattle; and

WHEREAS, the Board deems it proper to make a formal water district record of such filing and to approve said claim, NOW,

THEREFORE,

BE IT RESOLVED by the Board of Water Commissioners of Water District No. 42, King County, Washington, that the preparation, swearing to and filing of the District's "Water Right Claim", pursuant to RCW Chapter 90.14, (a copy of which claim is attached to this resolution for record purposes) with the Department of Ecology on June 26, 1974 at Olympia, Washington, are hereby approved.

ADOPTED by the Board of Water Commissioners of Water District
No. 42, King County, Washington, at a regular meeting held on July
15, 1974.



WATER RIGHT CLAIM

1. NAME King County Water District No. 42

ADDRESS 16906 - 15th Ave. N.E.

Seattle, Wa ZIP CODE 98146

2. SOURCE FROM WHICH THE RIGHT TO TAKE AND MAKE USE OF WATER IS CLAIMED: Surface water
(SURFACE OR GROUND WATER)

W.R.I.A. (LEAVE BLANK)

A. IF GROUND WATER; THE SOURCE IS Not applicable

B. IF SURFACE WATER, THE SOURCE IS Cedar River and South Fork of Tolt River

3. THE QUANTITIES OF WATER AND TIMES OF USE CLAIMED:

A. QUANTITY OF WATER CLAIMED 12 cu.ft. per second PRESENTLY USED 10.5 cu.ft. per second
(CUBIC FEET PER SECOND OR GALLONS PER MINUTE)

B. ANNUAL QUANTITY CLAIMED 3000 acre ft. per yr. PRESENTLY USED 2500 acre ft. per yr.
(ACRE FEET PER YEAR)

C. IF FOR IRRIGATION, ACRES CLAIMED Not applicable PRESENTLY IRRIGATED Not applicable

D. TIME(S) DURING EACH YEAR WHEN WATER IS USED: Continuously all year

4. DATE OF FIRST PUTTING WATER TO USE: MONTH August YEAR 1931

5. LOCATION OF THE POINT(S) OF DIVERSION/WITHDRAWAL: 1800 FEET West AND 1300

FEET North FROM THE Southeast CORNER OF SECTION 19

BEING WITHIN Southeast 1/4 OF SECTION 19, T. 22 N., R. 7 E. (E.O.R.W.) W.M.

IF THIS IS WITHIN THE LIMITS OF A RECORDED PLATTED PROPERTY, LOT See attachment at 5(a) BLOCK OF

Not within recorded plat

(GIVE NAME OF PLAT OR ADDITION)

6. LEGAL DESCRIPTION OF LANDS ON WHICH THE WATER IS USED: The service area of Water District No. 42 covers a total of 3,037 acres. The District boundaries are the Snohomish County Line (N.E. 205th Street) on the north; the northerly limits of the City of Seattle (N.E. 145th Street) on the south; 5th Avenue N.E. and Interstate Highway No. 5 on the west; and an irregular boundary corresponding roughly to 35th Avenue N.E. on the east

See attachment for legal description COUNTY of King

7. PURPOSE(S) FOR WHICH WATER IS USED: Municipal supply. See attachment at 7

8. THE LEGAL DOCTRINE(S) UPON WHICH THE RIGHT OF CLAIM IS BASED: See attachment at 8

DO NOT USE THIS SPACE

THE FILING OF A STATEMENT OF CLAIM DOES NOT CONSTITUTE AN ADJUDICATION OF ANY CLAIM TO THE RIGHT TO USE OF WATERS AS BETWEEN THE WATER USE CLAIMANT AND THE STATE OR AS BETWEEN ONE OR MORE WATER USE CLAIMANTS AND ANOTHER OR OTHERS. THIS ACKNOWLEDGEMENT CONSTITUTES RECEIPT FOR THE FILING FEE.

DATE RETURNED THIS HAS BEEN ASSIGNED
WATER RIGHT CLAIM REGISTRY NO.

I HEREBY SWEAR THAT THE ABOVE INFORMATION IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

X King County Water District No. 42

President of its Board of Commissioners DATE 12/1/74

IF CLAIM FILED BY DESIGNATED REPRESENTATIVE, PRINT OR TYPE FULL NAME AND MAILING ADDRESS OF AGENT BELOW.

Attachment A

ATTACHMENT

to

KING COUNTY WATER DISTRICT NO. 42 - WATER RIGHT CLAIM

5 (a) The point of diversion described on the face of the claim is the approximate location of the Landsburg Diversion Dam on the Cedar River for the water supply of the City of Seattle Water Department.

(b) The other location of the Point(s) of Diversion/Withdrawal: 1100 Feet East and 2450 Feet North from the Southwest Corner of Section 32, Being within Southwest 1/4 of Section 32, T. 26 N. R 9 E.W.M.

This latter description is the approximate location of the dam and diversion or withdrawal point for the water on the South Fork of the Tolt River.

6. See legal description, attached

7. Water District No. 42 now has 6656 customers, plus Firlands and public schools, served through meters; all but a very few are domestic household users. By 1995 it is believed the District's metered customers will increase to approximately 7791. Otherwise stated, the Water District currently serves a population of approximately 22,500; the ultimate service population will be more than 25,000.

8. The Seattle Water Department has water rights to certain flowage of the Cedar River and South Fork of the Tolt River. Some of these rights have been proved up by Seattle's direct user customers and the balance by purveyors such as King County Water District No. 42. It is the legal position of Water District No. 42 that to the extent that Seattle diverts waters from the Cedar and Tolt to sell to said District, Seattle holds such water rights as trustee for the District; which is to say that such rights are beneficially owned by Water District No. 42

Legal Description for Water Dist. # 42

Water District No. 42 comprises a portion of the following Sections as described below:

Sections 3, 4, 5, 8, 9, 10, 15, 16, and 17 of Township 26 N., Range 4 E., W.M., King County

That portion of the above described sections lying south of N.E. 205th St.; lying easterly of 5th. Ave. N.E. and Interstate 5, which ever is most westerly; lying northerly of N.E. 145th St.; and lying westerly of the following described line:

Beginning at the intersection of N.E. 145th St. and 25th. Ave. N.E., thence northerly along 25th. Ave. N.E. to an intersection with N.E. 155th St., thence easterly on N.E. 155th St. to an intersection with 35th. Ave. N.E., thence northerly on 35th. Ave. N.E. to the plat of Sherwood Glen, thence easterly and northerly along the boundary of Sherwood Glen to an intersection with N.E. 160th St., thence easterly along N.E. 160th St. and its easterly extension to the shore of Lake Washington, thence northeasterly

Attachment A

Continued on base 2

(2)

along the shore of Lake Washington to the easterly extension of N.E. 170th. St., thence westerly along the extension and N.E. 170th. St. to an intersection with the easterly line of the SW⁴ of section 10, thence northerly along the easterly line of said SW⁴ to the north line of said SW⁴, thence westerly along the northerly line of said SW⁴ to the west line of section 10, thence northerly along the west line of section 10 to the northeast corner of lot 6 of block 18 of the plat of Lake Forest Park 2nd. Addition, thence westerly along the north line of said lot 6 to 33rd. Ave.

N.E., thence northerly along 33rd. Ave. N.E. to the easterly extension of the south lines of lots 12 to 24 of block 19 of said plat of Lake Forest Park 2nd. Addition, thence westerly along said south lines to the west line of lot 12, thence northerly along said west line to N.E. 180th. St., thence northwesterly along N.E. 180th. St. and Perkins Way to N.E. 185th. St., thence easterly along N.E. 185th. St. to the west line of the plat of Hazel's Glen, thence northerly along said west line to the north line of said plat, thence easterly along said north line and its easterly extension to the west line of tract 7 of the plat of North Side Five Acre Tracts, thence northerly along said west line and the west line of tract 8 to N.E. 190th. St., thence easterly along N.E. 190th. St. to 35th. Ave. N.E., thence northerly along 35th. Ave. N.E. to N.E. 205th. St., and end of this line description.



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
WATER RIGHT CLAIMS REGISTRATION

WATER RIGHT CLAIM

1. NAME King County Water District No. 42

ADDRESS 16906 - 15th Ave. N.E.

Seattle, Wa ZIP CODE 98146

2. SOURCE FROM WHICH THE RIGHT TO TAKE AND MAKE USE OF WATER IS CLAIMED: Surface water
(SURFACE OR GROUND WATER)

W.R.I.A. 08
(LEAVE BLANK)

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(ACRE FEET PER YEAR)

C. IF FOR IRRIGATION, ACRES CLAIMED Not applicable PRESENTLY IRRIGATED Not applicable

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FEET North FROM THE Southeast CORNER OF SECTION 19

BEING WITHIN Southeast 1/4 OF SECTION 19, T. 22 N., R. 7 E (E.O.R.W.) W.M.

IF THIS IS WITHIN THE LIMITS OF A RECORDED PLATTED PROPERTY, LOT BLOCK OF

Not within recorded plat
(GIVE NAME OF PLAT OR ADDITION)

6. LEGAL DESCRIPTION OF LANDS ON WHICH THE WATER IS USED: The service area of Water District No. 42 covers a total of 3,037 acres. The District boundaries are the Snohomish County Line (N.E. 205th Street) on the north; the northerly limits of the City of Seattle (N.E. 145th Street) on the south; 5th Avenue N.E. and Interstate Highway No. 5 on the west; and an irregular boundary corresponding roughly to 35th Avenue N.E. on the east

See attachment for legal description COUNTY of King

7. PURPOSE(S) FOR WHICH WATER IS USED: Municipal supply. See attachment at 7

8. THE LEGAL DOCTRINE(S) UPON WHICH THE RIGHT OF CLAIM IS BASED: See attachment at 8

DO NOT USE THIS SPACE

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DATE RETURNED THIS HAS BEEN ASSIGNED
WATER RIGHT CLAIM REGISTRY NO.

FILED 075136018

[Signature]

DIRECTOR - DEPARTMENT OF ECOLOGY

I HEREBY SWEAR THAT THE ABOVE INFORMATION IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

X King County Water District No. 42
President of its Board of Commissioners
DATE 25 June 1974

IF CLAIM FILED BY DESIGNATED REPRESENTATIVE, PRINT OR TYPE FULL NAME AND MAILING ADDRESS OF AGENT BELOW.

☐ ADDITIONAL INFORMATION RELATING TO WATER QUALITY AND/OR WELL CONSTRUCTION IS AVAILABLE.

A FEE OF \$7.00 MUST ACCOMPANY THIS WATER RIGHT CLAIM

ORIGINAL DWR

RETURN ALL THREE COPIES WITH CARBONS INTACT, ALONG WITH YOUR FEE TO:
DEPARTMENT OF ECOLOGY
WATER RIGHT CLAIMS REGISTRATION
P.O. BOX 829 OLYMPIA, WASHINGTON 98504

Frequently Asked Questions about Water Right Claims

from Ecology's Water Resources Program

The Department of Ecology (Ecology) manages the state's water resources, working to meet all the varied demands on Washington's public waters. Water rights play a crucial role in managing and allocating this finite resource.

Water rights are generally represented by three different types of water right documents: claims, permits and certificates. A water right claim is simply that – a *claim* to a water right for a beneficial use which predates the state water-permitting system. The validity of a claim can only be confirmed through judicial processes.

"Beneficial use" is a key concept in Washington water law. It refers to both what the water is used for (e.g. domestic use, irrigation, and recreation) as well as the amount of water necessary for the specified purpose (so water is not wasted.)



Background: History of Washington Water Law

In our early history, Washington settlers obtained water rights under two doctrines: the **riparian** doctrine and the **prior appropriation** doctrine. The riparian doctrine allowed a person with property next to a surface water body (such as a stream or lake) to draw water from that source; it was not concerned with the priority of use among users. Prior appropriation allowed water to be used on land that was not close to the water source, and was based on a priority system ("first in time, first in right," see below).

In 1917, the Washington Legislature enacted the Water Code, still in use today, affirming that "all waters within the state belong to the public, subject to existing rights." The Water Code provided for centralized water administration by the state. While the Water Code did not affect existing rights, it did make a state permitting system the exclusive way to establish new rights. It did not address water rights that were established before 1917.

With the 1917 Water Code, water law was now officially based on the legal concept of "**first in time, first in right**:" that is, an individual's right to a specific quantity of water depends on the effective date of the water right (the "priority date"). In times of shortage, senior water right holders have their water needs satisfied first.

After the passage of the Water Code, a State Supreme Court case determined that for a riparian water right to have legal standing, steps must have been taken to remove the riparian land from federal ownership prior to 1917 and the water must have been put to full beneficial use by 1932.

By 1945, many people were using ground water wells as a source of water. The Legislature enacted the Ground Water Code, which required permits for use of ground water from 1945 on. ("Ground water" is water under the ground.) Today, Ecology manages permitting for both surface and ground waters.



The Ground Water Code does allow **an exemption** (often referred to as simply “the ground water exemption”). On November 18, 2005, the state Attorney General’s Office issued a formal opinion regarding how the groundwater exemption, especially for watering livestock, should be applied

There are four types of groundwater uses exempt from the state water-right permitting requirements:

- Providing water for livestock (no gallon per day limit or acre restriction).
- Watering a non-commercial lawn or garden one-half acre in size or less (no gallon per day limit).
- Providing water for a single home or groups of homes (limited to 5,000 gallons per day).
- Providing water for industrial purposes, including irrigation (limited to 5,000 gallons per day but no acre limit).

Water use of any sort is subject to the "first in time, first in right" clause, originally established in historical Western water law and now part of Washington state law. This means that a senior right cannot be impaired by a junior right. Seniority is established by priority date - the date an application was filed for a permitted or certificated water right - or the date that water was first put to beneficial use in the case of claims (discussed above) and exempt groundwater withdrawals.

While the water codes required administrative permits for most water uses starting after the effective dates of the codes, water uses predating the codes did not. Therefore, documentation of pre-code water rights was often incomplete or non-existent.

By the 1960's, it became clear to the Legislature that a more definitive accounting of the amount of water being used throughout the state was necessary. This information would let the state know how much water was still available for appropriation (distribution), and to plan for future needs.

A water right is established by the continuous beneficial use of water. Such rights are considered “perfected” or “vested.” A claim may represent a perfected water right, but it is not confirmed as valid until the extent and validity is determined in a general water right adjudication (a legal proceeding).

Since records for pre-code rights, as well as ground water exempt uses, were often unavailable, the state had no accurate record of the amount of water being used statewide. *The Claims Registration Act* was passed in 1967 to record the amount and location of pre-code and ground water exempt rights. A statement of claim needed to be registered with Ecology to report and preserve these rights.



Claims Registration

The Claims Registration Act set up periods of time for water users to file their water right claims with the state. All water users relying on rights established before the water codes were adopted were advised to register a claim to a water right. (Exceptions are listed below.) To date, there have been four registration periods. Each period had somewhat different requirements for registering; notably uses under the ground water exemption were required to be registered during the first three openings, but were specifically excluded under the fourth.

(Water use for stock watering under the ground water exemption was not required under the first opening.)

Ecology acknowledged receipt of the claims, but did not determine the validity of the information. More than 166,000 claims are now on file with the Claims Registry.

Some users were not required to file a claim during any of the four registration periods, including:

- Individuals who were served water through a company, district, public or municipal corporation. (However, the water supplier must have a valid water right or claim.)
- Persons with a valid Water Right Permit or recorded Certificate.
- Individuals with a water right determined by Court Decree and recorded through issuance of a Certificate of Adjudicated Water Right by Ecology or one of its predecessor agencies.
- Persons using water non-consumptively: uses such as boating, swimming, or other recreational and aesthetic uses, which do not reduce the amount of water in the stream.



Answers to commonly asked questions

Q. *What is the difference between a water right claim, permit and certificate?*

A. These are all types of water right documents, but with significant differences:

- A *claim* is simply that, a claim to a water right for a water use which predates the water permitting system. Its validity can only be confirmed through judicial processes.
- A *permit* is the first step towards securing a perfected water right. There is a step-by-step application process, resulting in a permit issued by Ecology which allows you to construct your water system and put the water to beneficial use.
- When all the conditions of a water right permit are met, the water right is said to be perfected. When Ecology receives information confirming perfection, Ecology issues a *certificate* documenting that the right has been perfected. (A different type of certificate, an adjudicated certificate, will be issued after a claim has been confirmed through a general adjudication.)

Q. *What if I (or the previous property owner) established a perfected right, but failed to file a claim?*

A. If you (or your predecessor) did not file a claim for a perfected right, that right was relinquished (that is, you are no longer authorized to withdraw or redirect that water), unless your pre-code right was exempt from the claims registration requirement. (See list of users not required to file on previous page). The Claims Registry is closed and Ecology cannot accept new claims. You will need to secure access to a legal supply of water by applying for a new water right permit or obtaining a right from someone else and obtaining Ecology's permission to change the right to your use/location.

Q. *How do I know if a water right claim was filed for my property?*

A. You may request a record search of Ecology's claims registry. Please contact the Ecology regional office nearest you. (Addresses and phone numbers are on the last page.) Note: water right records are filed by section, township and range. Be sure to include this portion of your legal property description, or have it handy, when making a request.

Q. *If I filed a claim, do I have a water right?*

A. Not necessarily. A claim filed under the Claims Registration Act does not give you a right to use the water. It was necessary to file a claim to protect a perfected water right which was established prior to 1917/1932 for surface water and 1945 for ground water. A water right is an official authorization to use water. A water right claim is only a statement that you claim to have a perfected right.

A water right claim is only a statement that you claim to have a perfected right. It is not a state-issued authorization to use water.

Q. *Will my claim to a perfected right ever be confirmed by the state?*

A. A small portion of Washington's pre-code rights have already been confirmed through a process known as a general water right adjudication. An adjudication is a legal process, conducted through the Superior Court, to determine the validity and extent of existing water rights in a given area. An adjudication does not create new rights, it only confirms existing rights.

If your right is confirmed by the court, you will receive a certificate issued by the state. Each confirmed right includes a priority date (that is, the date the water right became effective), quantity, point of diversion, and place of use. Ecology will protect and enforce the elements of your right as stated on the certificate once a pre-code right is confirmed and a certificate is issued. (Note: Ecology will tentatively determine the extent and validity of a claim as part of an evaluation on an application for change, but the final determination can only be made through an adjudication.)

Q. *How can I protect my water right claim?*

A. First, verify the elements of your registered claim. A claim protects a pre-code water right if you:

- Used surface water before 1917/1932, or ground water before 1945, and
- Filed a water right claim with the state, and
- Have continuously used the same amount of water.

You can demonstrate that the system existed prior to 1917/1932 or 1945 and has been in continuous use by showing items like photographs or maps depicting the water system, historical documents or old letters that describe the system, or tax documents. You can also use direct testimony by anyone with personal knowledge of the development of water use in the vicinity (sometimes referred to as "old timer" testimony). If you have a registered claim, it is extremely important that you collect and maintain historical records of your water use, in order to support your claim. (For more information, refer to Ecology publication #97-1804-WR, "Assessing Your Water Right.")

Q. *What if Ecology advises me that my water use is not protected by a claim?*

A. You should not continue to use water if it appears that you do not have a perfected water right. Ecology will work with you to try and find alternate ways for you to use water legally. Unauthorized use of water is illegal and detrimental to your neighbors, as well as to our state's waters.

Q. *How will I know if an adjudication will occur in my area?*

A. When an area is scheduled for an adjudication, all affected water users within the area are notified by summonses issued from the Superior Court. It is important, however, that you not wait until that time to collect the information you need to support your claim.

Q. *Does my claim limit my water usage in any way?*

A. Yes. Your claim protects your water right for the quantity, purpose, and place of use established prior to the surface and ground water codes. Your current water use should be consistent with this information. You may request to change the purpose and place of use of your water right, but increasing the quantity of water historically used is not allowed. If you contemplate expansion of your water use, you must obtain prior authorization in the form of a new state-issued water right. If you expand your water use without first obtaining a state-issued permit, you are subject to enforcement.



For more information

To find out more about your claim, you should first research and document your historical water use. This will prepare you to answer our questions and speed up the Ecology review. Then if you need more information about your claim and available alternatives, you can write or call the Water Resources Program at the Department of Ecology regional office nearest you. (Please have the section, township and range for the place of use handy.)

Northwest Regional Office

3190 - 160th Avenue SE
Bellevue, WA 98008-5452
(425) 649-7000

Central Regional Office

15 W. Yakima Ave., Suite 200
Yakima, WA 98902-3452
(509) 575-2490

Department of Ecology

300 Desmond Drive
Olympia, WA 98504-6000
(360) 407-6000

Southwest Regional Office

P.O. Box 47775
Olympia, WA 98504-7775
(360) 407- 6300

Eastern Regional Office

N. 4601 Monroe
Spokane, WA 99205-1295
(509) 329-3400

This publication and others on water rights, is available to view, download or print at www.ecy.wa.gov/programs/wr/wrhome.html

If you require this document in an alternate format, please contact the Water Resources Program at (360) 407-6600 or TTY (for the speech or hearing impaired) at 711 or 1-800-833-6388.

NORTH CITY WATER DISTRICT

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**SHORELINE WATER DISTRICT
RESOLUTION 2013.03.12**

**A RESOLUTION ADOPTING THE FRANCHISE AGREEMENT
WITH THE CITY OF LAKE FOREST PARK**

Background

1. The Shoreline Water District and City of Lake Forest Park ("City") have engaged in ongoing discussions regarding the scope and provisions of a Franchise Agreement to govern the use by the District of the City's rights-of-way to serve District customers residing within the City.
2. The Lake Forest Park City Council has passed Ordinance 1058 which approves the franchise agreement between the City of Lake Forest Park and the District.
3. District staff now recommends that the District approve the enclosed Franchise Agreement, to be effective March 6, 2013.

Action

IT IS RESOLVED THAT:

5. The District approves the enclosed Franchise Agreement to be effective March 6, 2013.
6. The Board authorizes the District Manager to execute the document.

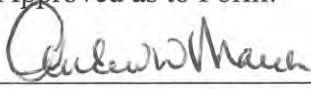
ADOPTED by the Board of Commissioners of Shoreline Water District at a regular open public meeting this 5th day of February, 2013.

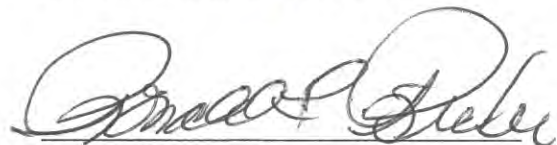
ATTEST:


Larry Schoonmaker, President


Charlotte Haines, Vice President

Approved as to Form:


Andrew Maron, District Attorney


Ronald Ricker, Secretary

I, Susan Stine, do hereby certify that the attached document is a full and true copy of ORDINANCE 1058, AN ORDINANCE OF THE CITY OF LAKE FOREST PARK, WASHINGTON, GRANTING SHORELINE WATER DISTRICT A NON-EXCLUSIVE FRANCHISE TO OWN, CONSTRUCT, MAINTAIN, OPERATE, REPLACE AND REPAIR A WATER SYSTEM WITHIN PUBLIC RIGHTS-OF-WAY OF THE CITY OF LAKE FOREST PARK, WASHINGTON, as adopted.



Susan Stine, City Clerk
City of Lake Forest Park, Washington

March 4, 2013

ORDINANCE NO. 1058**AN ORDINANCE OF THE CITY OF LAKE FOREST PARK, WASHINGTON, GRANTING SHORELINE WATER DISTRICT A NON-EXCLUSIVE FRANCHISE TO OWN, CONSTRUCT, MAINTAIN, OPERATE, REPLACE AND REPAIR A WATER SYSTEM WITHIN PUBLIC RIGHTS-OF-WAY OF THE CITY OF LAKE FOREST PARK, WASHINGTON.**

WHEREAS, RCW 35A.11.020 grants the City broad authority to regulate the use of the public right-of-way; and

WHEREAS, RCW 35A.47.040 authorizes the City "to grant nonexclusive franchises for the use of public streets, bridges or other public ways, structures or places above or below the surface of the ground for... facilities for public conveyances, for poles, conduits, tunnels, towers and structures, pipes and wires and appurtenances thereof ... for water, sewer and other private and publicly owned and operated facilities for public service;" and

WHEREAS, Shoreline Water District (the "District") is a special purpose municipal corporation that owns and operates a water system and related facilities located within and serving residents of the City of Lake Forest Park; and

WHEREAS, the City and the District have determined that it is in the best interest of the residents that they serve to work cooperatively on long-range plans and to share necessary information; and

WHEREAS, the City and the District acknowledge the Washington State Supreme Court's ruling in *Lane v. Seattle*, 164 Wn. 2d 875 (2008), that the cost of providing fire hydrants is a general government responsibility that the City is required to pay; but the District is willing to accept the burden of fire hydrant costs the City is responsible for in consideration of the terms and conditions set forth in this Franchise; and

WHEREAS, the City and the District also acknowledge the Washington Supreme Court's ruling in *Burns v. Seattle*, 161 Wn. 2d 129 (2007), wherein Seattle City Light ("SCL") entered into franchise agreements with certain cities and agreed to pay the cities a percent of SCL's revenues derived from retail power sales to SCL customers within such cities in consideration of the cities' agreement not to exercise their statutory authority to establish a competing municipal electrical utility during the term of the Franchise; and the District is willing to pay the City a percent of the District's revenues derived from its retail water sales to District customers located within the franchise area in consideration of the City's agreement not to exercise, and to forebear, its statutory authority pursuant to Chapter 35.13A RCW to attempt to assume jurisdiction over the District or any District responsibilities, property, facilities, equipment or utility customers located within or without the City's corporate limits during the term of this Franchise; and

WHEREAS the City Council finds that it is in the best interests of the health, safety and welfare of the residents of the City and the District to grant a non-exclusive franchise to the Shoreline Water District for the operation of a water system within the City's right-of-way, on the terms and conditions stated below; NOW, THEREFORE,

THE CITY COUNCIL OF THE CITY OF LAKE FOREST PARK, WASHINGTON, DO ORDAIN AS FOLLOWS:

1. **Definitions.** The following terms contained herein, unless otherwise indicated, shall be defined as follows:
 - 1.1. **City:** The City of Lake Forest Park, a municipal corporation of the State of Washington, specifically including all areas incorporated therein as of the effective date of this ordinance and any other areas later added thereto by annexation or other means.
 - 1.2. **Days:** Calendar days.
 - 1.3. **Director:** The City Administrator or designee.
 - 1.4. **District:** Shoreline Water District, a municipal corporation organized under RCW Title 57.
 - 1.5. **Facilities:** All pipes and appurtenances, access ways, pump stations, storage facilities, equipment, and supporting structures, located in the City's right-of-way, utilized by the District in the operation of its activities.
 - 1.6. **Fire Hydrants or Hydrants:** The installation, operation and maintenance of fire hydrants and related water system facilities and equipment for the delivery of water for fire suppression purposes, including the over-sizing of such water system facilities and equipment for the delivery of water for fire suppression purposes.
 - 1.7. **Permittee:** A person who has been granted a permit by the Permitting Authority, and District operating under Section 8 of this Franchise.
 - 1.8. **Permitting Authority:** The head of the City department authorized to process and grant permits required to perform work in the City's right-of-way, or the head of any agency authorized to perform this function on the City's behalf. Unless otherwise indicated, all references to Permitting Authority shall include the designee of the department or agency head.
 - 1.9. **Person:** An entity or natural person.
 - 1.10. **Revenue:** "Revenue" means income derived only from the sale of metered water to customers whose connections are within the City of Lake Forest Park. Revenue shall not include: late fees; impact or mitigation fees; any type of connection charges, general facilities charges,

or local facilities charges; grants; contributed assets (CIAC); loans; income from legal settlements not related to water sales; income from cellular antenna leases; income from real property or real property sales; income from the sale of surplus equipment, tools or vehicles; interest income; penalties; hydraulic modeling fees; water system extension agreement (WSEA) fees and charges; income from street lights; labor, equipment and materials charges; income from the sale of bidders documents and plan sets; sale of water to wholesale water purveyors, or any other fees and charges.

1.11. **Right-of-way:** As used herein shall refer to the surface of and the space along, above, and below any street, road, highway, freeway, lane, sidewalk, alley, court, boulevard, parkway, drive, easement, and/or road right-of-way now or hereafter held or administered by the City of Lake Forest Park.

1.12. **Relocation:** As used herein shall mean to protect, support, temporarily disconnect, relocate or remove District facilities in the City right-of-way.

2. **Franchise Granted.**

2.1. Pursuant to RCW 35A.47.040, the City hereby grants to the District, its successors and assigns, subject to the terms and conditions hereinafter set forth, a Franchise beginning on the effective date of this Ordinance.

2.2. This Franchise shall grant the District the right, privilege and authority, subject to the terms and conditions hereinafter set forth, to construct, operate, maintain, replace, and use all necessary equipment and facilities for a public water system including Fire Hydrants, in, under, on, across, over, through, along or below the public right-of-way located in the City of Lake Forest Park.

2.3. This Franchise is granted upon the express condition that it shall not in any manner prevent the City from granting other or further franchises in, along, over, through, under, below or across any right-of-way.

3. **Franchise Term.** The term of the Franchise granted hereunder shall be for the period commencing March 6, 2013 through December 31, 2023. The Franchise shall automatically be extended until December 31, 2028 unless, no later than December 31, 2022, either party notifies the other that the term will not be extended.

4. **Franchise Fee.** In consideration of the rights granted to the District by this Agreement, the District agrees:

4.1. To collect and distribute to the City a Franchise fee equal to 6% of Revenue generated from its operations within the City.

- 4.1.1. This Franchise fee shall be collected beginning upon the effective date of this Franchise.
 - 4.1.2. Proceeds of the Franchise fee collected shall be distributed to the City no later than 30 days after the end of each calendar quarter (quarters ending at the end of March, June, September and December).
- 4.2. Should the District be prevented by judicial or legislative action from collecting a Franchise fee on all or a part of the revenues, District shall be excused from the collection and distribution of that portion of the Franchise fee.
- 4.3. Should a court of competent jurisdiction declare, or a change in law make the Franchise fee invalid, in whole or in part, or should a court of competent jurisdiction hold that the collection of the Franchise fee by District is in violation of a pre-existing contractual obligation of District, then District's obligation to collect and distribute a Franchise fee to the City under this Section shall be terminated in accordance with and to the degree required to comply with such court action.
- 4.4. Should a court of competent jurisdiction declare, or a change in law make the Franchise fee invalid, in whole or in part, and further declare that the franchise fee collected by the District and paid to the City be refunded or repaid to District customers or other parties, City shall refund to District all monies collected plus any required interest in the amount required to satisfy said court declaration or change in law.
5. **Non-assumption.** In consideration of the District's payment of a Franchise fee to the City as provided in Section 4 herein, the District's acceptance of the burden to pay for hydrant costs as further provided in Section 6 herein, and the District's acceptance of the other terms and conditions of this Franchise, the City agrees not to exercise and to forebear its statutory authority pursuant to Chapter 35.13A RCW or other statutes to attempt to assume jurisdiction over the District or any District responsibilities, property, facilities, equipment or utility customers located within or without the City's corporate limits during the term of this Franchise. The City's agreement and forbearance includes not facilitating or cooperating with any other city or town to attempt pursuant to RCW 35.13A.060 or as such statute may be amended or superseded to assume jurisdiction over the District or any District responsibilities, property, facilities, equipment or utility customers located within or without the City's corporate limits during the term of this Franchise; provided, this provision shall not be construed to prohibit or prevent the City from responding to requests for public records related to such attempts by other cities or towns or from performing other duties or obligations required by law.

6. **Fire Hydrant Costs.**

- 6.1. The District agrees to be responsible for the operation, maintenance and cost of Fire Hydrants within the Franchise area, whether installed by the District or by third parties on behalf of the District; provided, should a court of competent jurisdiction determine the Parties may not transfer the City's responsibility to pay for Fire Hydrants to the District, or legislative action prevents the District from accepting responsibility to pay for Fire Hydrants, the District's obligation to pay for Fire Hydrants under this Section 6 shall be terminated in accordance with and to the degree required to comply with such court or legislative action; and should a court of competent jurisdiction declare that the costs for Fire Hydrants borne by the District must be repaid by the City to the District, the District's customers or other parties, City shall pay to the District all Fire Hydrant costs paid by the District during the term of this Franchise together with any required interest thereon in the amount required to satisfy any such court determination.
- 6.2. The District's agreement to accept responsibility for Fire Hydrant costs as provided in this Section 6, is based on its belief that the installation, operation, maintenance and payment for Fire Hydrants by the District is and shall continue to be a governmental function, and is not an activity of providing water for hire as defined in Title 80 RCW.
- 6.3. Notwithstanding the District's agreement to accept responsibility for Fire Hydrant costs as provided in this Section 6, the District does not represent or warrant sufficient water pressure or flow from fire hydrants for the purposes of fire suppression and protection. The District shall not have any duty, obligation or responsibility to provide fire protection and fire suppression services to the public within the franchise area. The District shall perform operational hydrant inspections and maintenance of the hydrants where every hydrant is inspected on a two year cycle. Any repairs found to be necessary will be promptly made by the District. Any hydrant whose output flow (modeled or field measured) is less than 500 gallons per minute will have the bonnet painted red. A list and location of any red colored hydrants shall be submitted to the City no later than January 31st of each year.
- 6.4. The City reserves in full its rights to challenge the threatened or actual imposition of a Hydrant fee, cost or assessment by the District against it as unlawful. The City's acceptance of this Franchise shall not operate as a waiver of the City's right to challenge the threatened or actual imposition of the Hydrant cost upon the City. For the purposes of ensuring the City's ability to bring a challenge, and in consideration of the mutual benefits of this Franchise for each party, the District and City agree that any statute of limitations or other time or procedural limitation on bringing a legal action to challenge the imposition of Hydrant costs on the City, whether existing

as a matter of statute, common law, or any other basis, shall be tolled during the term of this Franchise and shall not begin to run until 90 days following the termination of this Franchise. The District and City further agree that they shall not contest the other party's allegation of the timely commencement of a legal action challenging imposition of a hydrant cost against the City if such action is commenced on or before the expiration of the 90-day period following the expiration or termination of this Franchise. The provisions of this Section 6.4 shall survive the expiration or termination of this Franchise.

- 6.5. Should a court of competent jurisdiction or legislative action determine the District's installation, operation, maintenance and payment for Fire Hydrants is a proprietary function, the District shall have the right to terminate and rescind all or portions of this Section 6 which shall then have no further force or effect between the Parties; and, further, City agrees to defend, indemnify and hold District harmless from and against any and all claims, suits, actions or liabilities (including costs and attorneys' fees) incurred or asserted against District directly or indirectly arising out of District's acceptance of responsibility to install, operate, maintain and pay for Fire Hydrants as provided in this Franchise.
- 6.6. The District's agreement to be responsible for the installation, operation, maintenance and cost of Fire Hydrants within the franchise area shall not be construed to be a waiver of any other legal obligation or duty the District may have to charge the City for any services the District may provide the City or its citizens which are determined in the future to be a governmental function for which the City must provide or pay for.

7. City Ordinances and Regulations.

- 7.1. Nothing herein shall be deemed to direct or restrict the City's ability to adopt and enforce all necessary and appropriate ordinances regulating the rights-of-way including any reasonable ordinance made in the exercise of its police powers in the interest of public safety and for the welfare of the public. Such action(s) by the City shall not unreasonably affect or modify any portion of this agreement without the approval of the District. Should the District and City not be able to agree, they shall resolve the differences through Section 15 - Alternate Dispute Resolution.

8. Right-of-Way Management.

8.1. Permits Required.

- 8.1.1. Whenever District excavates in any right-of-way for the purpose of installation, construction, repair, maintenance or relocation of its facilities, it shall apply to the City for a permit to do so in accord with the ordinances and regulations of the City requiring permits to

operate in the right-of-way, and consistent with Section 8.6 of this Franchise. In no case shall any such Work commence within any right-of-way without a permit, except as otherwise provided in this Ordinance.

- 8.2. Abandonment of District's Facilities. Any abandoned District facility above the surface shall be removed by the District within a reasonable time. All necessary permits must be obtained prior to such work.
- 8.3. Restoration after Construction.
 - 8.3.1. District shall, after any installation, construction, relocation, maintenance, or repair of Facilities within the Franchise area, restore the right-of-way to at least the condition the same was in immediately prior to any such abandonment, installation, construction, relocation, maintenance or repair. Restoration shall not require an improvement to a condition that substantially exceeds the condition prior to the District's activities. All concrete encased monuments, which have been disturbed or displaced by such work, shall be restored pursuant to all federal, state and local standards and specifications. District agrees to promptly complete all restoration work and to promptly repair any damage caused by such work at its sole cost and expense.
 - 8.3.2. If it is determined that District has failed to restore the right-of-way in accordance with this Section, the City shall provide District with written notice including a description of actions the City believes necessary to restore the right-of-way.
- 8.4. Bonding Requirement. District, as a public agency, is not required to comply with the City's standard bonding requirement for working in the City's right-of-way.
- 8.5. Emergency Work, Permit Waiver. In the event of any emergency where any District facilities located in the right-of-way are broken or damaged, or if District's construction area for their facilities is in such a condition as to place the health or safety of any person or property in imminent danger, District shall immediately take any necessary emergency measures to repair, replace or remove its facilities without first applying for and obtaining a permit as required by this Franchise. However, this emergency provision shall not relieve District from later obtaining any necessary permits for the emergency work. District shall apply for the permits that would have been required and obtained prior to the emergency as soon as practical given the nature and duration of the emergency.
- 8.6. Excavations.
 - 8.6.1. All work performed by the District or its contractors shall be

accomplished in a safe and workmanlike manner, and in a manner that will minimize interference with traffic and the use of adjoining property. The District shall comply with applicable safety regulations during construction as required by ordinances of the City or the laws of the State of Washington.

- 8.6.2. The District shall secure City rights-of-way permits to work in the public rights-of-way, including but not limited to Capital Improvement Program projects, water main repairs, and work involving excavation in the right-of-way. This would include disruption of all motorized and non-motorized travel portions of the right-of-way, including all surface water drainage facilities. In addition, the District shall provide the City at least one (1) working day notice of its intent to commence work in the public right-of-way. For all routine operations, maintenance and repair work in the public rights-of-way such as flushing, painting hydrants, vegetation maintenance and work within existing chambers, no permit will be required.
- 8.6.3. If either party plans to excavate in the public rights-of-way, then upon a written request from the other, that party may share excavation upon mutually agreeable terms and conditions.
- 8.7. Dangerous Conditions. Whenever Facilities or the operations of the District cause or contribute to a condition that appears to endanger any person or substantially impair the use or lateral support of the adjoining right-of-way, public or private property, the Director may immediately inform the District of the condition. The District will immediately evaluate the condition and if the District determines that a condition exists that causes endangerment to the public or impairment of the right-of-way the District will immediately mitigate the condition at no cost to the City. The resolution of the dangerous condition requires approval of the District Manager and the Director before the work begins.
- 8.8. Relocation of System Facilities.
 - 8.8.1. In accord with the following schedule, the District agrees and covenants to protect, support, temporarily disconnect, relocate or remove from any right-of-way its Facilities when so required by the City to accommodate the completion of or as a result of a public project. As used in this Section, the term "public project" is a project included in the City adopted six-year Capital Improvement Program and as amended annually by the City Council.

<u>Age of Dist. Facility</u>	<u>% of relocation by City</u>	<u>% of relocation by District</u>
5 years or less	100%	0%
6-10 years	50%	50%
11+ years	0%	100%

8.8.2. This Relocation requirement shall not apply to those larger Facilities that cannot reasonably be supported, disconnected, relocated or removed, such as transmission mains, supply stations, and vault structures as listed on Attachment A. If these Facilities are required to be moved in order to accommodate the completion of or as a result of a City project, the City shall pay 50% of the relocation cost.

8.8.3. All Facilities utilized for providing water service within District's service area and within the right-of-way shall be considered owned, operated and maintained by District.

8.8.4. If the City determines that a public project necessitates the Relocation or removal of District's existing facilities, the City shall:

8.8.4.1. As soon as possible, but not less than one hundred eighty (180) days prior to the commencement of such project, City shall provide District with written notice requiring such relocation or removal; and

8.8.4.2. Provide District with copies of any plans and specifications pertinent to the requested relocation or removal and a proposed temporary or permanent relocation for District's Facilities.

8.8.4.3. After receipt of such notice and such plans and specifications, District shall make all reasonable efforts to complete relocation of its facilities according to the above cost sharing described in this Section.

8.8.5. District may, after receipt of written notice requesting relocation or removal of its facilities, submit to the City written alternatives to such relocation. The City shall evaluate such alternatives and advise District in writing if any of the alternatives are suitable to accommodate the work that necessitates the relocation of the facilities. If so requested by either party, District or City shall submit additional information to assist the other party in making such evaluation. The City shall give each alternative proposed by

District full and fair consideration and if appropriate, state why the District's proposed alternatives are not satisfactory. In the event the City and District ultimately do not agree on a reasonable alternative, District and City shall attempt to resolve the relocation through Section 15 — Alternate Dispute Resolution.

- 8.8.6. If the City determines that the District's facilities must be protected, supported, temporarily or permanently disconnected, relocated or removed from the right-of-way, City shall reimburse District all costs as submitted and verified by District within forty-five (45) days of completion of the relocation or removal by the District in accord with paragraph 8.8.1 and 8.8.2 herein.
- 8.8.7. The provisions of this Section 8.8 shall in no manner preclude or restrict District from making any arrangements it may deem appropriate when responding to a request for relocation of its Facilities by any person or entity other than the City.

9. Planning Coordination,

- 9.1. Growth Management. The parties agree, as follows, to participate in the development of, and reasonable updates to, the each other's planning documents:
 - 9.1.1. For District's service within the City limits, District will participate in a cooperative effort with the City to develop a Comprehensive Plan Utilities Element that meets the requirements described in RCW 36.70A.070(4).
 - 9.1.2. District will participate in a cooperative effort with the City to ensure that the Utilities Element of the City's Comprehensive plan is accurate as it relates to District's operations and is updated to ensure continued relevance at reasonable intervals.
 - 9.1.3. District shall submit information related to the general location, proposed location, and capacity of all existing and proposed Facilities within the City as requested by the Director within a reasonable time, not exceeding sixty (60) days from receipt of a written request for such information, provided that such information is in the District's possession, or can be reasonably developed from the information in the District's possession.
 - 9.1.4. District will update information provided to the City under this Section whenever there are major changes in District's system plans for the City.
 - 9.1.5. The City will provide information relevant to the District's operations within a reasonable period of written request to assist

the District in the development or update of its Comprehensive Water System Plan; provided that such information is in the City's possession, or can be reasonably developed from the information in the City's possession.

- 9.2. System Development Information. The District and City will each assign a representative whose responsibility shall be to coordinate planning for CIP projects including those that involve undergrounding. At a minimum, such coordination shall include the following:
 - 9.2.1. Annually, the District shall provide the City with a schedule of its planned capital improvements, which may affect the right-of-way for that year.
 - 9.2.2. Annually, the City shall provide the District with a schedule of its planned capital improvements which may affect the right-of-way for that year including but not limited to street overlays and repairs, storm drainage improvements and construction, and all other right-of-way activities that could affect District capital improvements and infrastructure.
 - 9.2.3. District shall meet with the City, other franchisees and users of the right-of-way, as necessary, to schedule and coordinate construction activities.
 - 9.2.4. All construction locations, activities, and schedules shall be coordinated, to minimize public inconvenience, disruption, or damages.
- 9.3. Emergency Operations. The City and District agree to cooperate in the planning and implementation of emergency operations response procedures.
- 9.4. Maps and Records. Without charge to either party, both parties agree to provide each other with as-built plans, maps, and records that show the vertical and horizontal location of its facilities within the right-of-way, measured from the center line of the right-of-way, using a minimum scale of one inch equals one hundred feet (1"=100'). Maps shall be provided in Geographical Information System (GIS) or other digital electronic format used by the City or District, and upon request, in hard copy plan form used by City or District. City and District agree to maintain confidentiality of any and all information received to the extent necessary to meet Homeland Security objectives.

10. Indemnification.

- 10.1. District hereby releases, covenants not to bring suit, and agrees to indemnify, defend and hold harmless the City, its elected officials,

employees, agents, and volunteers from any and all claims, costs, judgments, awards, attorney's fees, or liability to any person, including claims by District's own employees to which District might otherwise be immune under Title 51 RCW, arising from personal injury or damage to property allegedly due to the negligent or intentional acts or omissions of District, its agents, servants, officers or employees in performing activities authorized by this Franchise. This covenant of indemnification shall include, but not be limited by this reference, to claims against the City arising as a result of the acts or omissions of District, its agents, servants, officers or employees except for claims for injuries and damages caused in whole or in part by the sole negligence of the City. If final judgment is rendered against the City, its elected officials, employees, agents, and volunteers, or any of them, District shall satisfy the same. The City may appear in any proceeding it deems necessary to protect the City's or the public's interests.

- 10.2. Inspection or acceptance by the City of any work performed by District at the time of completion of construction shall not be grounds for avoidance of any of these covenants of indemnification. Said indemnification obligations shall extend to claims that are not reduced to a suit and any claims that may be settled prior to the culmination of any litigation or the institution of any litigation.
- 10.3. Should a court of competent jurisdiction determine that this Franchise is subject to RCW 4.24.115, then, in the event of liability for damages arising out of bodily injury to persons or damages to property caused by or resulting from the concurrent negligence of District and the City, its officers, employees and agents, District's liability hereunder shall be only to the extent of District's negligence. It is further specifically and expressly understood that the indemnification provided herein constitutes the District's waiver of immunity under Industrial Insurance, Title 51 RCW, solely for the purposes of this indemnification. This waiver has been mutually negotiated by the parties. The provisions of this section shall survive the expiration or termination of this Franchise.
- 10.4. The City hereby releases and agrees to indemnify, defend and hold harmless the District, its elected officials, employees, agents, and volunteers from any and all claims, costs, judgments, awards or liability to any person arising from District's compliance with this Agreement.
- 10.5. The City hereby releases and agrees to indemnify, defend and hold harmless the District, its elected officials, employees, agents and volunteers from any and all claims, costs, judgments, awards or liability to any person arising from City's decision to issue development permits based on accurate information on fire flow and water availability provided by the District or the City's enforcement of the International Fire Code.

11. **Insurance.**

11.1. District shall procure and maintain for the duration of the Franchise, insurance against claims for injuries to persons or damages to property which may arise from or in connection with the exercise of the rights, privileges and authority granted hereunder to District, its agents or employees. A combination of self-insurance and excess liability insurance may be utilized by District. District shall provide to the City an insurance certificate and proof of self-insurance, if applicable, evidencing the required insurance and a copy of the additional insured endorsements, for its inspection prior to the commencement of any work or installation of any Facilities pursuant to this Franchise, and such insurance shall evidence the following required insurance:

11.1.1. Automobile Liability insurance for owned, non-owned and hired vehicles with limits no less than \$2,000,000 Combined Single Limit per accident for bodily injury and property damage.

11.1.2. Commercial General Liability insurance policy, written on an occurrence basis with limits no less than \$1,000,000 combined single limit per occurrence and \$2,000,000 aggregate for personal injury, bodily injury and property damage. Coverage shall include premises, operations, independent contractors, products-completed operations, personal injury and advertising injury. There shall be no endorsement or modification of the Commercial General Liability insurance excluding liability arising from explosion, collapse or underground property damage. The City shall be named as an additional insured under District's Commercial General Liability insurance policy.

11.1.3. Excess Liability in an amount of \$5,000,000 each occurrence and \$5,000,000 aggregate limit. The City shall be named as an additional insured on the Excess Liability insurance policy.

11.2. Payment of deductible or self-insured retention shall be the sole responsibility of District.

11.3. The coverage shall contain no special limitations on the scope of protection afforded to the City, its officers, officials, or employees. In addition, the insurance policy shall contain a clause stating that coverage shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability. District's insurance shall be primary. Any insurance, self insurance, or insurance pool coverage maintained by the City shall be excess of District's insurance and shall not contribute with it. Coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days prior written notice has been given to

the City.

- 11.4. District shall require all its subcontractors to carry insurance consistent with this Section 11, and shall provide evidence of such insurance to the City upon request.

12. **Enforcement.**

- 12.1. Both City and District reserve the right to revoke and terminate this Franchise in the event of a substantial violation or breach of its terms and conditions.

- 12.2. A substantial violation or breach by City or by District shall include, but shall not be limited to, the following:

- 12.2.1. An uncured violation of any material provision of this Franchise;

- 12.2.2. An intentional evasion or knowing attempt by either party to evade any material provision of this Franchise or practice of any fraud or deceit upon the District or upon the City;

- 12.2.3. Failure to provide the services specified in the Franchise;

- 12.2.4. Misrepresentation of material fact during negotiations relating to this Franchise or the implementation thereof;

- 12.2.5. An uncured failure to pay fees associated with this Franchise; and

- 12.2.6. Changes in existing City regulations or ordinances or new regulations or ordinances that materially change the interpretation or application of provisions in this agreement.

- 12.3. No violation or breach shall occur which is without fault of the District or the City, or which is as a result of circumstances beyond the District's or the City's reasonable control. Neither the District, nor the City, shall be excused by economic hardship nor by nonfeasance or malfeasance of its directors, officers, agents or employees.

- 12.4. Prior to any termination or revocation, the City, or the District, shall provide the other with detailed written notice of any substantial violation or material breach upon which it proposes to take action. The party who is allegedly in breach shall have a period of sixty (60) days following such written notice to cure the alleged violation or breach, demonstrate to the other's satisfaction that a violation or breach does not exist, or submit a plan satisfactory to the other to correct the violation or breach. If, at the end of said 60-day period, the City or the District reasonably believes that a substantial violation or material breach is continuing and the party in breach is not taking satisfactory corrective action, the other may declare that the party in breach is in default and may terminate this Agreement in accord with this Section, which declaration must be in

writing.

13. **Notice.** Any notice or information required or permitted to be given to the parties under this Franchise may be sent to the following addresses unless otherwise specified:

District Manager
Shoreline Water District
P.O. Box 55367
Shoreline, WA 98155
Phone: (206) 362-8100
Fax: (206) 361-0629

City Administrator
City of Lake Forest Park
17425 Ballinger Way NE
Lake Forest Park, WA 98155
Phone: (206) 368-5440
Fax: (206) 957-2820

14. **Non-Waiver.** The failure of either party to enforce any breach or violation by the other party of any provision of this Franchise shall not be deemed to be a waiver or a continuing waiver by the non-breaching party of any subsequent breach or violation of the same or any other provision of this Franchise.
15. **Alternate Dispute Resolution.** If the parties are unable to resolve disputes arising from the terms of this Franchise, prior to resorting to a court of competent jurisdiction, the parties shall submit the dispute to a non-binding alternate dispute resolution process agreed to by the parties. Unless otherwise agreed between the parties or determined herein, the cost of that process shall be shared equally.
16. **Entire Agreement.** This Franchise constitutes the entire understanding and agreement between the parties as to the subject matter herein and no other agreements or understandings, written or otherwise, shall be binding upon the parties upon execution and acceptance hereof.
17. **Survival.** All of the provisions, conditions and requirements of Sections 8.1 Permits Required, 8.2 Abandonment Of District's Facilities, 8.3 Restoration After Construction, 8.6 Excavations, 8.7 Dangerous Conditions, 8.8 Relocation Of System Facilities, and 10 Indemnification, of this Franchise shall be in addition to any and all other obligations and liabilities District may have to the City at common law, by statute, or by contract, and shall survive the City's Franchise to District for the use of the areas mentioned in Section 2 herein, and any renewals or extensions thereof. All of the provisions, conditions, regulations and requirements contained in this Franchise Ordinance shall further be binding upon the heirs, successors, executors, administrators, legal representatives and assigns of District and all privileges, as well as all obligations and liabilities of District shall inure to its heirs, successors and assigns equally as if they were specifically mentioned wherever District is named herein.
18. **Severability.** If any Section, sentence, clause or phrase of this Ordinance should be held to be invalid or unconstitutional by a court of competent jurisdiction, such invalidity or unconstitutionality shall not affect the validity or constitutionality of any other Section, sentence, clause or phrase of this Franchise Ordinance. The

Parties may amend, repeal, add, replace, or modify any provision of this Franchise to preserve the intent of the parties as expressed herein prior to any finding of invalidity or unconstitutionality.

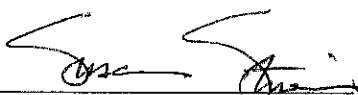
19. **Directions to City Clerk.** The City Clerk is hereby authorized and directed to forward certified copies of this Ordinance to the District. The District shall have fifteen (15) days from receipt of the certified copy of this ordinance to accept in writing the terms of the Franchise granted to the District in this ordinance.
20. **Publication Costs.** In accord with state law, this ordinance shall be published in full by the City.
21. **Effective Date.** This ordinance, being an exercise of a power specifically delegated to the City legislative body, is not subject to referendum, and shall take effect five (5) days after passage and publication of an approved summary thereof consisting of the title.

PASSED BY A MAJORITY VOTE of the members of the City of Lake Forest Park City Council this 28th day of February 2012.

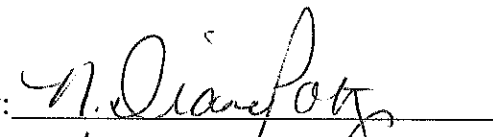
APPROVED:


Mary Jane Goss, Mayor

ATTESTED:


Susan Stine, City Clerk

Shoreline Water District

By: 
Date: Mar 6, 2013

ATTACHMENT A
TO THE FRANCHISE GRANTED
TO THE SHORELINE WATER DISTRICT BY
THE CITY OF LAKE FOREST PARK
February 28, 2013

In accord with paragraph 8.8.2 of the Franchise granted by the City of Lake Forest Park to the Shoreline Water District on February 28, 2013, the following list of facilities owned, operated and maintained by the Shoreline Water District are designated as “larger facilities that cannot be reasonably supported, disconnected, relocated or removed”:

1. Pressure reducing station 2 – NE 178th Street between 25th and 28th Ave NE
2. Pressure reducing station 3 – NE 178th Street between 29th and 33rd Ave NE
3. Pressure reducing station 4 – 26th Ave NE at the cul de sac
4. Pressure reducing station 5 – NE 160th Street between 33rd and 34th Ave NE
5. Pressure reducing station 6 – NE 162nd Street between 36th and 37th Ave NE
6. Pressure reducing station 9 – NE 184th PL
7. Pressure reducing station 10 – NE 35th Ave NE between NE 166th PL and NE 178th St
8. Pressure reducing station 11 – intersection of NE 178th Street and Brookside Blvd NE
9. Pressure reducing station 12 – intersection of NE 165th Street and 39th Ave NE
10. Control valve – NE 202nd Street and 37th Ave NE
11. 2.0 million gallon tank – east end of NE 196th Court
12. Supply station 2 - NE 195th Street and 40th PL NE
13. Supply station 3 - NE 195th Street and 32nd Ave NE
14. Water main on NE 185th St, 28th Ave NE, NE 187th St and 29th St

**SHORELINE WATER DISTRICT
RESOLUTION 2012.08.55**

**A RESOLUTION APPROVING FRANCHISE AGREEMENT
WITH THE CITY OF SHORELINE**

Background

1. The Shoreline Water District and City of Shoreline ("City") entered into a Franchise Agreement (the "Franchise") on July 3, 2001 granting Shoreline Water District a non-exclusive franchise to construct, maintain, operate, replace and repair a water system within public rights-of-way of the City of Shoreline, Washington. The Franchise Agreement has been extended from time to time since then, and now expires on August 15, 2012.
2. The District and the City have engaged in ongoing discussions regarding the scope and provisions of a revised Franchise Agreement. Those discussions have been impacted by recent State Supreme Court rulings, which determined that providing hydrants and associated fire suppression facilities is the responsibility of a local general government, rather than of a water district. The rulings have allowed for such responsibility to be transferred to a water district under agreement with the municipality in exchange for reasonable compensation.
3. The District and the City have negotiated a franchise agreement which resolves the hydrant issue, allows for certain payments to the City, promotes cooperation on planning road and utility improvements, and maintains the District's position to operate within the city for at least fifteen years;
4. The Shoreline City Council has adopted City Ordinance No. 637 granting the District a non-exclusive right to operate a water system within the City's rights-of-way through December 31, 2027.
5. District staff recommends that the District accept and approve the enclosed Franchise Agreement.

Action

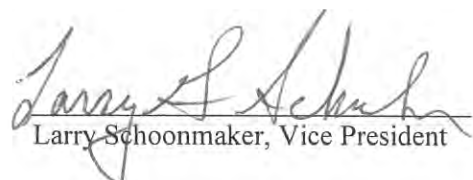
IT IS RESOLVED THAT:

6. The enclosed Franchise Agreement is approved.
7. The District Manager is authorized to execute the Franchise Agreement and any related documents.

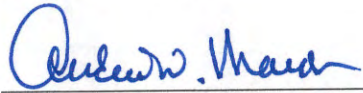
ADOPTED by the Board of Commissioners of Shoreline Water District at a regular open public meeting this 15th day of August 2012.

ATTEST:

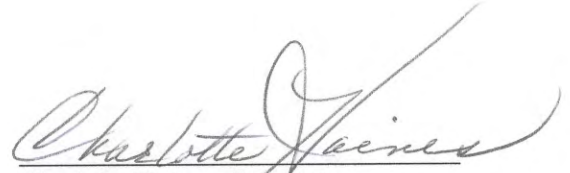
Ron Ricker, President


Larry Schoonmaker, Vice President

Approved as to Form:



Andrew Maron, District Attorney



Charlotte Haines, Secretary

ORIGINAL

ORDINANCE NO. 637

AN ORDINANCE OF THE CITY OF SHORELINE, WASHINGTON, GRANTING SHORELINE WATER DISTRICT A NON-EXCLUSIVE FRANCHISE TO OWN, CONSTRUCT, MAINTAIN, OPERATE, REPLACE AND REPAIR A WATER SYSTEM WITHIN PUBLIC RIGHTS-OF-WAY OF THE CITY OF SHORELINE, WASHINGTON.

WHEREAS, RCW 35A.11.020 grants the City broad authority to regulate the use of the public right-of-way; and

WHEREAS, RCW 35A.47.040 authorizes the City "to grant nonexclusive franchises for the use of public streets, bridges or other public ways, structures or places above or below the surface of the ground for... facilities for public conveyances, for poles, conduits, tunnels, towers and structures, pipes and wires and appurtenances thereof for transmission and distribution of electrical energy, signals and other methods of communication, for gas, steam and liquid fuels, for water, sewer and other private and publicly owned and operated facilities for public service;" and

WHEREAS, the Shoreline Water District's franchise, granted by Ordinance No. 518, expired December 31, 2011; and

WHEREAS, on November 16, 2011, the City Council passed Ordinance No. 613 extending the franchise granted to the Shoreline Water District through December 31, 2012; and

WHEREAS, this franchise extension was not accepted by the Shoreline Water District; instead, the Shoreline Water District Board of Commissioners on December 27, 2011 adopted Resolution 2011.12.45, which extended the City's franchise agreement to March 31, 2012; on April 9, 2012 adopted Resolution 2012.04.23 which extended the City's franchise agreement to June 6, 2012; on June 5, 2012 adopted Resolution 2012.06.37, which extended the City's franchise agreement to July 9, 2012; and on July 5, 2012 adopted Resolution 2012.07.44, which extended the City franchise agreement to August 15, 2012; and

WHEREAS, the City and the District acknowledge the Washington State Supreme Court's ruling in *Lane v. Seattle*, 164 Wn. 2d 875 (2008) that the cost of providing fire hydrants is a governmental responsibility for which general purpose governments are required to pay; but the District is willing to accept the burden of fire hydrant costs in consideration of the terms and conditions set forth in this Franchise; and

WHEREAS, the City and the District also acknowledge the Washington Supreme Court's ruling in *Burns v. Seattle*, 161 Wn. 2d 129 (2007), wherein Seattle City Light ("SCL") entered into franchise agreements with certain cities and agreed to pay the cities a percent of SCL's revenues derived from retail power sales to SCL customers within such cities in consideration of the cities' agreement not to exercise their statutory authority to establish a competing municipal electrical utility during the term of the Franchise; and the District is willing to pay the City a

percent of the District's revenues derived from its retail water sales to District customers located within the franchise area in consideration of the City's agreement not to exercise, and to forebear, its statutory authority pursuant to Chapter 35.13A RCW to attempt to assume jurisdiction over the District or any District responsibilities, property, facilities, equipment or utility customers located within or without the City's corporate limits during the term of this Franchise; and

WHEREAS, the Council finds that it is in the best interests of the health, safety and welfare of the residents of the Shoreline community to grant another non-exclusive franchise to the Shoreline Water District for the operation of a water system within the City right-of-way; NOW, THEREFORE,

**THE CITY COUNCIL OF THE CITY OF SHORELINE, WASHINGTON, DO ORDAIN
AS FOLLOWS:**

1. **Definitions.** The following terms contained herein, unless otherwise indicated, shall be defined as follows:
 - 1.1 **City:** The City of Shoreline, a municipal corporation of the State of Washington, specifically including all areas incorporated therein as of the effective date of this ordinance and any other areas later added thereto by annexation or other means.
 - 1.2 **Days:** Calendar days.
 - 1.3 **Director:** The City Manager or designee.
 - 1.4 **District:** Shoreline Water District, a municipal corporation organized under RCW Title 57.
 - 1.5 **Facilities:** All pipes and appurtenances, fire hydrants, access ways, pump stations, storage facilities, equipment, and supporting structures, located in the City's right-of-way, utilized by the District in the operation of its activities.
 - 1.6 **Franchise:** This ordinance and any amendments or modifications hereto.
 - 1.7 **Fire Hydrants or Hydrants:** The installation, operation and maintenance of fire hydrants and related water system facilities and equipment for the delivery of water for fire suppression purposes, including the over-sizing of such water system facilities and equipment for the delivery of water for fire suppression purposes.
 - 1.8 **Permittee:** A person who has been granted a permit by the Permitting Authority, and District operating under Section 9.6 of this Franchise.
 - 1.9 **Permitting Authority:** The head of the City department authorized to process and grant permits required to perform work in the City's right-of-way, or the head of any agency authorized to perform this function on the

City's behalf. Unless otherwise indicated, all references to Permitting Authority shall include the designee of the department or agency head.

1.10 Person: An entity or natural person.

1.11 Revenue: Income derived only from the sale of metered water to customers whose connections are within the City of Shoreline. Revenue shall not include: late fees; impact or mitigation fees; any type of connection charges, general facilities charges, or local facilities charges; local improvement district and utility local improvement district assessments and payments; grants; contributed assets (CIAC); loans; income from legal settlements not related to water sales; income from cellular antenna leases; income from real property or real property sales; income from the sale of surplus equipment, tools or vehicles; interest income; penalties; hydraulic modeling fees; water system extension agreement (WSEA) fees and charges; income from street lights; labor, equipment and materials charges; income from the sale of bidders documents and plan sets; sale of water to wholesale water purveyors, or any other fees and charges.

1.12 Right-of-way: As used herein shall refer to the surface of and the space along, above, and below any street, road, highway, freeway, lane, sidewalk, alley, court, boulevard, parkway, drive, easement, and/or road right-of-way now or hereafter held or administered by the City of Shoreline.

2. **Franchise Granted.**

2.1 Pursuant to RCW 35A.47.040, the City hereby grants to the District, its successors and assigns, subject to the terms and conditions hereinafter set forth, a Franchise beginning on the effective date of this Ordinance.

2.2 This Franchise shall grant the District the right, privilege and authority, subject to the terms and conditions hereinafter set forth, to construct, operate, maintain, replace, and use all necessary equipment and facilities for a public water system, in, under, on, across, over, through, along or below the public right-of-way located in the City of Shoreline.

2.3 This Franchise is granted upon the express condition that it shall not in any manner prevent the City from granting other or further franchises in, along, over, through, under, below or across any right-of-way.

3. **Franchise Term.** The term of the Franchise granted hereunder shall be for the period commencing on the effective date of this ordinance or the date this Franchise is fully executed, whichever is later, through December 31, 2027 which may be extended by mutual written agreement of both parties.

4. **Franchise Fee.** In consideration of the rights granted to the District by this Franchise, the District agrees to comply with the terms and considerations of operation within the City rights-of-way set forth in this ordinance and, as additional consideration, the District agrees:

4.1 To collect and distribute to the City a Franchise fee equal to 6% of Revenue generated within the City.

4.1.1 This Franchise fee shall be collected beginning upon the effective date of this Franchise.

4.1.2 Proceeds of the Franchise fee collected shall be distributed to the City no later than 30 days after the end of each calendar quarter (quarters ending at the end of March, June, September and December).

4.2 Should the District be prevented by judicial or legislative action from collecting a Franchise fee on all or a part of the revenues, the District shall be excused from the collection and distribution of that portion of the Franchise fee.

4.3 Should a court of competent jurisdiction declare, or a change in law make, the Franchise fee to be collected on behalf of the City invalid, in whole or in part, or should a court of competent jurisdiction hold that the collection of the Franchise fee by the District is in violation of a pre-existing contractual obligation of the District, then the District's obligation to collect and distribute a Franchise fee to the City under this Section shall be terminated in accordance with and to the degree required to comply with such court action.

4.3.1 Should a court of competent jurisdiction declare, or a change in law make, the franchise fee invalid, in whole or in part, and further declare that the franchise fee collected by the District and paid to the City be refunded or repaid to District customers or other parties, the City shall refund to the District all monies collected plus any required interest in the amount required to satisfy said court declaration.

4.4 The District will not be a party to or otherwise support legal or legislative action intended to result in judicial determination or legislative action referred to in Sections 4.2 and 4.3 hereof.

5. Utility Tax.

5.1 The City has adopted Ordinance No. 634, as amended by Ordinance No. 638, adopting a Utility Tax upon water distribution operations, but providing an exemption from the tax for the District until the expiration or termination of this Franchise. The District reserves in full its rights to ~~challenge the threatened or actual imposition of the Utility Tax as~~ unlawful. Neither the District's acceptance of this Franchise nor the payment by the District of any Franchise fee shall operate as a waiver of the District's right to challenge the threatened or actual imposition of the Utility Tax. For the purposes of ensuring the District's ability to bring a challenge to the Utility Tax, and in consideration of the mutual benefits of this Franchise for each party, the District and City agree that any statute of limitations or other time or procedural limitation on bringing a legal action to challenge the Utility Tax, whether existing as a matter of statute, common law, or any other basis, shall be tolled during the term of this Franchise and shall not begin to run until 90 days following the expiration or termination of this Franchise. The District and City further agree that they shall not contest the other party's allegation of the timely commencement of a legal action challenging the Utility Tax if such action is commenced on or before the expiration of the 90-day period following the expiration or termination of this Franchise. The provisions of this Section 5.1 shall survive the expiration or termination of this Franchise.

5.2 District's non-payment of a Utility Tax shall not be deemed a breach or violation of this Franchise; and, further, shall not justify termination of this Franchise.

5.3 If the City enacts or adopts before or during the term of this Franchise, a Utility Tax applicable to the District, the District shall be exempt from any such tax during the term of this Franchise.

6. Non-assumption. In consideration of the District's payment of a Franchise fee to the City as provided in Section 4 herein, the District's acceptance of the burden to pay for hydrant costs as further provided in Section 7 herein, and the District's acceptance of the other terms and conditions of this Franchise, the City agrees not to exercise and to forebear its statutory authority pursuant to Chapter 35.13A RCW or other statutes to attempt to assume jurisdiction over the District or any District responsibilities, property, facilities, equipment or utility customers located within or without the City's corporate limits during the term of this Franchise.

7. Fire Hydrant Costs.

7.1 The District agrees to be responsible for the operation, maintenance and cost of Fire Hydrants within the Franchise area, whether installed by the District or by third parties on behalf of the District; provided, should a

court of competent jurisdiction determine the Parties may not transfer the City's responsibility to pay for Fire Hydrants to the District, or legislative action prevents the District from accepting responsibility to pay for Fire Hydrants, the District's obligation to pay for Fire Hydrants under this Section 7 shall be terminated in accordance with and to the degree required to comply with such court or legislative action; and should a court of competent jurisdiction declare that the costs for Fire Hydrants borne by the District must be repaid by the City to the District, the District's customers or other parties, City shall pay to the District all Fire Hydrant costs paid by the District during the term of this Franchise together with any required interest thereon in the amount required to satisfy any such court determination.

- 7.2 The District's agreement to accept responsibility for Fire Hydrant costs as provided in this Section 7 is based on its belief that the installation, operation, maintenance and payment for Fire Hydrants by the District is and shall continue to be a governmental function, and is not an activity of providing water for hire as defined in Title 80 RCW.
- 7.3 Notwithstanding the District's agreement to accept responsibility for Fire Hydrant costs as provided in this Section 7, the District does not represent or warrant sufficient water pressure or flow from fire hydrants for the purposes of fire suppression and protection. The District shall not have any duty, obligation or responsibility to provide fire protection and fire suppression services to the public within the franchise area. The District shall perform operational hydrant inspections and maintenance of the hydrants where every hydrant is inspected on a two year cycle. Any repairs found to be necessary will be promptly made by the District. Any hydrant whose output flow (modeled or field measured) is less than 500 gallons per minute will have the bonnet painted red. A list and location of any red colored hydrants shall be submitted to the City no later than January 31st of each year.
- 7.4 The City reserves in full its rights to challenge the threatened or actual imposition of a Hydrant fee, cost or assessment by the District against it as unlawful. The City's acceptance of this Franchise shall not operate as a waiver of the City's right to challenge the threatened or actual imposition of the Hydrant cost upon the City. For the purposes of ensuring the City's ability to bring a challenge, and in consideration of the mutual benefits of this Franchise for each party, the District and City agree that any statute of limitations or other time or procedural limitation on bringing a legal action to challenge the imposition of Hydrant costs on the City, whether existing as a matter of statute, common law, or any other basis, shall be tolled during the term of this Franchise and shall not begin to run until 90 days following the expiration or termination of this Franchise. The District and City further agree that they shall not contest the other party's allegation of the timely commencement of a legal action challenging imposition of a

hydrant cost against the City if such action is commenced on or before the expiration of the 90-day period following the expiration or termination of this Franchise. The provisions of this Section 7.4 shall survive the expiration or termination of this Franchise.

- 7.5 Should a court of competent jurisdiction or legislative action determine the District's installation, operation, maintenance and payment for Fire Hydrants is a proprietary function, the District shall have the right to terminate and rescind all or portions of this Section 7 which shall then have no further force or effect between the Parties; and, further, City agrees to defend, indemnify and hold District harmless from and against any and all claims, suits, actions or liabilities (including costs and attorneys' fees) incurred or asserted against District directly or indirectly arising out of District's acceptance of responsibility to install, operate, maintain and pay for Fire Hydrants as provided in this Franchise.
- 7.6 The District's agreement to be responsible for the installation, operation, maintenance and cost of Fire Hydrants within the franchise area shall not be construed to be a waiver of any other legal obligation or duty the District may have to charge the City for any services the District may provide the City or its citizens which are determined in the future to be a governmental function for which the City must provide or pay for.

8. **City Ordinances and Regulations.**

- 8.1 Nothing herein shall be deemed to direct or restrict the City's ability to adopt and enforce all necessary and appropriate ordinances regulating the rights-of-way, including the State Building Code as adopted by the City and any reasonable ordinance made in the exercise of its police powers in the interest of public safety and for the welfare of the public. The City shall have the authority at all times to control, by appropriate regulations, the general location and elevation of new or relocated facilities of the District that are part of a public project located within the City right-of-way needed for the City's own use of the right-of-way, which may include coordination with other utilities in the right-of-way. The District shall promptly conform with all such regulations at no charge or expense to the City, unless compliance would cause the District to violate other requirements of law. Such regulations shall not unreasonably affect or modify any portion of this Franchise without the approval of the District. Should the District and the City not be able to agree, they shall resolve the differences through Section 17 - Alternate Dispute Resolution.

9. Right-of-Way Management.

9.1 Excavation.

9.1.1 Whenever the District excavates in any right-of-way for the purpose of installation, construction, repair, maintenance or relocation of its facilities, it shall apply to the City for a permit to do so in accord with the ordinances and regulations of the City requiring permits to operate in the right-of-way. In no case shall any such work commence within any right-of-way without a permit, except as otherwise provided in this Ordinance.

9.2 Abandonment of the District's Facilities. Any abandoned District facility above the surface shall be removed by the District within a reasonable time. All necessary permits must be obtained prior to such work.

9.3 Restoration after Construction.

9.3.1 The District shall, after any installation, construction, relocation, maintenance, or repair of Facilities within the Franchise area, restore the right-of-way to at least the condition the same was in immediately prior to any such abandonment, installation; construction, relocation, maintenance or repair. Restoration shall not require an improvement to a condition that substantially exceeds the condition prior to the District's activities. All concrete encased monuments, which have been disturbed or displaced by such work, shall be restored pursuant to all federal, state and local standards and specifications. The District agrees to promptly complete all restoration work and to promptly repair any damage caused by such work at its sole cost and expense.

9.3.2 If it is determined that the District has failed to restore the right-of-way in accordance with this Section, the City shall provide the District with written notice including a description of actions the City believes necessary to restore the right-of-way.

9.4 Bonding Requirement. The District, as a public agency, is not required to comply with the City's standard bonding requirement for working in the City's right-of-way.

9.5 Emergency Work, Permit Waiver. In the event of any emergency where any District facilities located in the right-of-way are broken or damaged, or if the District's construction area for their facilities is in such a condition as to place the health or safety of any person or property in imminent danger, the District shall immediately take any necessary emergency measures to repair, replace or remove its facilities without first applying for and obtaining a permit as required by this Franchise. However, this emergency provision shall not relieve the District from later

obtaining any necessary permits for the emergency work. The District shall apply for the permits that would have been required and obtained prior to the emergency as soon as practical given the nature and duration of the emergency.

- 9.6 Permit requirements and types of activities. The District shall be authorized to perform "Minor Activities" without a City permit of any kind and "Blanket Activities" under the terms and conditions of this Section. All other activities will require a separate permit in accordance with City ordinances.

- 9.6.1 "Blanket Activities" shall be defined as those activities that cause some disruption to the right-of-way and possibly to traffic patterns but not to the degree where significant City involvement is required during the plan review and inspection processes. Examples include:

9.6.1.1 Replace, install, maintain services, valves and water mains and appurtenances in pavement, sidewalk or gravel shoulder.

9.6.1.2 Replace, install or maintain valve boxes in pavement, if not in conjunction with City generated projects (overlays, etc.).

9.6.1.3 Transverse tie-ins on joint trench projects (transverse: placed straight across).

9.6.1.4 Replace, install or maintain blowoffs, air-vacs, fire hydrants in pavement, sidewalk or gravel shoulder.

9.6.1.5 Open cutting of pavement not to exceed 70 square feet.

- 9.6.2 "Minor Activities" shall be defined as those activities on streets that do not cause any significant disruption of the right-of-way and traffic patterns. Typical examples include the inspection, operation and maintenance of services, pump stations, air-vacs, valves, hydrants and service meters.

- 9.6.3 For Blanket Activities, the District shall pay the City a permit inspection/processing fee in the amount equal to the hourly rate at the time of the permit and for a time of two (2) hours. The permit fees for District activities shall not exceed permit fees charged for similar activities to any other franchise holder.

- 9.6.4 The District shall provide a quarterly list of permit construction activity concurrently with Franchise fee payments listing the previous three month's activity authorized under this Section.

- 9.6.5 The District shall provide payment of inspection fees for quarterly activity. No statement will be provided by the City.
- 9.6.6 For each separate use of the right-of-way under this Section except Minor Activities or Emergencies, and prior to commencing any work in the right-of-way under this Section, the District shall fax or otherwise deliver to the Permitting Authority, at least twenty-four (24) hours in advance of entering the right-of-way, a City Inspection Request Form, as provided by the Permitting Authority, which shall include at a minimum a work time, date the work begins, date the work is estimated to be complete, location, traffic control plan (if applicable) and a description of the work to be performed.
- 9.7 Safety.
- 9.7.1 The District, in accordance with applicable federal, state, and local health and safety rules and regulations shall, at all times, employ ordinary care in the installation, maintenance, operation, and repair of facilities utilizing methods and devices commonly accepted for public water utility operations to prevent failures and accidents that are likely to cause property damage and personal injury, and shall accomplish work in a manner that will minimize interference with traffic and use of adjoining property.
- 9.7.2 All of the District's Facilities in the right-of-way shall be constructed and maintained in a safe and operational condition.
- 9.8 Dangerous Conditions, Authority for City to Abate. Whenever Facilities or the operations of the District cause or contribute to a condition that appears to endanger any person or substantially impair the use or lateral support of the adjoining right-of-way, public or private property, the Director may immediately inform the District of the condition. The District will immediately evaluate the condition and if the District determines that a condition exists that causes endangerment to the public or impairment of the right-of-way the District will immediately mitigate the condition at no cost to the City. The resolution of the dangerous condition requires approval of the District Manager and the Director before the work begins.
- 9.9 Relocation of System Facilities.
- 9.9.1 In accord with the following schedule, the District agrees and covenants to protect, support, temporarily disconnect, relocate or remove from any right-of-way its facilities when so required by the City to accommodate the completion of or as a result of a public project. As used in this Section, the term "public project" is a

project included in the City adopted six-year Capital Improvement Program and as amended annually by the City Council.

Category	Age of District Facility	Percent of Relocation Costs Paid by City	Percent of Relocation Costs Paid by District
1)	5 years or less	100%	0%
2)	6 —10 years	50%	50%
3)	11 + years	0%	100%

9.9.2 This relocation cost allocation requirement shall not apply to those larger facilities that cannot reasonably be supported, disconnected, relocated or removed as set forth on **Attachment A** to this Franchise, to be approved by both parties within 60 days of the District's acceptance of this ordinance. This attachment may be amended from time to time by the parties. If these facilities are required to be moved in order to accommodate the completion of or as a result of a public project, the City shall pay 50% of the relocation cost (except those facilities in Category 1 above, for which the City will pay 100% of the relocation costs).

9.9.3 All Facilities utilized for providing water service within the District's service area and within the right-of-way shall be considered owned, operated and maintained by the District.

9.9.4 If the City determines that a public project necessitates the relocation or removal of the District's existing facilities, the City shall:

9.9.4.1 As soon as possible, but not less than one hundred eighty (180) days prior to the commencement of such project, provide the District with written notice requiring such relocation or removal; and

9.9.4.2 Provide the District with copies of any plans and specifications pertinent to the requested relocation or removal and a proposed temporary or permanent relocation for the District's facilities.

9.9.4.3 After receipt of such notice and such plans and specifications, the District shall make all reasonable efforts to complete relocation of its facilities according to the above cost sharing described in Section 9.9.2.

9.9.5 The District may, after receipt of written notice requesting relocation or removal of its facilities, submit to the City written

alternatives to such relocation. The City shall evaluate such alternatives and advise the District in writing if any of the alternatives are suitable to accommodate the work that necessitates the relocation of the facilities. If so requested by either party, the District or the City shall submit additional information to assist the other party in making such evaluation. The City shall give each alternative proposed by the District full and fair consideration and if appropriate, state why the District's proposed alternatives are not satisfactory. In the event the City and the District ultimately do not agree on a reasonable alternative, the District and the City shall attempt to resolve the relocation through Section 17 – Alternate Dispute Resolution.

- 9.9.6 If the City determines that the District's facilities must be protected, supported, temporarily or permanently disconnected, relocated or removed from the right-of-way, the City shall reimburse the District all costs as submitted and verified by the District within 45 days of completion of the relocation or removal by the District in accord with Section 9.9.1 herein.
- 9.9.7 The provisions of this Section 9.9 shall in no manner preclude or restrict the District from making any arrangements it may deem appropriate when responding to a request for relocation of its Facilities by any person or entity other than the City.

10. **Planning Coordination.**

- 10.1 **Growth Management.** The parties agree, as follows, to participate in the development of, and reasonable updates to, the each other's planning documents:
 - 10.1.1 For the District's service within the City limits, the District will participate in a cooperative effort with the City of Shoreline to develop a Comprehensive Plan Utilities Element that meets the requirements described in RCW 36.70A.070(4).
 - 10.1.2 The District will participate in a cooperative effort with the City to ensure that the Utilities Element of Shoreline's Comprehensive plan is accurate as it relates to the District's operations and is updated to ensure continued relevance at reasonable intervals.
 - 10.1.3 The District shall submit information related to the general location, proposed location, and capacity of all existing and proposed Facilities within the City as requested by the Director within a reasonable time, not exceeding sixty (60) days from receipt of a written request for such information, provided that such information is in the District's possession, or can be

reasonably developed from the information in the District's possession.

10.1.4 The District will update information provided to the City under Section 10 – Planning Coordination, whenever there are major changes in the District's system plans for Shoreline.

10.1.5 The City will provide information relevant to the District's operations within a reasonable period of written request to assist the District in the development or update of its Comprehensive Water System Plan, provided that such information is in the City's possession, or can be reasonably developed from the information in the City's possession.

10.2 System Development Information. The District and the City will each assign a representative whose responsibility shall be to coordinate planning for CIP projects including those that involve undergrounding. At a minimum, such coordination shall include the following:

10.2.1 By February 1st of each year, the District shall provide the City with a schedule of its planned capital improvements, which may affect the right-of-way for that year.

10.2.2 By February 1st of each year, the City shall provide the District with a schedule of its planned capital improvements which may affect the right-of-way for that year including but not limited to street overlays and repairs, storm drainage improvements and construction, and all other right-of-way activities that could affect the District's capital improvements and infrastructure.

10.2.3 The District shall meet with the City, other franchisees and users of the right-of-way, as necessary, to schedule and coordinate construction activities.

10.2.4 All construction locations, activities, and schedules shall be coordinated, to minimize public inconvenience, disruption, or damages.

10.3 Emergency Management. The City and the District agree to cooperate in emergency management planning, emergency operations response procedures, and recovery activity strategies, including identifying potential hazards and risks in the District's Facilities so that they can be either mitigated or minimized.

10.4 Maps and Records. Without charge to either party, the City and the District agree to provide each other with as-built plans, maps, and records that show the vertical and horizontal location of its facilities within the right-of-way, measured from the center line of the right-of-way, using a

minimum scale of one inch equals one hundred feet (1"=100'). Maps shall be provided in Geographical Information System (GIS) or other digital electronic format used by the City or the District, and upon request, in hard copy plan form used by the City or the District.

11. **Survival of Wheeling Agreement Between the District and the City of Seattle.**

The City acknowledges that the District is negotiating a wheeling agreement with the City of Seattle - Seattle Public Utilities (SPU) for the District's supply station located at NE 185th Street and 5th Avenue NE and an emergency connection located at NE 185th Street and 8th Avenue NE. The City agrees that if the City assumes all or part of the SPU system in Shoreline subsequent to the execution of such wheeling agreement, then the City assumes all obligations of SPU under the wheeling agreement.

12. **Indemnification.**

12.1 The District hereby releases, covenants not to bring suit, and agrees to indemnify, defend and hold harmless the City, its elected officials, employees, agents, and volunteers from any and all claims, costs, judgments, awards, attorney's fees, or liability to any person arising from the negligent or intentional acts or omissions of the District, its agents, servants, officers or employees in performing activities or failing to perform activities authorized by this Franchise, and including those claims arising against the City by virtue of the District's exercise of rights granted herein. It is further specifically and expressly understood that the indemnification provided herein constitutes the District's waiver of immunity under Industrial Insurance, Title 51 RCW, solely for the purpose of this indemnification. This waiver has been mutually negotiated by the parties. The provisions of this Section shall survive the expiration or termination of the Franchise. This covenant of indemnification shall include, but not be limited by this reference, to claims against the City arising as a result of the acts or omissions of the District, its agents, servants, officers or employees except for claims for injuries and damages caused in whole or in part by the sole negligence of the City. If final judgment is rendered against the City, its elected officials, employees, agents, and volunteers, or any of them, the District shall satisfy the same. The City may appear in any proceeding it deems necessary to protect the City's or the public's interests.

12.2 Inspection or acceptance by the City of any work performed by the District at the time of completion of construction shall not be grounds for avoidance of any of these covenants of indemnification. Said indemnification obligations shall extend to claims that are not reduced to a suit and any claims that may be settled prior to the culmination of any litigation or the institution of any litigation.

- 12.3 In the event the District refuses to undertake the defense of any suit or any claim, after the City's request for defense and indemnification has been made pursuant to the indemnification clauses contained herein, and the District's refusal is subsequently determined by a court having jurisdiction (or such other tribunal that the parties shall agree to decide the matter), to have been wrongful refusal on the part of the District, then the District shall pay all of the City's costs and expenses for defense of the action, including reasonable attorneys' fees of recovering under this indemnification clause as well as any judgment against the City.
- 12.4 Should a court of competent jurisdiction determine that this Franchise is subject to RCW 4.24.115, then, in the event of liability for damages arising out of bodily injury to persons or damages to property caused by or resulting from the concurrent negligence of the District and the City, its officers, employees and agents, the District's liability hereunder shall be only to the extent of the District's negligence. It is further specifically and expressly understood that the indemnification provided herein constitutes the District's waiver of immunity under Industrial Insurance, Title 51 RCW, solely for the purposes of this indemnification. This waiver has been mutually negotiated by the parties. The provisions of this Section shall survive the expiration or termination of this Franchise.
- 12.5 The City hereby releases and agrees to indemnify, defend and hold harmless the District, its elected officials, employees, agents, and volunteers from any and all claims, costs, judgments, awards or liability to any person arising from the District's compliance with this ordinance.
- 12.6 The City hereby releases and agrees to indemnify, defend and hold harmless the District, its elected officials, employees, agents and volunteers from any and all claims, costs, judgments, awards or liability to any person arising from City's decision to issue development permits based on accurate information on fire flow and water availability provided by the District or the City's enforcement of the International Fire Code.

13. **Insurance.**

- 13.1 The District shall procure and maintain for the duration of the Franchise insurance against claims for injuries to persons or damages to property which may arise from or are in connection with the exercise of the rights, privileges and authority granted hereunder to the District, its agents or employees. A combination of self-insurance and excess liability insurance may be utilized by the District. The District shall provide to the City an insurance certificate and proof of self-insurance, if applicable, evidencing the required insurance and a copy of the additional insured endorsements, for its inspection prior to the commencement of any work or installation of any Facilities pursuant to this Franchise, and such insurance shall evidence the following required insurance:

- 13.1.1 Automobile Liability insurance for owned, non-owned and hired vehicles with limits no less than \$2,000,000 Combined Single Limit per accident for bodily injury and property damage.
- 13.1.2 Commercial General Liability insurance policy, written on an occurrence basis with limits no less than \$5,000,000 combined single limit per occurrence and \$10,000,000 aggregate for personal injury, bodily injury and property damage. Coverage shall include premises, operations, independent contractors, products-completed operations, personal injury and advertising injury. There shall be no endorsement or modification of the Commercial General Liability insurance excluding liability arising from explosion, collapse or underground property damage. The City shall be named as an additional insured under District's Commercial General Liability insurance policy.
- 13.1.3 Excess Liability in an amount of \$5,000,000 each occurrence and \$5,000,000 aggregate limit. The City shall be named as an additional insured on the Excess Liability insurance policy.
- 13.2 Payment of deductible or self-insured retention shall be the sole responsibility of District.
- 13.3 The coverage shall contain no special limitations on the scope of protection afforded to the City, its officers, officials, or employees. In addition, the insurance policy shall contain a clause stating that coverage shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability. The District's insurance shall be primary. Any insurance, self insurance, or insurance pool coverage maintained by the City shall be excess of the District's insurance and shall not contribute with it. Coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days prior written notice has been given to the City.
- 13.4 The District shall require all its contractors working in the Franchise Area to carry insurance consistent with Section 13 - Insurance, except Commercial General Liability insurance limits may be no less than \$1,000,000 per occurrence and \$2,000,000 aggregate, and shall provide evidence of such insurance to the City upon request.
- 14. **Enforcement.**
 - 14.1 Both the City and the District reserve the right to revoke and terminate this Franchise in the event of a substantial violation or breach of its terms and conditions as provided in this Section 14.

- 14.2 Except as otherwise provided in this Franchise, a substantial violation or breach by the City or by the District shall include, but shall not be limited to, the following:
- 14.2.1 An uncured violation of any material provision of this Franchise,
 - ~~14.2.2 An intentional evasion or knowing attempt by either party to evade~~ any material provision of this Franchise or practice of any fraud or deceit upon the District or upon the City;
 - 14.2.3 Failure to provide the services specified in the Franchise;
 - 14.2.4 Misrepresentation of material fact during negotiations relating to this Franchise or the implementation thereof;
 - 14.2.5 An uncured failure to pay fees associated with this Franchise; and
 - 14.2.6 Changes in existing City regulations or ordinances or new regulations or ordinances that materially change the interpretation or application of the provisions in this Franchise.
- 14.3 No violation or breach shall occur which is without fault of the District or the City, or which is as a result of circumstances beyond the District's or the City's reasonable control. Neither the District, nor the City, shall be excused by economic hardship nor by nonfeasance or malfeasance of its directors, officers, agents or employees.
- 14.4 Prior to any termination or revocation, the City or the District shall provide the other with detailed written notice of any substantial violation or material breach upon which it proposes to take action. The party who is allegedly in breach shall have a period of 60 days following such written notice to cure the alleged violation or breach, demonstrate to the other's satisfaction that a violation or breach does not exist, or submit a plan satisfactory to the other to correct the violation or breach. If, at the end of said 60-day period, the City or the District reasonably believes that a substantial violation or material breach is continuing and the party in breach is not taking satisfactory corrective action, the other may declare that the party in breach is in default and may terminate this Franchise in accord with Section 14 - Enforcement, which declaration must be in writing.
15. **Notice.** Any notice or information required or permitted to be given to the parties under this Franchise may be sent to the following addresses unless otherwise specified:

District Manager
Shoreline Water District
P.O. Box 55367
Shoreline, WA 98155
Phone: (206) 362-8100
Fax: (206) 361-0629

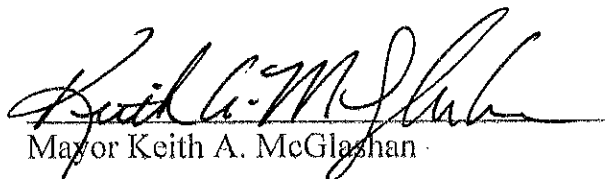
City Manager
City of Shoreline
17500 Midvale Avenue N.
Shoreline, WA 98133-4921
Phone: (206) 801-2700
Fax: (206) 546-2200

16. **Non-Waiver.** The failure of either party to enforce any breach or violation by the other party of any provision of this Franchise shall not be deemed to be a waiver or a continuing waiver by the non-breaching party of any subsequent breach or violation of the same or any other provision of this Franchise.
17. **Alternate Dispute Resolution.** If the parties are unable to resolve disputes arising from the terms of this Franchise, prior to resorting to a court of competent jurisdiction, the parties shall submit the dispute to a non-binding alternate dispute resolution process agreed to by the parties. Unless otherwise agreed between the parties or determined herein, the cost of that process shall be shared equally.
18. **Modification.** No provision of this Franchise shall be amended or otherwise modified, in whole or in part, except by an instrument in writing, duly approved and executed by the City and the District, which amendment shall be authorized on behalf of the City through the adoption of an appropriate ordinance.
19. **Entire Agreement.** This Franchise constitutes the entire understanding and agreement between the parties as to the subject matter herein and no other agreements or understandings, written or otherwise, shall be binding upon the parties upon execution and acceptance hereof.
20. **Survival.** All of the provisions, conditions and requirements of Sections 9.1 - Excavation, 9.2 - Abandonment Of District's Facilities, 9.3 - Restoration After Construction, 9.7 - Dangerous Conditions, Authority For City To Abate, 9.8 - Relocation Of System Facilities, and 12 - Indemnification, of this Franchise shall be in addition to any and all other obligations and liabilities the District may have to the City at common law, by statute, or by contract, and shall survive the City's Franchise to the District for the use of the areas mentioned in Section 2 herein, and any renewals or extensions thereof only to the extent that existed prior to this agreement. All of the provisions, conditions, regulations and requirements contained in this ordinance shall further be binding upon the heirs, successors, executors, administrators, legal representatives and assigns of the District and all privileges, as well as all obligations and liabilities of the District shall inure to its heirs, successors and assigns equally as if they were specifically mentioned wherever the District is named herein.
21. **Severability.** If any Section, sentence, clause or phrase of this ordinance should be held to be invalid or unconstitutional by a court of competent jurisdiction, such invalidity or unconstitutionality shall not affect the validity or constitutionality of any other Section, sentence, clause or phrase of this ordinance. The Parties may

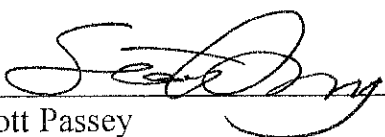
amend, repeal, add, replace, or modify any provision of this Franchise to preserve the intent of the parties as expressed herein prior to any finding of invalidity or unconstitutionality.

22. **Directions to City Clerk.** The City Clerk is hereby authorized and directed to forward certified copies of this ordinance to the District set forth in this ordinance. The District shall have fifteen (15) days from receipt of the certified copy of this ordinance to accept in writing the terms of the Franchise granted to the District in this ordinance.
23. **Publication Costs.** In accord with state law, this ordinance shall be published in full by the City. The District shall reimburse the City for the cost of publishing this ordinance within sixty (60) days of receipt of an invoice from the City.
24. **Repealer.** Ordinance No. 613 is hereby repealed.
25. **Effective Date.** This ordinance shall take effect and be in full force five (5) days after publication.

PASSED BY THE CITY COUNCIL ON AUGUST 13, 2012.

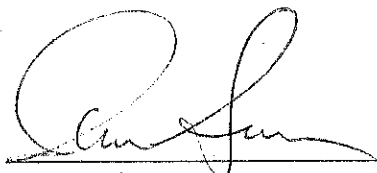

Mayor Keith A. McGlashan

ATTEST:



Scott Passey
City Clerk

APPROVED AS TO FORM:



Ian R. Sievers
City Attorney

Date of Publication: _____, 2012
Effective Date: _____, 2012

ORIGINAL

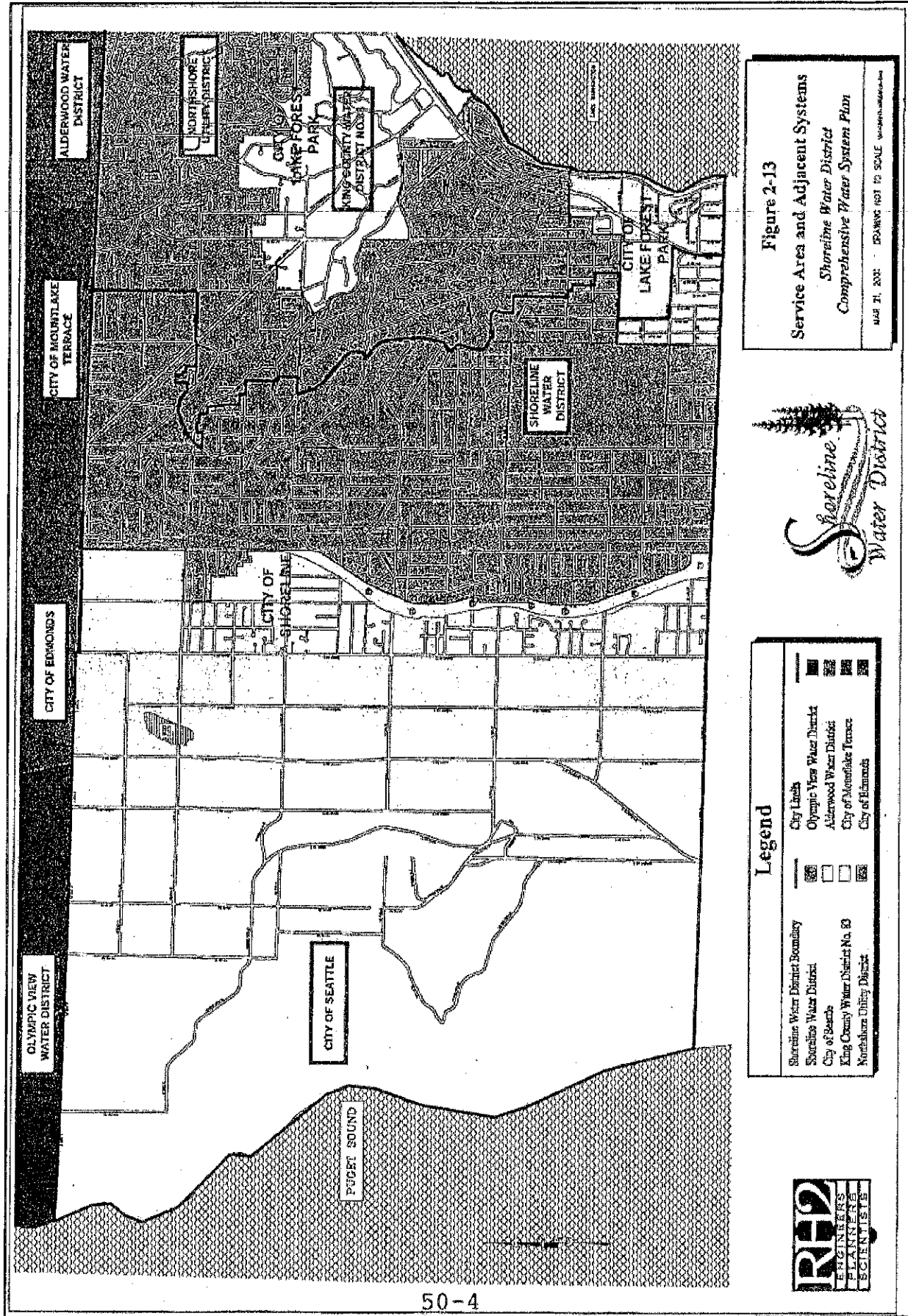
ATTACHMENT A TO THE FRANCHISE GRANTED TO THE SHORELINE WATER DISTRICT BY THE CITY OF SHORELINE

August 13, 2012

In accord with paragraph 9.9.2 of the Franchise granted by the City of Shoreline to the Shoreline Water District on August 13, 2012, the following list of facilities owned, operated and maintained by the Shoreline Water District are designated as "larger facilities that cannot reasonably be supported, disconnected, relocated or removed":

1. Booster Station No. 1, (BS-1), located on NE 160th Street East of 8th Avenue N. Includes all associated piping, electrical equipment and appurtenances.
2. Booster Station No. 2, (BS-2), located NE 185th Street east of 8th Avenue NE Includes all associated piping, electrical equipment and appurtenances.
3. Supply Station No. 1, (SS-1), located on NE 192nd Street West of 16th Avenue NE. Includes all associated piping, electrical equipment and appurtenances.
4. Supply Station No. 4, (SS-4), located at NE 185th Street and 5th Avenue NE. Includes all associated piping, electrical equipment and appurtenances.
5. Proposed Supply Station No. 5, (SS 5), located at NE 145th Street and 5th Avenue NE. Includes all associated piping, electrical equipment and appurtenances.
6. Emergency Connection, located at NE 185th Street and 8th Avenue NE (south of the BS-2). Includes all associated piping and appurtenances.
7. Piping located at or near the intersection of 15th Avenue NE and NE 180th Street connecting District pumping and storage facilities located on property designated as 18012-15th Avenue NE to the District's water supply system piping on 15th Avenue NE (Shoreline Water District North City Pump Station).
8. Pressure Reducing Station No. 1 (PRS-1), located at NE 201st St near 5th Avenue NE. Includes all associated piping, electrical equipment and appurtenances.
9. Pressure Reducing Station No. 7 (PRS-7), located at NE 200st St and 25th Avenue NE. Includes all associated piping, electrical equipment and appurtenances.

10. Pressure Reducing Station No. 8 (PRS-8), located at NE Perkins Way and 18th Avenue NE. Includes all associated piping, electrical equipment and appurtenances.
11. Intertie on NE 205th Street between Ballinger Road NE and 19th Avenue NE, includes all piping, electrical equipment and appurtenances.
12. Water Main on NE 189th Street crossing the Interstate 5 Right-of-Way.
13. Water Main on NE 205th Street crossing the Interstate 5 Right-of-Way.
14. All Water Mains on 15th Avenue NE between NE 175th Street and 15th Place N.





March 1, 2019

Diane Pottinger, General Manager
North City Water District
P.O. Box 55367
Seattle, WA 98155

Re: Modification to Exhibit II of Wholesale Water Supply Contract

Dear Diane:

Attached is the revision to Exhibit II of the Full Requirements Contract for the Supply of Water to Shoreline Water District (now known as the North City Water District) that we have been discussing. The revision reflects correction of an error that had created a discrepancy between Ex. II of the water supply contract and Ex. C of a water wheeling agreement with the District. The minimum hydraulic gradients described for stations 193 and 194 on Ex. C of the wheeling agreement reflect pumping.

Please sign this letter in the space below, keep one copy for your files and return a signed copy to me to indicate that you acknowledge and accept the new version of Exhibit II.

Please contact me at (206) 684-7975 if you have any questions.

Sincerely,

A handwritten signature in blue ink, reading "Kathy Curry", written over a horizontal line.

Kathy Curry
Wholesale Contracts Manager

A handwritten signature in blue ink, reading "Diane Pottinger", written over a horizontal line.

Diane Pottinger, General Manager
North City Water District

Attachment: Exhibit II, Revised March 1, 2019

CUSTOMARY POINTS OF DELIVERY, MINIMUM HYDRAULIC GRADIENTS, AND MAXIMUM FLOW RATES OF WATER SUPPLIED

METER SERVICE				MINIMUM HYDRAULIC GRADIENT FOR PLANNING PURPOSES AT STATION UPSTREAM OF METER (FEET NAVD-88 Datum)	MAXIMUM FLOW RATE UP TO WHICH THE MINIMUM HYDRAULIC GRADIENT APPLIES (gpm) ⁽²⁾
LOCATION	STATION NUMBER ⁽¹⁾	PIPELINE SEGMENT NUMBER ⁽³⁾	SIZE OF METER (IN.)		
8 th Ave NE & NE 160 th Street	101	7	10	505	805
16 th Ave NE & NE 192 nd Street	102	7	10	520	735
32 nd Ave NE & NE 195 th Street	103	7	6	525	Backup to Sta. 191
8 th Ave NE & NE 185 th Street	104	7	8	515	965
NE 195 th St & 40 th PI NE	191	7	8	520	325
8 th Ave NE & NE 185 th Street ⁽⁴⁾	N/A	7	N/A	515	500
8 th Ave NE & NE 145 th Street ⁽⁴⁾	N/A	7	N/A	495	Backup to the above
				TOTAL:	3,330

Notes:

- (1) Station and Pipeline Segment Numbers pertain to the demand metering program.
- (2) City of Seattle's estimate of Water Utility's average daily demand for 2020 with a peaking factor of 2.0 for peak day.
- (3) All Points of Delivery provide a wholesale level of service. Seattle bears no responsibility for retail service level obligations, such as fire flow or emergency backup.
- (4) Water is pumped from the Regional System at the above locations and wheeled through the Seattle 590 zone to be delivered to the District at Stations 193 and 194 as specified in Exhibit C in the April 11, 2013 Agreement for Wheeling Water Between the City of Seattle and the Shoreline Water District (now known as North City Water District).

**NORTH CITY WATER DISTRICT
RESOLUTION 2015.04.06**

**A RESOLUTION APPROVING AMENDED WHEELING AGREEMENT
WITH THE CITY OF SEATTLE**

Background

1. In 2001, North City Water District (the "District") and the City of Seattle entered into a Wholesale Water Supply Contract establishing the terms and conditions by which Seattle provides water to the District (Resolution 2001.11.18). Among the terms of the Wholesale Water Supply Contract is a list of the assets of the Seattle Regional Transmission System used to deliver water throughout the region; and

2. In 2003, Olympic View Water and Sewer District ("OVWSD") entered into a Northwest Sub-regional Wheeling Agreement with Seattle, by which Seattle provides water to OVWSD via assets that are not part of the Regional Transmission System. Those assets are part of the Northwest Sub-regional Transmission System. In 2012, the District signed a similar Northwest Sub-regional Wheeling Agreement (Resolution 2012.07.045). As a result, the District constructed two new points of delivery from the Northwest Sub-regional Transmission System; and

3. Included in the Northwest Sub-regional Wheeling Agreement is a provision for a review of the agreement every five years to update any changes that may have occurred in the transmission system. The original Northwest Sub-regional System Agreement was executed in 2003, and no changes were made in 2008. Beginning in 2013, the staffs of the District, OVWSD, and Seattle began negotiation of an Amended Wheeling Agreement. A substantially completed version of that Amended Wheeling Agreement, attached as Exhibit A, changes the operating band of the tanks, removes one tank and the standpipe from operation, adds the increased value to the remaining tank that was recently painted, and provides for participation in the capital facilities planning of the Northwest Sub-regional System.

Action

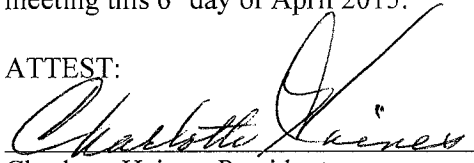
IT IS RESOLVED THAT:

4. An Amended Wheeling Agreement with the City of Seattle, substantially in the form attached as Exhibit A, is approved. The President of the Board is authorized to execute the document.

5. The Wheeling Rate is revised to \$0.07 per hundred cubic feet, effective May 1, 2015.


ADOPTED by the Board of Commissioners of North City Water District at a regular open public meeting this 6th day of April 2015.

ATTEST:


Charlotte Haines, President


Ron Ricker, Vice President

Approved as to Form:


Andrew Maron, District Attorney

Larry Schoonmaker, Secretary

January 21, 2016


Diane Pottinger, Manager
North City Water District
1519 NE 177th Street
Shoreline WA 98155

Dear Ms. Pottinger,

Enclosed please find your original of the executed "Amended Agreement for Wheeling Water between the City of Seattle and the North City Water District." Please note, the cover page is now dated as of the date of the last signature (Ray's).

It was a pleasure working with you on these amendments to help meet North City's interests. We value you as a wholesale water customer, and look forward to collaboration in the years to come!

Sincerely,

A handwritten signature in cursive script, appearing to read "Sheila Strehle".

Sheila Strehle
Corporate Policy Adviser
Seattle Public Utilities

SS

Enclosure

**AMENDED AGREEMENT FOR
WHEELING WATER
BETWEEN
THE CITY OF SEATTLE
AND THE
NORTH CITY WATER DISTRICT**

Amended January 14, 2016

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**AGREEMENT FOR WHEELING WATER
BETWEEN
THE CITY OF SEATTLE
AND
NORTH CITY WATER DISTRICT**

THIS AGREEMENT is entered into between the CITY OF SEATTLE ("Seattle"), a municipal corporation of the State of Washington, and the NORTH CITY WATER DISTRICT ("Utility"), a municipal corporation of the State of Washington.

RECITALS

1. Seattle owns and operates a system for the supply, transmission and distribution of water and is authorized to sell and distribute water to its residents and other customers located outside its corporate limits; and
2. The Utility entered into a Wholesale Water Supply Contract with Seattle to purchase water supply; and
3. Seattle, within its Wholesale Water Supply Contract, has listed the assets of the Seattle Regional Transmission System used to deliver water throughout the region and the terms and conditions for that delivery; and
4. With Seattle's consent, the Utility constructed two new points of delivery that are served through assets that are not part of the listed Seattle Regional Transmission System assets, and the wheeling of water through those assets is not covered by the Utility's Wholesale Water Supply Contract with Seattle;

NOW, THEREFORE, in consideration of mutual covenants herein, it is agreed as follows:

SECTION I. DEFINITIONS

For the purposes of this Agreement, the following terms have been defined as:

"Point(s) of Delivery" - The water meter and associated appurtenances, including everything from the outlet from the supply pipeline to the end of the Seattle meter vault, through which water is delivered from Seattle's Northwest Sub-regional System to the Utility's distribution system.

"Northwest Sub-regional System" - Those assets identified in Exhibit A and generally shown on the map in Exhibit B.

"Northwest Sub-regional System Allocation" - The percentage of each asset in the Northwest Sub-regional System that is used for sub-regional system use, i.e. transmission purposes.

“Seattle Regional Transmission System” - Those transmission mains, pumps and storage facilities serving Seattle’s retail and wholesale customers with water as set forth in the Wholesale Water Supply Contract.

“Wheeling” - The process of delivering water through a set of assets from one utility to another.

“Wholesale Water Supply Contract” - The agreement for the provision of water supply between Seattle and the Utility, dated November 5, 2001.

SECTION II. TERM OF CONTRACT AND GUARANTEES

II.A. Term of Contract

1. This Agreement is effective from March 1, 2012 and shall remain in effect during the term of the Wholesale Water Supply Contract (December 31, 2062), so long as the Utility uses the Northwest Sub-regional System to receive water from Seattle.
2. Seattle may assign all or a portion of its rights and obligations under this Agreement to another public utility in the event Seattle transfers ownership of all or a portion of the assets identified in Exhibit A.

II.B. Agreement to Wheel Water

Seattle agrees to facilitate delivery of water pursuant to the terms and conditions of the Wholesale Water Supply Contract by wheeling water from the Seattle Regional Transmission System through the Northwest Sub-regional System to the Utility’s Points of Delivery, as more particularly described in Exhibit C.

II.C. Service Delivery

1. Standard Level of Service. Seattle shall maintain a minimum hydraulic gradient or head at a maximum flow rate in amounts and at locations described in Exhibit C for each of Utility’s Points of Delivery served through the Northwest Sub-regional System.
2. Interruptions of Service. Seattle may temporarily interrupt or reduce delivery of wheeled water to the Utility if Seattle determines that such interruption or reduction is necessary or reasonable in case of system emergencies or in order to install equipment, make repairs, replacements, investigations and inspections or perform other maintenance work on the Northwest Sub-regional System assets. Except in cases of emergency, Seattle shall give the Utility reasonable notice of any such interruption or reduction in service. Notice should include the reasons and probable duration of the interruption. Seattle shall use its best efforts to minimize service interruptions to the Utility.

II.D. Infrastructure

1. Assets. The Northwest Sub-regional System consists of those assets identified in Exhibit A. The percentage attributed to each asset in Exhibit A represents the proportion of the

asset that is deemed to be a sub-regional use and is referred to as the Northwest Sub-regional System Allocation (Allocation). The remaining proportion of each asset is considered to be a local use, i.e. for Seattle's distribution system. For the Richmond Highlands Tanks as listed in Exhibit A, the Allocation is based on the methodology in Seattle's "2015-2018 Northwest Wheeling Rate Study" using 0' and 10' operating bands for Tanks 1 and 2 respectively, which will remain in effect unless there is a major change to these assets, such as reactivation of a refurbished or replaced Richmond Highlands Tank 1 or deactivation of Richmond Highlands Tank 2.

2. Operation and Ownership. Seattle owns, operates and maintains the Northwest Sub-regional System used for wheeling under this Agreement. Nothing in this Agreement shall convey ownership rights or responsibilities of Seattle's assets to the Utility.
3. Points of Delivery and Meters. Water will be wheeled to the Utility to the Points of Delivery identified in Exhibit C. Seattle shall own the Points of Delivery, including appropriate metering devices to measure the amount of water wheeled to the Utility under this Agreement. Seattle will perform any work, including but not limited to operation, maintenance, repair, replacement, relocation, improvement or decommission of the Points of Delivery at Utility's expense, except a) to the extent of Seattle's negligence or b) for regular testing, cleaning and recalibration of the metering devices. Utility will operate and maintain its distribution system in a manner that the water flowing through the metering devices is within the normal operating range for the meter as specified by the manufacturer. At the Utility's request and expense, Seattle shall install and maintain equipment selected by the Utility and approved by Seattle to transmit signals to the Utility's recording equipment (at locations determined by the Utility) of the amount of water delivered as measured by Seattle's meter(s).
4. Asset and Allocation Review. Every five years, Seattle, in consultation with the Utility and other utilities receiving water through the Northwest Sub-regional System, shall conduct a review of the Northwest Sub-regional System assets and Allocations in Exhibit A to determine whether they are consistent with current operating needs and conditions. The next five-year review is scheduled for 2013. Seattle shall modify Exhibit A as necessary to reflect any changes, which will become incorporated into the Agreement upon written notice to Utility.
5. Capital Facilities Plan Review. When Seattle updates or amends its Comprehensive Facilities Plan ("Plan") and such update or amendment includes a project relating to an asset in the Northwest Sub-regional System, Water Utility shall have an opportunity to review and comment on that portion of the Plan prior to submission to the Seattle City Council. This review shall be coordinated with the Comprehensive Capital Facilities Plan review under section VI.D. of the Partial Requirements Water contracts, i.e. Water Utility shall respond within 60 days of receipt of the Plan, or its approval shall be presumed to be given. The response submitted by Water Utility regarding the Northwest Sub-regional System shall be seriously considered by Seattle. Seattle will reply to Water Utility's comments within 90 days of receipt. Water Utility and Seattle shall use their best efforts to arrive at a mutually acceptable plan. Final decisions and authority to approve capital projects relating to the Northwest Sub-regional System shall rest with the Seattle City Council.

II.E. Water Quality

Seattle shall wheel water to the Utility's system that meets or exceeds all applicable Federal and State regulations as the same may change from time to time.

SECTION III. WHEELING COSTS

The following general principles shall apply to the establishment of all rates and charges for wheeling hereunder.

- Seattle shall utilize generally accepted accounting principles consistently applied as a basis for developing the financial information upon which rates and charges are based.
- The rate structure should be simple to administer and easily understandable.
- The rate structure should be fair and equitable while balancing the needs of all parties.
- The rate structure should not place financial burdens on Seattle's retail customers for which they do not receive a corresponding benefit.

III.A. Cost Recovery

In accordance with the foregoing principles, Seattle shall develop wheeling rates for the Northwest Sub-regional System as follows:

1. Annual Costs of the Northwest Sub-regional System. These annual costs pertain to those assets listed in Exhibit A and include both capital and operation and maintenance costs.
 - a. Operations and maintenance. For purposes of calculating a wheeling rate, operations and maintenance costs are limited to (i) the cost of power used at the pumping stations listed in Exhibit A and (ii) the proportionate share of costs for extraordinary maintenance or repairs, as determined by Seattle, on any asset in Exhibit A in accordance with the Northwest Sub-regional System Allocation for that asset.
 - b. Capital. Total asset costs shall be calculated using the utility basis. Under the utility basis, the cost for an asset in any year shall be the sum of 1) the annual depreciation expense recorded for that asset, and 2) the product of the net book value of that asset and the rate of return on investment, which shall be 1.5% plus Seattle's average cost of debt as defined in the Wholesale Water Supply Contract.
 - i. Asset Accounts. An asset account shall be established and maintained for each asset listed in Exhibit A. Within that account, Seattle shall record the original cost of the asset plus betterments and less retirements.
 - ii. Depreciation. Assets shall be depreciated according to Standard Water System Asset Lives and a record of life-to-date depreciation shall be maintained for each asset. For future assets, no depreciation shall be recorded in the first calendar year of operation of that asset. A full year's depreciation shall be recorded in every subsequent year.

- iii. Net Book Value. The net book value of each asset shall be its original cost plus betterments and less retirements, as recorded in its asset account, less life-to-date depreciation.
 - iv. Capacity. Costs associated with increasing capacity of or adding new assets to the Northwest Sub-regional System over and above that necessary to provide the level of service outlined in Section II.C.1 shall be borne by the party(ies) creating the need for or requesting the expansion or addition. Seattle shall modify Exhibit A as necessary to reflect any changes in the list of assets or the Northwest Sub-regional System Allocation, which will replace the existing Exhibit A and become incorporated into the Agreement upon written notice to Utility. If Utility has not created the need for or requested the expansion or addition of assets to the Northwest Sub-regional System, over and above the level of service outlined in Section II.C.1, Utility shall not be obligated to share in the costs of the expanded or added assets.
2. Wheeling Rate. The wheeling rate is calculated by dividing the allocated annual costs for the Northwest Sub-regional System pursuant to the Northwest Sub-regional System Allocation by the total amount of water delivered to Seattle's retail and wholesale customers through the Northwest Sub-regional System. The total amount of water delivered will be calculated as an average of the three most recent years. The wheeling rate as of the effective date of this Agreement is \$0.02 per hundred cubic feet. Subsequent rates shall be established pursuant to Section III.C.

III.B. Billing

- 1. Determination of Bill. The wheeling rate will be applied to the quantity of water measured at the Utility's Points of Delivery in Exhibit C. Charges for the metered amount of water will be billed pursuant to the Wholesale Water Supply Contract.
- 2. Payment. Seattle shall bill the Utility on a monthly basis for all charges due under this Agreement. The Utility shall pay such charges within 30 days of the billing date. Seattle, at its option, may add these charges to billings sent to the Utility in association with the purchase of water from the Wholesale Water Supply Contract.
- 3. Penalties for Late Payment. All late payments or monies owed shall accrue interest at 1% per month.

III.C. Rate Adjustments

- 1. Comprehensive Rate Review. Every five years, Seattle shall conduct a comprehensive review of the wheeling rate, including consideration of updates to Exhibit A, if any, pursuant to Section II.D.4. The next comprehensive rate review is scheduled for 2013. Any changes to the rate will become effective upon written notice to the Utility.

2. **Interim Rate Review.** Within the five-year review periods above, but no more frequently than annually, any utility using the Northwest Sub-regional System may request, in writing, a review of the wheeling rate. Seattle shall conduct the review in accordance with this Agreement. The comprehensive rate review under Section III.C.1 above shall remain on schedule, even if a review is conducted under this section.
3. In the event that during either a comprehensive or interim rate review, it is determined that annual costs related to that portion of the Fremont Avenue N feeder north of the Richmond Highlands Tanks (see Exhibit A, pipeline #3) or the N 205th Street feeder (see Exhibit A, pipeline #4), or both, cause an increase in the wheeling rate, Seattle will relieve Utility of the increased wheeling rate to the extent it is caused by costs related to the Northwest Sub-regional System assets described in this section.

SECTION IV. ADMINISTRATION

IV.A. Severability

If any provision of this Agreement or its application is held by a court of competent jurisdiction to be illegal, invalid, or void, the validity of the remaining provisions of this Agreement or its application to other entities, or circumstances shall not be affected. The remaining provisions shall continue in full force and effect, and the rights and obligations of the parties shall be construed and enforced as if the Agreement did not contain the particular invalid provision; provided, however, if the invalid provision or its application is found by a court of competent jurisdiction to be substantive and to render performance of the remaining provisions unworkable and non-feasible, is found to seriously affect the consideration and is inseparably connected to the remainder of the Agreement, the entire Agreement shall be null and void.

IV.B. Consent

Whenever it is provided in this Agreement that the prior written consent or approval of either party is required as a condition precedent to any actions, in each such instance said consent or approval shall not be unreasonably withheld, and in each such instance where prior consent is sought, failure of the party to respond in writing within 90 days of the request shall be deemed as that party's consent or approval unless expressly stated herein. This provision does not apply to requests for amendments of this Agreement.

IV.C. Emergency Situations

Nothing in this Agreement shall be deemed to require service under this Agreement nor to preclude either party from taking necessary action to maintain or restore Wheeling services and water supply in emergency situations and such actions shall not be deemed a violation of this Agreement.

IV.D. No Joint Venture - Individual Liability

This is not an agreement of joint venture or partnership, and no provision of this Agreement shall be construed so as to make the Utility individually or collectively a partner or joint venture with any other wholesale customer or with Seattle. Neither party is an agent of the other. Neither Seattle nor the Utility shall be liable for the acts of the other in any representative capacity whatsoever.

IV.E. Complete Agreement

This Agreement for Wheeling water represents the entire agreement between the parties hereto concerning the subject matter hereof. This Agreement may not be amended except as provided herein.

IV.F. Venue, Jurisdiction and Specific Performance

In the event of litigation between the parties, venue and jurisdiction shall lie with the King County Superior Court of the State of Washington, at Seattle. The parties shall be entitled to specific performance of the terms hereof.

IV.G. Default

In the event of default of any provision of the Agreement, the non-defaulting party shall issue written notice to the other party setting forth the nature of the default. If the default is for a monetary payment due hereunder, the defaulting party shall have thirty (30) days to cure the default. In the event of other defaults, the defaulting party shall use its best efforts to cure the default within ninety (90) days. If such default cannot be reasonably cured within such ninety (90) day period, the defaulting party shall, upon written request prior to the expiration of the ninety (90) day period be granted an additional sixty (60) days to cure the default.

IV.H. Force Majeure

The time periods for the parties' performance under any provisions of this Agreement shall be extended for a reasonable period of time during which a party's performance is prevented, in good faith, due to fire, flood, earthquake, lockouts, strikes, embargoes, acts of God, war and civil disobedience. If this provision is invoked, the parties agree to immediately take all reasonable steps to alleviate, cure, minimize or avoid the cause preventing such performance, at their sole expense.

IV.I. No Third Party Beneficiaries

This Agreement does not create, and shall not be construed to create, any rights enforceable by any person that is not a party to this Agreement.

IV.J. Successors

This Agreement shall inure to the benefit of and be binding upon the parties and their successors and assigns.

IV.K. Exhibits

Exhibits A through C are attached hereto and are hereby incorporated by reference as if set forth in full herein.

IN WITNESS WHEREOF, the parties hereby execute this Agreement.

NORTH CITY WATER DISTRICT

BY: Sam F. Rieke
TITLE: Pres
DATE 1-05-2016

THE CITY OF SEATTLE

BY: Ray Webb
Director, Seattle Public Utilities
DATE: 1/14/16

LIST OF EXHIBITS

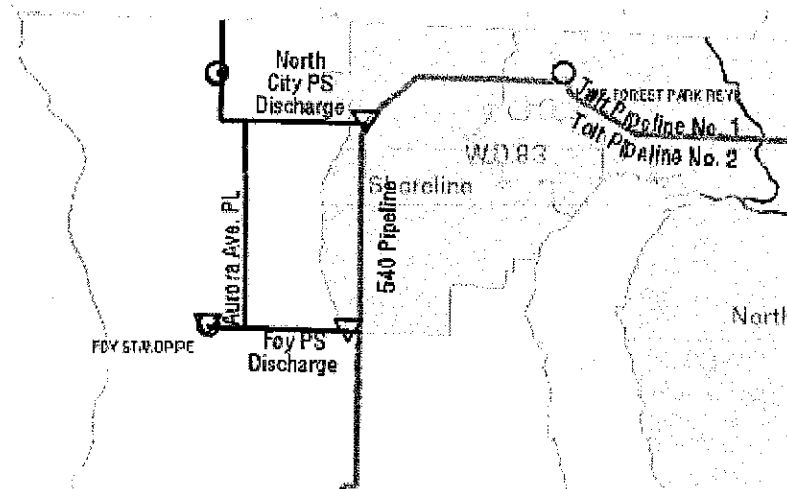
- Exhibit A** Northwest Sub-regional System List of Assets and Allocation
- Exhibit B** Northwest Sub-regional System Map
- Exhibit C** Points of Delivery

EXHIBIT A**NORTHWEST SUB-REGIONAL LIST OF ASSETS AND ALLOCATION**

PIPELINES	NW Sub-regional System Allocation
1. The N. 185 th Street feeder, from North City Pump Station to Aurora Avenue N, 30-inch steel pipeline, 24-inch steel pipeline across I-5.	70%
2. The N. 185 th Street feeder, from Aurora Avenue N to Fremont Avenue N, 20-inch steel pipeline.	70%
3. The Fremont Avenue N feeder, from N. 185 th Street to N 205 th Street, 20-inch steel pipeline. ¹	58%
4. The N. 205 th Street feeder, from Fremont Avenue N to Olympic View services, 12-inch ductile iron pipeline. ²	24%
5. The Aurora Avenue N feeder, from N. 185 th Street to N 145 th Street, 24-inch steel pipeline	64%
6. The N/NE 145 th Street feeder, from Foy Pump Station to Foy Standpipe connections near Dayton Avenue N, 24-inch steel pipeline.	65%
7. Foy Pump Station suction line in NE 145 th Street from Foy Pump Station to 8 th Avenue NE, including connections to the 550 pipeline and to the 430 zone.	65%
PUMP STATIONS	
1. North City Pump Station, including the suction line from the pump station to the 66-inch pipeline, and the pump station bypass from the 66-inch pipeline to the pump station discharge.	100%
2. Foy Pump Station, including the 12-inch bypass between the suction and discharge lines.	100%
TANKS	
1. Richmond Highlands Tanks, and all associated appurtenances and connections to the 590 zone.	19.0%
2. Foy Standpipe, including its connections to the N. 145 th Street feeder, altitude valve, overflow, and drain.	0.0%

¹ Seattle and Utility agree that the segment of the Fremont Avenue N feeder north of the Richmond Highland Tanks is not currently providing benefit or used for wheeling water to Utility, but has no impact on the current wheeling rate under this Agreement. See Section III.C.3 for any future adjustments.

² Seattle and Utility agree that the N 205th Street feeder is not currently providing benefit or used for wheeling water to Utility, but has no impact on the current wheeling rate under this Agreement. See Section III.C.3 for any future adjustments.

EXHIBIT B**NORTHWEST SUB-REGIONAL SYSTEM MAP**

The Pump Station shown near the Foy Standpipe is not a NW Sub-regional asset

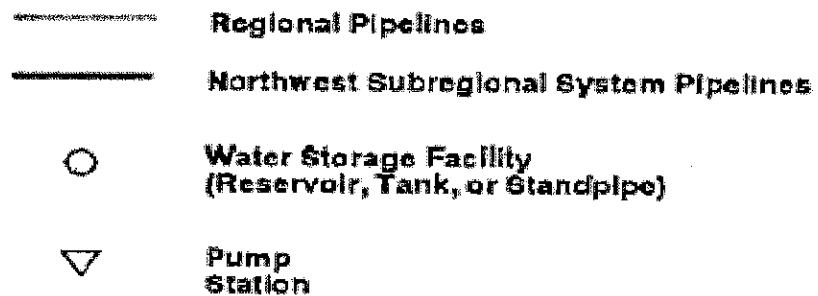


EXHIBIT C

POINTS OF DELIVERY

LOCATION	STATION NUMBER (1)	PIPELINE SEGMENT NUMBER (1)	SIZE OF METER (IN.)	MINIMUM HYDRAULIC GRADIENT FOR PLANNING PURPOSES AT STATION UPSTREAM OF METER (FEET NAVD-88 Datum)	MAXIMUM FLOW RATE UP TO WHICH THE MINIMUM HYDRAULIC GRADIENT APPLIES (gpm) (2)
NE 185 th and 5 th Avenue N	193	7	8	565	500
NE 185 th and 8 th Ave NE	194	7	8	565	Back up to Sta. 193
				TOTAL:	500

Notes:

- (1) Station and Pipeline Segment Numbers pertain to cost allocations and the demand metering program.
 (2) City of Seattle's estimate of Utility's average daily demand for 2020 with a peaking factor of 2.0 for peak day use.



Letter of Transmittal

Attachment A

1519 NE 177th St. Shoreline, WA. 98155
Office (206)362-8100 Fax (206)361-0629

To: Seattle Public Utilities

Date: 1-6-2016

PO Box 34018

Project No.:

Seattle, WA 98124-4018

Project Title:

Attn: Sheila Strehle

Subject: Wheeling Agreement with NCWD

The Following Items:



REQUESTED

Sent Via:



US MAIL



ENCLOSED



EMAIL



FOR YOUR FILE



HAND DELIVERY



FOR YOUR USE

____ TOTAL PAGES TRANSMITTED
INCLUDING COVER SHEET



OTHER

Copies:	Description:
2	Originals of the updated signed Wheeling Agreement

Remarks:

Sheila-

Attached please find two original signed copies of the wheeling agreement with North City Water District. Thanks for helping complete this process.

Diane

Signed:

CC:

**SHORELINE WATER DISTRICT
RESOLUTION 2010.12.47**

ORIGINAL

**A RESOLUTION APPROVING THE MEMORANDUM OF AGREEMENT REGARDING AN
INTERTIE CONNECTION TO A SEATTLE PUBLIC UTILITY SUPPLY LINE FOR THE
SHORELINE WATER DISTRICT.**

Background

1. King County METRO is constructing the Brightwater Treatment Plant and associated conveyance facilities including tunnels to be constructed under portions of the Seattle Public Utilities Tolt Supply Pipeline within the District boundaries.
2. The District receives water from Seattle Public Utilities through five connections along the Tolt Transmission Main in north King County. The Brightwater transmission line will be located under SPU's Tolt Transmission Main. Failure of a Brightwater tunnel could damage the Tolt Supply Pipeline and cause a complete loss of water supply to the District.
3. The District has proposed a connection to the SPU supply line from the Seattle Cedar River Source which the District could use as an emergency source of water for an extended period. The District has requested and County has agreed to pay certain costs associated with constructing the connection.
4. The District and King County have negotiated a Memorandum of Agreement regarding construction of an additional Intertie Connection to Seattle Public Utility Supply Line connected to the Cedar River source as an alternative source of supply. District staff recommends approval of the Memorandum of Agreement.

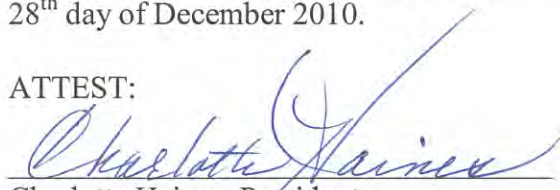
Action

IT IS RESOLVED THAT:

5. The enclosed Memorandum of Agreement regarding an Intertie Connection to Seattle Public Utility Supply Line for the Shoreline Water District is hereby approved.

ADOPTED by the Board of Commissioners of Shoreline Water District at a public meeting this 28th day of December 2010.


ATTEST:


Charlotte Haines, President


Ronald Ricker, Vice President

Approved as to Form:

Andrew Maron, District Attorney


Larry Schoonmaker, Secretary

COPY

MEMORANDUM OF AGREEMENT
Regarding an Intertie Connection to a Seattle Public Utility
Supply Line for the Shoreline Water District

This MEMORANDUM OF AGREEMENT ("Agreement") is made by and between the Shoreline Water District ("District") and King County ("County"), both of which are located in and existing under the laws of the State of Washington, (collectively the "Parties") as of the 28th day of December 2010.

I. RECITALS

WHEREAS:

The County is constructing the Brightwater Treatment Plant and associated conveyance lines;

The District receives water from Seattle Public Utilities (SPU) through five connections along the Tolt Transmission Main in north King County;

A failure of SPU's transmission main could result in all five District connections losing their source of water and the District not having enough storage to supply its customers over a long period;

The alignment for that portion of the Brightwater conveyance known as BT3 will travel underneath SPU's 550 transmission line that supplies water to the District;

The District has proposed an emergency connection ("Connection") to the SPU supply line which the District could use as an emergency source of water for an extended period;

The District has requested and County has agreed to pay certain costs associated with the Connection;

NOW, THEREFORE, the District and County agree as follows:

II. PURPOSE

The purpose of this Agreement is to set forth the mutual obligation and rights of the District and County for completion of the Connection to SPU's 550 transmission line that the District could use as an emergency source of water for an extended period.

III. DISTRICT RESPONSIBILITIES

- A. District (or its contractor) shall construct the Connection, a 45-foot long pipe and valve emergency connection across N.E. 185th Street to SPU's North City Pump Station in the City of Shoreline.

- B. District shall apply for and obtain any permits or approvals from all applicable government bodies, necessary for the construction of the Connection.
- C. District shall be responsible for any direct costs associated with the construction of the Connection which exceed the \$30,000 total the County has agreed to reimburse the District (or its contractor) for those costs.
- D. District shall be responsible for any remaining costs of the final asphalt overlay that exceed the \$10,000 total the County has agreed to pay.

IV. COUNTY RESPONSIBILITIES

- A. County agrees to reimburse the District (or directly to its contractor on behalf of the District) an amount not-to-exceed \$30,000 total for direct costs, including staff labor, construction management, construction engineering services, and permitting, associated with the construction of the Connection.
- B. County or its contractor shall install a final asphalt overlay after construction of the Connection is complete.
- C. County shall pay the cost of the final asphalt overlay up to \$10,000.

V. INDEMNIFICATION

To the fullest extent permitted by law, the District releases and shall indemnify, hold harmless and defend County, its officials, representatives, employees and agents from and against any and all claims, losses, demands, attorneys fees, litigation costs, causes of action, lawsuits, obligations, liabilities, judgments, awards and/or damages of any kind or nature resulting from, relating to or arising directly or indirectly out of, on account of, or in connection with the District's or its contractor's construction of the Connection, whether arising before, during or after construction and whether suffered by District, its officials, employees and/or agents, County or any other person or entity; except that the District shall not so indemnify, hold harmless and defend for issues relating to or arising out of County's responsibilities set forth in Section IV of this Agreement.

VI. TERMINATION

This Agreement shall terminate upon fulfillment of the obligations of the Parties to each other.

VII. DISPUTES

If a dispute arises between the District and the County, the Parties agree that they will attempt to resolve the issues through mutual negotiation. In the event the Parties are not able to reach an agreement through such negotiation, the Parties agree to engage in mediation in order to resolve the dispute. Mediation may be requested by either party, and shall be attempted prior to the institution of any lawsuit arising under this Agreement. The Parties agree to share the costs of mediation equally. Both Parties hereby agree and consent to the exclusive jurisdiction of the courts of the State of Washington and that the venue of any action brought hereunder shall be Seattle, Washington.

VIII. CHANGES AND MODIFICATIONS

Either party may request changes, amendments, or additions to any portion of this Agreement; however, except as otherwise provided in this Agreement, no such change, amendment, or addition to any portion of this Agreement shall be valid or binding upon either party unless it is in writing and signed by personnel authorized to bind each of the Parties. All amendments shall be made part of this Agreement.

IX. ENTIRE AGREEMENT

These provisions represent the entire agreement of the parties and may not be modified or amended except as provided herein. Any understanding, whether oral or written, which is not incorporated herein is expressly excluded.

X. AUTHORITY

The individuals signing this Agreement as the Shoreline Water District (District) represent and warrant that they have the authority to enter into this Agreement on behalf of the District and to bind the District to the terms and conditions contained herein.

The individual signing this Agreement on behalf of the COUNTY represents and warrants that he or she has the authority to enter into this Agreement on behalf of the COUNTY and to bind the COUNTY to the terms and conditions contained herein.

IN WITNESS WHEREOF, the Parties hereto have executed this Agreement as of the day and year first written above.

KING COUNTY

By: _____

TITLE Director, KC DNRP

DATE 1/20/2011

SHORELINE WATER DISTRICT

By: _____

TITLE District Manager

DATE 12/28/2010

TECHNICAL MEMORANDUM

DATE: February 10, 2011

TO: Stuart E. Turner, P.E., General Manager
Denny Clouse, Operations Manager
Shoreline Water District
Shoreline, WA

FROM: Chris H. Uber, P.E.
Marshall Meyer, P.E.
Jeff Kostechka, EIT
Murray, Smith & Associates, Inc.

PROJECT: Supply Station No. 4

RE: Preliminary Engineering Design and
Opinion of Probable Construction Costs

Introduction and Purpose

The Shoreline Water District (District) authorized Murray, Smith & Associates, Inc. (MSA) to complete the design of the planned Supply Station No. 4 (SS4) and related water main improvements along 5th Avenue NE in Shoreline, Washington. The purpose of this technical memorandum is to document the work performed to date, identify the design criteria, record MSA's project preliminary findings and offer recommendations related to the proposed water system improvements.

This technical memorandum is also intended to assist the District with securing necessary permits and approvals from the Washington State, Department of Health, Division of Environmental Health, and Office of Drinking Water (DOH). To facilitate review and approval by DOH, this memorandum is organized according to the suggested Project Report Contents as outlined in Chapter 2.2 of DOH's Water System Design Manual, dated December 2009.

Project Background and Description

The Shoreline Water District proposes to construct a new municipal water supply station, which is referred to as either “planned supply station” or “Supply Station 4” (SS4). This planned supply station will be located near the intersection of NE 185th Street and 5th Avenue NE in Shoreline, Washington. The project also includes a new water main, which will extend northward along 5th Avenue NE from SS4 to the District’s existing water main. A brief description of the project’s major elements is as follows:

Project Description

Seattle Public Utilities (SPU) plans to complete an existing 8-inch diameter connection from its existing 30-inch diameter water main. This connection is located at the intersection of NE 185th Street and 5th Avenue NE and currently consists of an 8-inch diameter tap, isolation valve and capped pipe. SPU will be responsible for the installation of all necessary meters, valves, and other equipment to effectively control, monitor and safeguard existing SPU facilities and supply municipal water to the District within an existing SPU vault.

The District plans to construct a new supply station facility consisting generally of a below-grade concrete utility vault, control valves, isolation valves, flow meter, electrical equipment, telemetry equipment, and other appurtenances necessary to control, monitor, and safeguard the existing District facilities.

The District will also construct approximately 450 feet of new 12-inch diameter ductile iron water main connecting the proposed supply station to the District’s existing water main along 5th Avenue NE.

Planning

Prior to planning and designing SS4, the MSA design team consulted the District’s current Comprehensive Water System Plan and had conversations with District staff to gather information on the existing system operation. This information allowed the MSA design team to gain an understanding of existing system operations and to better plan SS4. A brief planning overview discussion is presented as follows:

Water System Planning

The District’s Comprehensive Water System Plan provides specific information on water system demands, water use characteristics, and water distribution system relating to the proposed facilities. The District currently operates and maintains five existing supply stations. Supply stations SS1 and SS3 currently operate in either a flow or pressure mode, and supply water to the District’s 492 Zone. In 2009, supply station SS2 was constructed and is operated in 3 modes: pressure mode, constant pressure mode, and flow mode for supplying water to the District’s 424 Zone. These supply stations provide water to the District through control valves.

In addition, the District owns and operates two booster stations which pump water from SPU. These stations supply water to the District's 590 Zone and maintain a static water level and resulting system pressure within the District's 3.7 MG 590 Zone Water Tank referred to as 590WT from SPU's transmission mains. Under normal operating conditions, the 590WT operates no lower than 60 feet in depth and fills to a tank depth of 88 feet. The tank's overflow height is 98 feet at the tank. The estimated ground elevation is approximately 490 feet at 590WT. Water is pumped from the 590WT to the District's 660 Zone. A pressure sustaining valve is also used by the District to regulate and maintain water pressures in both its 590 and 660 Zones. These system characteristics are represented in the Hydraulic Profile, included as Figure 3-1 in Appendix E.

The District's current draft Comprehensive Water System Plan (Shoreline Water District, January 2007) was used to determine the design flow rate for SS4 and the planned water main along 5th Avenue NE. The proposed SS4 will also provide water to the District's 590 Zone from SPU and will serve as the new primary source for the 590WT depending on the water levels within this tank and the system's demands. The 590 Zone is currently served by SPU through the District's BS1 and BS2 supply connections. Overall, SS4 will improve system reliability and offer redundancy for portions of the District's water distribution system, specifically the 590 Zone, west of Interstate 5 and in other areas. SS4 is not anticipated to increase supply capacity to the District, but rather to improve supply redundancy, flexibility and efficiency.

Analysis of Alternatives

During the pre-project planning stages, the District considered several alternatives to increase flow and pressures within the immediate vicinity of the planned supply station. The following alternatives were considered during the pre-project planning phase:

No-Action Alternative

The District would continue to serve the areas located west of Interstate 5 at reduced pressures and decreased flow capacity during normal and emergency conditions. This alternative would not offer redundancy or increased reliability within the District's 590 Zone.

Alternatives

The following actions or alternatives were considered:

New Source or Storage Development

The development of new groundwater or surface water sources, or increasing volume storage was considered by the District. These alternatives were determined to be non viable by the District due to significant permitting complexities and financial considerations.

New Intertie with Seattle Public Utilities (Preferred Alternative)

The District has an existing water supply agreement with SPU for furnishing municipal water from the SPU water system. Currently, the District receives water from 5 supply connections throughout the District. This agreement is currently being modified to allow the District to also take water from an existing 30-inch diameter SPU water main located at the intersection of NE 185th Street and 5th Avenue NE. The agreement states that the District may use up to 2,830 gallons per minute (gpm) of SPU water throughout the District. The existing connection to SPU's 30-inch diameter water main consists of a short run of 8-inch diameter water main capped inside a below grade SPU vault. The District's new water main would connect to the existing 8-inch diameter SPU water main and continue through SS4 where the water main transitions to a 12-inch diameter main before connecting to the District's existing system. The agreement is consistent with overall goals, objectives and other criterion established in both the District's current Comprehensive Water System Plan and SPU's plans to supply municipal water to other water system purveyors, and elements of the applicable Coordinated Water System Plan.

The recommended improvements intended to satisfy the agreement include: the completion of an existing connection with SPU's water supply system; the construction of a dedicated water main from SPU's 30-inch diameter water main connection to the District's existing water main along 5th Avenue NE; and the construction of a supply station consisting of an underground precast concrete vault, flow meter, control valves, isolation valves and other appurtenances. The major elements of the project are further described as:

Existing SPU Point of Connection - The District intends to use an existing 8-inch diameter connection with SPU's 30-inch diameter water main along NE 185th Street. An existing underground vault was installed by SPU. SPU anticipates installing underground metering equipment, piping, valves and backflow control devices as necessary to put this connection to full and beneficial use serving the District, and safeguard SPU's water system. The existing vault and equipment installed by SPU will be owned, operated and maintained by SPU following construction.

Supply Station 4 (SS4) - The District will construct an underground vault, in which metering equipment, control valves, and other appurtenances will be installed to monitor and control water supplied by SPU. This new vault will be owned, operated and maintained by the District, and will remain independent of the vault owned, operated and maintained by SPU.

The planned supply station will be located at the intersection of NE 185th Street and 5th Avenue NE in Shoreline, Washington, and within the existing City of Shoreline right-of-way. The selected location for SS4 is based on the close proximity of District and SPU facilities and the ability to install the concrete vault structure and maintain access during construction and future operation and maintenance activities.

The size of the planned supply station will be approximately 20 feet long by 10 feet wide and 7 feet in depth. Within the planned supply station, the District will install a 3-inch diameter control valve and piping for low flows, and an 8-inch diameter control valve and pipe for higher flows. A new flow meter will be installed within SS4 to monitor and record flows from SPU.

The preferred location of the planned supply station allows for adequate room during and after construction. Although SS4 is planned to be located inside the City of Shoreline's right-of-way, the vault and water main will be in the shoulder along 5th Avenue NE, so traffic disruptions are anticipated to be minimal.

New District Water Main - The District intends to connect to the 8-inch diameter water main exiting from the existing SPU vault, and install a new 8-inch diameter ductile iron water main to and through SS4. The water main will increase in size to 12-inch diameter immediately upon exiting SS4. The new 12-inch diameter water main will extend to a point of connection with the District's existing 10-inch diameter water main, which is located approximately 450 feet north along 5th Avenue NE.

Other design elements considered during the planning and engineering phases of the planned supply station include:

- The District desires to maintain and use the existing SPU connection and vault to the greatest extent possible.
- The District and City desire to locate the new vault structure within the public right of way and outside of the paved travel lanes.
- The District and City desire to provide safe access during construction and for routine operation and maintenance activities once work is complete.

Estimated Costs of the Preferred Alternative

The anticipated construction costs for the preferred alternative may range from approximately \$430,000 to \$470,000, exclusive of SPU's improvements. The range of costs presented are opinions of probable construction costs only, acknowledging that final costs of the project will vary depending on actual labor and material costs, market conditions for construction, and other factors beyond control of the District, MSA and its subconsultants. The cost opinions are preliminary, and are based on the level and detail of planning presented in this memorandum. Updated opinions of probable construction costs will be provided as part of the 60%, 99% and "Bid Ready" completion submittals.

A tabulated summary of the probable construction costs is presented in Appendix B.

Anticipated Project Schedule

The anticipated project schedule is summarized in Table 1. This schedule is a guideline for the District's use in planning and budgeting. The duration of permitting activity is difficult to predict at this time and may vary from that shown.

Table 1
Project Schedule Summary

Activity	Date
Authorization to Proceed	November 9, 2010
Preliminary Engineering Complete	January 2011
Project Permitting Begins	January 2011
60% Engineering Complete	February 2011
99% Engineering Complete	March 2011
"Bid Ready" Deliverables Complete	April 2011
Permits and Approvals Complete	May 2011
Bidding Complete and Award	June 2011
Construction Complete	September 2011

Water Quality

The existing agreement between SPU and the District requires SPU to furnish water which meets or exceeds all state and federal water quality requirements to the District for its intended use as municipal water. For system reliability and redundancy, the District will include sufficient space for the installation of chlorine injection equipment, if such equipment is required in the future. The District will also install a chlorine residual analyzer in SS4 to monitor chlorine concentration entering the District's system.

Water Quantity and Water Rights

The agreement with SPU for SS4 does not increase the total amount of supply available to the District, but provides the District with an additional connection into the SPU system. Additional information in regard to water quantity and water rights available to the District can be found in the District's Comprehensive Water System Plan.

Engineering Calculations

To identify an estimated range of flows anticipated for the planned supply station, a hydraulic calculation worksheet was prepared based on the estimated static pressure elevations or hydraulic grade line (HGL) of the planned connections, and the estimated friction and minor losses associated with planned pipes, fittings, valves, and other equipment planned within both the SPU and District supply station vaults.

An estimated HGL was determined based on pressures observed within SPU water main by the District under normal operations, and pressures observed in the District's 590 Zone. For the SPU system, an operating pressure of approximately 65 psi was observed by the District on two separate occasions using a pressure gauge mounted on an existing SPU hydrant located just north of the intersection of 3rd Avenue NE and NE185th Street. The ground elevation of the SPU hydrant was determined to be approximately 433 feet. These pressure readings indicate the HGL for the SPU system is estimated to be approximately 585 feet at the planned point of connection.

Based on the overflow elevation of the reservoir serving the 590 Zone, the maximum operating pressure on the District's side of the point of connection with SPU may be as high as 75 psi. The District mounted a pressure gauge on the existing hydrant nearest to the planned point of connection and observed a pressure of approximately 73 psi under normal operating conditions confirming the operating pressure. The District's HGL is estimated to be approximately 577 feet, 8 feet lower than the SPU HGL, at the planned point of connection based on the measured pressure values and an approximate ground elevation of 416 feet. The District's water system pressure map may be found in Appendix C.

Pipe friction losses for varying pipe sizes and material were estimated using the Hazen-Williams formula. The total friction loss was found in pipes starting at the SPU connection and reaching as far as the point of connection with the District's 590 Zone on 5th Avenue NE. Finally, the anticipated minor losses were determined based on the planned number, type and diameter of planned valves, fittings, and other equipment within the SPU vault and District's planned supply station.

Table 2 summarizes the approximate HGL based on the varying flows for the 8-inch diameter control valve and piping at the location of the District's planned supply station.

Table 2
Summary of Anticipated Operating Conditions

Flow (gpm)	Approximate HGL (ft)
0	585
600	581
1,200	567
1,800	546
2,400	515
2,800	490

See Appendix D for the engineering calculation worksheet summarizing the anticipated operating conditions of the 3-inch and 8-inch diameter control valves and piping at the location of the District's planned supply station.

Flow rates are anticipated to be reduced if SS4 will be operating in parallel with BS1 and BS2. To improve the efficiency of SS4, it will typically operate only when BS1 and BS2 are not operating. The typical operation of these 590 Zone supply facilities will be that SS4 is opened at a setpoint on the 590WT to supply the zone and begin filling the 590WT. If the water level in the 590WT drops lower than another setpoint, likely due to increased demand, BS1 and or BS2 will be called to operate and assist in filling the tank. All setpoints will be adjustable at the District headquarters and at SS4.

Hydraulic analyses were also conducted using the District's hydraulic model to analyze the system's response under the following conditions:

- 2011 Average Day Demand, 590WT nearly full, only SS4 supplying 590 Zone
- 2011 Maximum Day Demand, 590WT at low setpoint, only SS4 supplying 590 Zone
- 20-Year Projected Peak Hour Demand, only SS4 supplying 590 Zone

Design Criteria

SS4 is capable of operating at various flows that can be controlled remotely in multiple modes. The District will be able to set the mode that best fits the system at the current time and system demand and are as follows:

Water System Characteristics

SS4 will provide adequate flow to the District's 590 Zone to meet the existing operational needs, and serve as a source for filling the 590WT. The anticipated flow rate through the planned supply station may be as low as approximately 200 gpm and may increase to

approximately 2,830 gpm depending on actual pressures within the SPU water transmission main and in the District's water system in the immediate vicinity of the planned supply station connection. It is anticipated that BS1 and or BS2 will be used to fill the 590WT, as they currently do, when SS4 is not capable of adequately replenishing the tank. SS4 will not typically operate in parallel with BS1 or BS2. The design criteria for the supply rate at SS4 consider different modes for operating the supply station including:

- **Pressure Mode (PM)** – High and low setpoints will regulate when the 8-inch valve will open and close to fill the 590WT.
 - When the transmitted reservoir level is below a low level setpoint, the 8-inch diameter valve will fully open.
 - When the transmitted reservoir level is above a high level setpoint, the 8-inch diameter valve will fully close.
 - When the transmitted reservoir level is below a lower-low level setpoint, BS1 and BS2 will be called to operate in order to fill the tank in an effective manner.
- **Constant Pressure Mode (CPM)** – A desired pressure measured at the discharge side of SS4 will be regulated using a PRV. The position of the active valve will be controlled so that the discharge pressure closely matches the pressure setpoint.
 - The 3-inch diameter valve will initially be used to maintain the downstream system pressure. If the 3-inch diameter valve is fully open and the downstream site pressure is outside the deadband (e.g. 2 PSI) of the pressure setpoint for 2 minutes, the system will use the 8-inch diameter valve to maintain the pressure and close the 3-inch diameter valve.
 - The valve position will be controlled by a pressure transducer inside the vault.
 - If the 8-inch diameter valve is at its minimally open position and the downstream site pressure is outside the deadband of the pressure setpoint for 2 minutes, the system will use the 3-inch diameter valve to maintain the pressure and close the 8-inch diameter valve.
 - When the transmitted reservoir level is above a high level setpoint, the valve currently being used will fully close, and CPM will be disabled for a set amount of time (e.g. 1 hour).
- **Flow Mode (FM)** – Both valves are operated in order to maintain a constant flow setpoint (e.g. 450 GPM). The position of the active valve will be controlled so that the flow setpoint can be maintained.

- The 3-inch diameter valve will initially be used to maintain the flow. If the 3-inch diameter valve is fully open and the downstream site flow is outside the deadband (e.g. 20 GPM) of the flow setpoint for 2 minutes, the system will use the 8-inch diameter valve to maintain the flow and close the 3-inch diameter valve.
- The valve position will be controlled by a proportional–integral–derivative controller (PID) operating off of the site flow.
- If the 8-inch diameter valve is at its minimally open position and the downstream site flow is outside the deadband of the flow setpoint for 2 minutes, the system will use the 3-inch diameter valve to maintain the flow and close the 8-inch diameter valve.
- When the transmitted reservoir level is above a high level setpoint, the active valve will fully close, and FM will be disabled for a set amount of time (e.g. 1 hour). After the specified length of time, the valve will reopen again.

Operating SS4 in PM primarily will provide the District full control over the operating level of the 590WT and provide for greater flexibility with pressure zone management. This condition will allow SS4 to fill the 590WT during varying demand conditions and tank levels, and provide greater reliability during emergency operating conditions in the immediate vicinity of SS4.

Coordination with SPU

A meeting with District, SPU, City of Shoreline and MSA staff was held on October 19, 2010. The meeting's intent was to review the District's planned project, and gain better understandings of the relative work responsibilities of each organization in order to successfully complete the planned project. SPU representatives determined that the existing SPU vault and 8-inch diameter connection were sufficiently sized and in good condition. SPU will use these facilities for the installation of the necessary metering equipment, piping, valves and backflow control devices to complete the connection.

Since SPU's vault and piping are existing structures and are currently in place, the District's project can proceed independently of SPU's installation schedule. The District will not have full and beneficial use of the new supply station until SPU completes the installation of the equipment, which may occur at any time, and until the District's improvements are constructed.

Design and Construction Standards

All construction materials and equipment furnished in connection with the planned project will meet or exceed the requirements set forth by the standards as currently established by Shoreline Water District. In addition, the project's contract documents, including engineering plans, details and technical specifications, will include applicable

references to the current versions of the City of Shoreline Engineering Development Guide (City Standards), WSDOT/APWA Standards for Road, Bridge and Municipal Construction (M 41-10), and the standards and guidelines established by the Washington State Department of Health. The project documents will also comply with other applicable local, state or federal guidelines and regulations relating to the engineering and construction associated of the planned supply station and other related project elements.

Legal Considerations

The District entered into an agreement with Seattle Public Utilities on or before 10/20/2010, and the District may use up to 2,830 gpm in consideration of services provided and fees exchanged between the two water purveyors. Please refer to Appendix A for the Agreement between Seattle Public Utilities and the Shoreline Water District outlining the terms and conditions of the intertie connection.

Operational and Maintenance Considerations

SS4 will require necessary operation and maintenance. The following describes required actions by the District and others to properly maintain SS4:

District Operations and Maintenance

Operation and maintenance activities for SS4 are anticipated to be similar in nature to the activities needed for the District's existing supply stations. These activities will involve the necessary labor, materials, tools, equipment, services, and incidentals for the anticipated tasks and preventative maintenance recommended by the manufacturer of each meter, valve, control valve, equipment, and other specified appurtenance as well as other provisions established in the District's standard operating procedures.

Following completion of SS4, the contractor responsible for constructing this project will be required to furnish operation and maintenance manuals and other pertinent manufacturer data, such as the following:

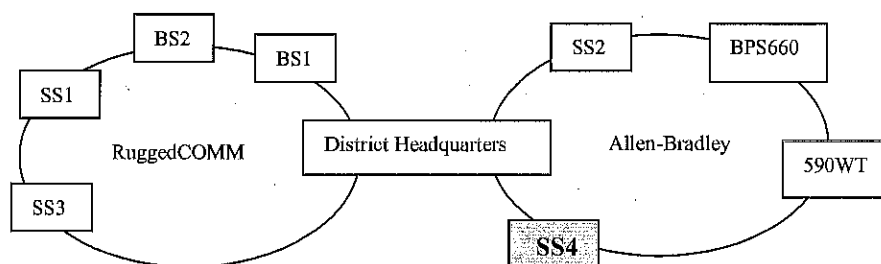
- Equipment operating and maintenance instructions.
- Parts lists, including diagrams and cut-a-way sections.
- Assembly and disassembly instructions.
- Equipment specifications and guaranteed performance data.
- Name, address and telephone of vendor and spare parts sources.
- Factory parts list with interchangeability listings of all component sources and original manufacturer's part number.
- Manufacturers' warranties.
- Recommendations for preventative maintenance.
- Step by step operating and startup procedures.

The above information will be used by the District in the development or revision of standard operating procedures relating to the planned supply station. The anticipated operation and maintenance costs of the planned supply station are expected to be similar to the cost associated with operating and maintaining other District supply stations. These costs are estimated at \$6,000 per year based on historical costs the District incurs at other supply stations.

Telemetry and SCADA Operational Considerations

The District currently has two different telemetry systems; older RuggedCOMM and newer Allen-Bradley systems. These two systems interface via a communication control center located at the District's headquarters. Figure 1 displays basic understandings of the communications within the District's supply, storage and pumping facilities which will be affected by SS4.

Figure 1
Telemetry System Ring Diagram



The District will require effective telemetry between SS4, 590WT, BS1, and BS2 for the proper operation of its 590 Zone. SS4 will receive level information for the 590WT at all times. If the level in the 590WT is high enough, SS4 will close to prevent an overflow regardless of the operating mode it is in. In pressure and constant pressure modes, BS1 and or BS2 may be called under two circumstances. First, BS1 and or BS2 may be called to fill the upper portion of 590WT not filled by the HGL provided by the SPU connection. Secondly, BS1 and or BS2 may be called to operate when the flow provided by SS4 cannot meet system demands and levels in the 590WT continue to decline.

SS4 will be planned to open and operate in a hydraulically controlled pressure reducing valve mode should a power loss occur at BS1. It is anticipated that BS2 and the planned supply station would coincidentally fail during power outages given the relative locations of each and power grid configurations. If a power outage occurs at SS4, the valves will remain open operating hydraulically in a constant pressure control mode. The hydraulic grade of the SPU supply line is understood to be low enough to prevent overflowing the 590WT. The planned telemetry improvements for SS4 will also include a local override within the supply station in the event of a communication failure with District headquarters.

Other telemetry items within the planned supply station will include:

- Siemens electromagnetic flow meter
- Pressure transducers within SS4 to measure upstream and downstream pressures
- Non-reactant chlorine residual analyzer
- Intrusion alarms
- Fire and Flood Alarms
- Electric outlets
- Telephone and communication services

Summary

This memo summarizes key design issues, outlines alternatives and highlights preliminary design criteria used for the District's planned supply station and presents a range of probable construction costs of the preferred alternative. Design related items presented in this memorandum are incorporated into the preliminary design of the District's planned supply station and related improvements. This new supply station will establish an additional connection to the SPU supply system and improve the operating parameters of the District's 590 Zone.

Following the District's review and approval of the design concepts and issues presented in this memorandum, final design of the proposed supply station and related improvements will proceed. It is anticipated that additional District input and guidance will be incorporated into the project's final designs.

Appendices

- A - Inter-Agency Agreement between Seattle Public Utilities and the Shoreline Water District, and dated ~~XX/XX/20XX~~
- B - Preliminary Opinion of Probable Total Construction Costs for Preferred Alternative
- C - District's water system pressure map
- D - Engineering Calculations
- E - Hydraulic Profile, Figure 3-1 from Shoreline Water District's 2007 Comprehensive Water System Plan
- F - Preliminary Engineering Plans – 25% Complete
- G - Preliminary Contract Documents and Technical Specifications – 25% Complete



1519 NE 177th St. • P.O. Box 55367 • Shoreline, WA 98155 • Phone: 206.362.8100 • Fax: 206.361.0629

Commissioners:*Larry Schoonmaker**Charlotte Haines**Ron Ricker***District Manager:***Diane Pottinger, P.E.*

April 16, 2013

Paige Igoe, PE
Regional Engineer
Washington State Department of Health
Office of Drinking Water – Northwest Regional Office (NWRO)
20425 72nd Ave S, Suite 310
Kent, WA 98032

RE: Supply Station No. 4 Project

Dear Paige:

Attached please find a February 2011 draft of the Technical Memorandum regarding Shoreline Water District's Supply Station 4 project. In review of communication between the District and its consultant, it appears that this memorandum was never finalized because the discussions with Seattle Public Utilities (SPU) were not moving. SPU staff was in agreement (see email dated July 7, 2010 from SPU to Shoreline Water District), but the official changes to the District's 60 year supply contract were not completed until 2013.

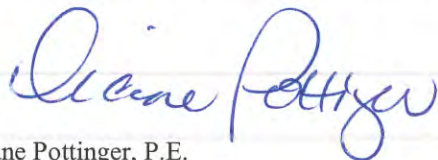
Given that SPU had agreed to allow the District to reconnect Shoreline Water District's system to the SPU Tolt Transmission Main, Shoreline Water District completed the project design and construction without submitting the memorandum to the Department of Health. It appears that because the approved 2007 Comprehensive Water System Plan included this project and many other projects, the former District management team was under the impression the project was approved and did not need to have the Department of Health's approval prior to completing design and commencing construction.

The new Shoreline Water District Management Team understands the need for the Department of Health to review ALL projects except the distribution projects, when the District has an approved variance. The District is now transmitting the draft Technical Memorandum, dated February 10, 2011, to the Department of Health. It did not have Appendix A as part of this memorandum but we have included a copy of the updated Exhibit II of our 60 year contract with SPU. Also, Appendix G is available via email but we did not print out the draft specifications.

We have included a *.pdf file in the same email, of the project drawings that went out to bid, updating those drawings that are included in Appendix F.

The project has been completed and we have a draft of the asbuilts available if you would like to review them. We anticipate the final asbuilts in the next few weeks as they are currently being updated by our consultant.

We look forward to your comments on this project.

A handwritten signature in blue ink, appearing to read "Diane Pottinger". The signature is fluid and cursive, with the first name "Diane" written in a larger, more prominent script than the last name "Pottinger".

Diane Pottinger, P.E.
District Manager

Cc: Chris Uber, PE, Murray, Smith & Associates, Inc.

Attachments

From: Mantchev, Eugene [<mailto:Eugene.Mantchev@seattle.gov>]
Sent: Wednesday, July 07, 2010 4:11 PM
To: Denny Clouse
Cc: Gregg, Terri
Subject: New whole sale service to Shoreline WD at NE 185th ST & I-5

Hi, Denny,

As we discussed last week at the OB meeting, I am sending you this email to confirm that SPU will work with the District to install a new whole sale service at NE 185th ST just West of I-5. In your letter dated Amy 24, 2010 the District agrees to reimburse SPU for its costs in supporting the District's project. I will set up a charge number to track the costs, and you will get a quarterly bill. If you have questions about the bill I'd be your point of contact.

In your letter you ask for a 10-inch meter. Let's discuss meter size in the context of necessary flow rates.

What is your desired on line date for the new service?

Seems like the next step would be to compile the as-builds for the SPU pipeline. I'll get that going, and will wait to hear form BHC.

Thanks!

Eugene V. Mantchev, P.E.
206-684-0335



City of Seattle
Seattle Public Utilities

March 13, 2013

Diane Pottinger, District Manager
Shoreline Water District
P.O. Box 55367
Seattle, WA 98155

Re: Modification to Exhibit II of Wholesale Water Supply Contract:

Dear Ms. Pottinger: *Diane*

Attached is the revision to Exhibit II of the Full Requirements Contract for the Supply of Water to Shoreline Water District. The revision reflects the additions of Stations 191, 193 and 194. Stations 193 and 194 are also listed in Exhibit C of your Wheeling Water Agreement.

Please sign the two letters in the space below, keep one for your files and return the other signed letter to me to indicate you acknowledge and accept the new version Exhibit II.

Thank you and if you have any questions, please contact me at (206) 684-7975.

Sincerely,

Terri Gregg
Wholesale Contracts Manager

Diane Pottinger, District Manager
Shoreline Water District

Ray Hoffman, Director
Seattle Public Utilities
700 5th Avenue, Suite 4900
PO Box 34018
Seattle, WA 98124-4018

Tel (206) 684-5851
Fax (206) 684-4631
TDD (206) 233-7241
ray.hoffman@seattle.gov

<http://www.seattle.gov/util>

An equal employment opportunity, affirmative action employer. Accommodations for people with disabilities provided on request.

CUSTOMARY POINTS OF DELIVERY, MINIMUM HYDRAULIC GRADIENTS, AND MAXIMUM FLOW RATES OF WATER SUPPLIED

METER SERVICE				MINIMUM HYDRAULIC GRADIENT FOR PLANNING PURPOSES AT STATION UPSTREAM OF METER (FEET NAVD-88 Datum)	MAXIMUM FLOW RATE UP TO WHICH THE MINIMUM HYDRAULIC GRADIENT APPLIES (gpm) ⁽²⁾
LOCATION	STATION NUMBER ⁽¹⁾	PIPELINE SEGMENT NUMBER ⁽¹⁾	SIZE OF METER (IN.)		
8 th Ave NE & NE 160 th Street	101	7	10	505	805
16 th Ave NE & NE 192 nd Street	102	7	10	520	735
32 nd Ave NE & NE 195 th Street	103	7	6	525	Backup to Sta. 191
8 th Ave NE & NE 185 th Street	104	7	8	515	965
NE 195 th St & 40 th PINE	191	7	8	520	325
5 th Ave NE & NE 185 th Street ⁽⁴⁾	193	7	8	510	500
8 th Ave NE & NE 185 th Street ⁽⁴⁾	194	7	8	515	Backup to Sta. 193
TOTAL:					3,330

Notes:

- (1) Station and Pipeline Segment Numbers pertain to the demand metering program.
- (2) City of Seattle's estimate of Water Utility's average daily demand for 2020 with a peaking factor of 2.0 for peak day.
- (3) All Points of Delivery provide a wholesale level of service. Seattle bears no responsibility for retail service level obligations, such as fire flow or emergency backup.
- (4) This station is subject to a wheeling agreement, and is not physically located at this address. Water is wheeled from this location of the regional system to the location identified in the wheeling agreement, as provided for in it.



STATE OF WASHINGTON
DEPARTMENT OF HEALTH
NORTHWEST DRINKING WATER REGIONAL OPERATIONS
20425 72nd Avenue South, Suite 310, Kent, Washington 98032

August 13, 2013

DIANE POTTINGER PE
DISTRICT MANAGER
SHORELINE WATER DISTRICT
PO BOX 55367
SHORELINE WA 98155



Subject: Shoreline Water District (ID# 39600E)
King County
Supply Station 4
As-Built Approval
Submittal #13-0302

Dear Ms. Pottinger:

The project report for the above project received in this office April 18, 2013 and the plans and specifications received February 19, 2013 have been reviewed and in accordance with the provisions of WAC 246-290 are hereby **APPROVED**. The approval issued herein is only valid as it relates to current standards outlined in WAC 246-290, effective April 30, 2012. Future revisions in the rules may be more stringent and require facility modifications or corrective action.

The project included a new connection to Seattle Public Utility's (SPU) existing 30-inch diameter supply transmission main (Supply Station 4) located at NE 185th Street and 5th Avenue NE in Shoreline, Washington. The project also includes installation of 450 feet of 12-inch ductile iron water main. This project has already been constructed.

Regulations establishing a schedule of fees for review of planning, engineering and construction documents have been adopted (WAC 246-290-990). An itemized invoice for \$1,595.00 is enclosed. Please remit your complete payment in the form of a check or money order within thirty days of the date of this letter to: **DOH, Revenue Section, P.O. Box 1099, Olympia, WA 98507-1099.**

Shoreline Water District
August 13, 2013
Page 2

Nothing in this approval shall be construed as satisfying other applicable federal, state, or local statutes, ordinances and regulations.

Sincerely,



for

Steve Deem, P.E.
Regional Engineer
NW Drinking Water Operations
253-395-6767

Enclosures

cc: Public Health – Seattle & King County
Paige Igoe, DOH

FULL REQUIREMENTS CONTRACT

BETWEEN
THE CITY OF SEATTLE
AND
THE SHORELINE WATER DISTRICT

FOR THE SUPPLY OF WATER



ENTERED INTO NOVEMBER 5, 2001



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**FULL REQUIREMENTS CONTRACT
BETWEEN
THE CITY OF SEATTLE
AND
THE SHORELINE WATER DISTRICT
FOR THE SUPPLY OF WATER**

THIS CONTRACT is entered into between the CITY OF SEATTLE ("Seattle"), a municipal corporation of the State of Washington, and the SHORELINE WATER DISTRICT ("Water Utility"), a municipal corporation of the State of Washington.

RECITALS

1. Seattle owns and operates a system for the supply, transmission and distribution of potable water and is authorized to sell and distribute water to its residents and to other persons and customers located outside the corporate limits of Seattle.
2. Seattle's water system is integral to the health and welfare of the residents located within the water service area shown in Seattle's Water System Comprehensive Plan. Seattle intends to provide water from the system to meet the current and future needs of the residents of such water service area when such service is requested from Seattle.
3. In meeting this service commitment, Seattle must ensure that this role does not place financial burdens on its retail customers for which they do not receive a corresponding benefit.
4. This contract and contracts of a similar nature with other wholesale customers of Seattle located within Seattle's service area are intended to provide those customers with the security of a long term service commitment and to describe the terms and conditions associated with that commitment.
5. Under this contract, Seattle intends to provide wholesale water to Water Utility at an equivalent level of service and under the same pricing principles as it provides water to Seattle's own distribution system.
6. Given the extensive of growth of the Seattle and surrounding areas and the impacts upon infrastructure and costs, this contract is intended to provide sufficient water for growth. As a general philosophy for cost sharing purposes, the parties desire to adopt the principle that "growth should pay for growth."

7. Seattle and Water Utility, together with other wholesale customers of Seattle, have agreed to establish an Operating Board comprised of representatives pledged to represent the best interests of the region in order to provide overall direction to the Administrator of the Seattle Water Supply System.

NOW, THEREFORE, in consideration of mutual covenants herein, it is agreed as follows:

SECTION I. DEFINITIONS

For the purposes of this contract, the following terms have been defined as:

"Full Water Requirements" - All of the water needed by Water Utility to meet the needs of its present and future water customers within its service area as shown in Water Utility's comprehensive water system plan.

"Block Purchase Contract" - A contract in which Seattle sells a fixed quantity of water to the Wholesale Customer on a take or pay basis.

"Full Requirements Contract" - A contract in which Seattle supplies a Wholesale Customer with its Full Water Requirements.

"Partial Requirements Contract" - A contract in which Seattle supplies a Wholesale Customer with that portion of its Full Water Requirements above that provided by the Wholesale Customer's own supply.

"Wholesale Customer" - Those customers who receive water from Seattle for the purposes of reselling to others.

"1982 Water Purveyor Contract" - That certain Water Purveyor Contract between Water Utility and Seattle having an effective date of September 8, 1982.

"Existing Supply Resources" - Current components of the Seattle Water Supply System which consist of the Cedar River storage, treatment and diversion facilities, the Tolt River storage, treatment and diversion facilities, and the Highline Well Field as set forth in Exhibit VII.

"FC" - Means Facility Charge.

"1% Water Conservation Program" - A program which has been implemented by Seattle with the agreement of Water Utility which contains a goal of 1% conservation per year for ten years.

"Seattle Water Supply System" - Seattle's water supply system consisting of dams, impounded water, supply and transmission mains, pumps, treatment facilities, and all other facilities utilized in conveying water to Seattle's retail service area, to Water Utility and other Wholesale Customers. This definition does not include Seattle's water distribution system, which is used to serve its Retail Customers.

"Seattle's Average Cost of Debt" - The weighted average interest rate on Seattle's water system debt outstanding calculated at the end of each calendar year during the term of this contract.

"Rate of Return on Investment" - Seattle's Average Cost of Debt, plus 1.5 percent.

"Service Connection" - The water meter and appurtenances through which water is delivered from the Seattle Water Supply System to a Wholesale Customer's water system.

"Seattle Transmission Facilities" - Those facilities serving Seattle's regional transmission needs as set forth in Exhibit VIII.

"Stranded Costs" - Those water supply and related costs that Seattle and others have invested for the region which may not be recovered as a result of lost revenues.

"Seattle Water System Comprehensive Plan" - Seattle's Water System Comprehensive Plan dated April, 2001, and amendments thereto, prepared by Seattle to comply with the requirements of WAC 248-54-580, and successor regulations.

"Administrator" - The Director of Seattle Public Utilities or any other title given to that person who maintains the authority to operate and manage the Seattle Water Supply System.

"Operating Board" - A board of representatives having the powers and duties set forth in Section V hereof.

SECTION II. TERM OF CONTRACT AND GUARANTEES

II.A. Term of Contract

1. Term. This contract shall take effect upon the signature of both parties and shall remain in effect until 12:01 AM on January 1, 2062.
2. Subsequent Right Of First Refusal. At the end of the term of this contract, Water Utility shall have a right of first refusal to continue to purchase the amount of water then purchased from Seattle at the time of contract expiration.
3. Periodic Review and Right to Change Certain Terms and Conditions. The parties may review and change certain terms and conditions governing the sales of water hereunder on January 1, 2022 and January 1, 2042 as follows.
 - a. Consensual Process. On or before January 1, 2021, and then again on or before January 1, 2041, either party may provide the other with a written proposal to amend the contract terms. The parties shall then meet and consider the proposal. If the parties agree to the proposal prior to January 1, 2022 and January 1, 2042,

respectively, a written amendment to this contract shall be approved and executed by both parties and this contract shall be amended accordingly.

- b. Seattle's Right to Amend. If the parties are unable to agree on a proposal by Seattle pursuant to subsection a. above within the respective one-year periods, Seattle may propose in writing its desired amendment to the Operating Board. Seattle and the Operating Board shall meet and consider the proposed amendment and use reasonable efforts to resolve any differences in the proposal. After 90 days from Seattle's written proposal to the Board, Seattle may propose its desired amendment to the Seattle City Council. If the Operating Board does not agree with such proposal, it may submit a revised proposal to the Seattle City Council within 90 days of Seattle's submission of its proposal to the Seattle City Council. After receiving the Operating Board's alternate proposal, or after the lapse of the 90 day period for the Operating Board to make an alternate proposal, the Seattle City Council may then deny both proposals or approve one of them and issue an amendment to this contract which shall be in effect for the remaining term of the contract from the date of issuance, unless later amended pursuant to subsection a. above, or by mutual agreement.
- c. Limitation on Seattle's Right to Amend. Notwithstanding subsection b. above, Seattle shall not have the right to: (i) reduce its obligation to provide the Full Water Requirements of Water Utility; (ii) cease to provide wholesale water to Water Utility at an equivalent level of service as it provides water to Seattle's own distribution system. (iii) charge a higher wholesale rate for water supply and transmission to Water Utility than that charged to Seattle for supply to its retail customers, (iv) reduce its water quality obligations hereunder, (v) change the methodology for calculating Rate of Return on Investment, (vi) restrict Water Utility's right to withdraw from this contract, and (vii) disband or significantly reduce the powers of the Operating Board.

II.B. Agreement to Supply and Purchase Water

1. Full Requirements Commitment. Seattle shall supply the Full Water Requirements of Water Utility for the term of this contract. Except as set forth in Exhibit I and section II.B.5 below, Water Utility shall purchase all of its wholesale water needs from Seattle.
2. Adjustments in Water Utility's Service Area. In the event Water Utility acquires additional service area that is: 1) located outside of the service area identified in its comprehensive water system plan and 2) which is not already served with Seattle water, then Seattle shall supply the water requirements of the additional service area subject to a) Seattle's ability to serve that area, and b) Water Utility's payment of FCs for that additional service area in accordance with section IV.E.

3. Assumption or Transfer of Responsibilities. In the event Water Utility's entire service area and service responsibilities are assumed by or are transferred to another utility or utilities, then this contract shall become null and void at the time of the assumption or transfer; provided, however, if the transferee of the service area is a Wholesale Customer, Seattle shall provide water to the transferee according to the terms of the transferee's water supply contract with Seattle. If the transferee is the City of Shoreline and/or the City of Lake Forest Park, Seattle shall provide water to the City of Shoreline and/or the City of Lake Forest Park according to the terms and conditions of the Water Utility's contract at the time of transfer or assumption, provided that the City of Shoreline and/or the City of Lake Forest Park agrees to be bound by those terms and conditions. If upon transfer or assumption the City of Shoreline and/or City of Lake Forest Park rejects the terms and conditions of the Water Utility's contract, the contract shall become null and void. If the transferee is not a Wholesale Customer (other than the Cities of Shoreline and Lake Forest Park), then Seattle shall issue the transferee a water supply contract for such area subject to terms and conditions as Seattle shall determine.

4. Annexation by Seattle. If the entire water service area of Water Utility is annexed to Seattle, then this contract shall become null and void upon Seattle's assumption of Water Utility's water system.

5. Water Utility's Right To Terminate or Reduce Purchase Commitment. Water Utility's commitment to purchase water from Seattle under this contract may be terminated or reduced subject to the terms and conditions set forth below. Water Utility shall provide Seattle at least 5 years written notice thereof, provided, however, if Seattle unilaterally amends the terms and conditions of this contract pursuant to Section II.A.3 above, Water Utility may terminate this contract at any time within 1 year thereafter by giving Seattle 1 year written notice.

a. Automatically Permitted Reductions. Water Utility may, without restriction, upon five years written notice to Seattle, reduce its water purchases from Seattle by an amount not to exceed 10 million gallons per day of its average annual demand.

b. Reductions Requiring Permission. Water Utility may reduce quantities of water purchased from Seattle by more than the amount identified in the preceding section or by providing less than five years advance notice of such reduction if in the judgment of the Operating Board, using the criteria listed below, it determines that such reduction is in the best interest of the Seattle Water Supply System as a whole.

c. Criteria. The criteria to be used by the Operating Board in determining the best interest of the Seattle Water Supply System shall include but not be limited to the following:

i. The potential for Stranded Costs and impacts on rates;

- ii. The cost of new resources;
- iii. The feasibility and benefit of reallocating to Seattle or other customers the amount of water foregone by Water Utility; and
- iv. Environmental aspects of the proposed change.

The Operating Board shall act promptly and reasonably in evaluating and deciding upon Water Utility's request. The Operating Board may approve, with or without reasonable conditions, or deny Water Utility's request based on the above criteria. Approval conditions may include a requirement that Water Utility waive its rights to be served its Full Water Requirements. If the approval conditions are unacceptable to Water Utility, it may elect in writing to withdraw its request and this contract shall continue in full force and effect.

II.C. Continuity of Service within the Term of the Contract

1. Parity of Service. Seattle shall provide wholesale water to Water Utility at an equivalent level of service that it provides to Seattle's own distribution system. In the event of a general emergency or weather-related water shortage affecting the entire Seattle Water Supply System, general restrictions placed upon water deliveries to Water Utility shall be determined by the Operating Board and applied equally to Seattle's distribution system and the Wholesale Customers. In the event of localized emergency problems, Water Utility acknowledges temporary, localized service interruptions may occur for the duration of the emergency.
6. Emergency Curtailment Measures. It is recognized by both parties that emergency water use curtailment measures may have to be implemented by Seattle on a regional basis in order to meet an emergency condition or a regional water shortage. The procedures to be used in the event of a weather-related regional water shortage, or shortages caused by other factors, shall be as described in Seattle's Water Shortage Contingency Plan in effect as of the effective date of this contract, or successor contingency plans. Successor contingency plans shall be developed and implemented by Seattle in consultation with the Operating Board. Water Utility shall assist with and support all emergency curtailment measures that are implemented.
7. Other Emergencies. Seattle may temporarily interrupt or reduce deliveries of water to Water Utility if Seattle determines that such interruption or reduction is necessary or reasonable in case of system emergencies or in order to install equipment, make repairs, replacements, investigations and inspections or perform other maintenance work on the Seattle Water Supply System. Except in cases of emergency, and in order that Water Utility's operations will not be unreasonably interrupted, Seattle shall give Water Utility and the Operating Board reasonable notice of any such interruption or reduction, the reasons for and the probable duration. Seattle shall use its best efforts to minimize service interruptions to Water Utility.

8. Waiver Of Charges. If interruption or reduction in service to Water Utility requires that Water Utility draw water supply in a manner that subjects Water Utility to demand charges (as described in Exhibit III hereto), Seattle shall waive such charges during the period of such interruption or reduction.

II.D. Water Quality

1. Seattle Water Supply System. Seattle shall be responsible for water quality within the Seattle Water Supply System as set forth below. Seattle shall construct, operate and maintain water quality treatment facilities and use its best efforts to carry out its water quality responsibilities in the most cost-effective manner for the region.
9. Applicable Standards. Seattle shall at all times during the term hereof deliver water to Water Utility's system that meets or exceeds all applicable Federal, State and local regulations as the same may change from time to time.
10. System-wide Water Quality Plan. Seattle, in consultation with the Operating Board, shall develop and maintain a system-wide regional water quality plan. The plan shall describe, at a minimum, goals, objectives, procedures and the means to satisfy legal requirements and industry standards for water quality, monitoring, information exchange, best management practices, adaptive management practices, public health protection, and cross connection control. The Operating Board may form a technical subcommittee to provide input and review of such plan. Seattle shall share available water quality data and technical expertise with all Wholesale Customers.
11. Distribution Systems. Water Utility shall be responsible for compliance with all applicable federal, State and local water quality laws and regulations applicable to water in its distribution system including any water from supply sources that it may own or operate.
12. Monitoring. Water quality monitoring shall be performed by Seattle in the Seattle Water Supply System and by Water Utility in its distribution system to comply with federal, State and local water quality regulations, to verify the condition of water that is passing from one entity to the other, to enhance system operation and to document the aesthetic qualities of the water. Notwithstanding the foregoing, Water Utility may contract with Seattle for water quality monitoring services as an elective service under section IV.F. hereof.
13. Water Quality Notifications to Customers (Consumer Confidence Reports). Each party shall prepare at its sole cost periodic water quality notifications to its respective retail customers and regulatory agencies as required by law. Seattle shall provide Water Utility all water quality data in a timely manner regarding the Seattle Water Supply System that Water Utility may be legally required to report in such notices.

14. Water Quality Best Management Practices and Adaptive Management Practices. The Operating Board shall develop best management practices ("BMPs") and adaptive management practices ("AMPs") as reasonably necessary to protect water quality within the Seattle Water Supply System. The BMPs and AMPs will include recommendations to prevent deterioration of water quality in transmission and distribution systems. The parties shall use reasonable efforts to comply with the BMPs and AMPs.
15. Flushing. Water Utility shall be solely responsible for flushing water mains within its system. Flushing allowances will be provided by Seattle only when the Operating Board determines that flushing is required to maintain or improve regional water quality.
16. New Water Sources. Prior to the introduction of any new water supply source by Water Utility which mixes with water in Seattle's Transmission Facilities, the proposed source must be evaluated using customary and reasonable water quality criteria developed in consultation with the Operating Board to ensure compatibility with Seattle water. The proposed Water Utility source must also meet all federal, state and Seattle water quality and treatment standards. Water Utility shall also provide Seattle with satisfactory results from a blending study to determine the compatibility of the source with existing sources already in the Transmission System, the appropriate method and level of treatment and the probable distribution of the new supply within the Transmission System. Water Utility shall also complete a flavor rating analysis of no more than 3.0 as tested by Seattle's Flavor Profile Panel according to the methodology described by the American Water Works Association, or its successor. Water Utility shall obtain all necessary and appropriate regulatory permits, reviews and approvals for rights to and operational use of such water supply source. The introduction of any direct or indirect potable reuse water into Seattle's Transmission Facilities shall, in addition, require Seattle's prior written consent.

The Operating Board may form a technical subcommittee to develop water quality standards and review and advise on the water quality evaluation criteria for proposed new sources. Such criteria for new sources shall be the same for surface water and ground water.

17. Transfers Outside Seattle's Transmission System. If, with the consent of Seattle, water is transferred between Water Utility and another water utility in a manner that does not use the Seattle Water Supply System, Water Utility or the other water utility shall be responsible for meeting all applicable water quality standards related to the transfer of such water.

II.E. Conservation

The parties acknowledge that conservation prolongs the time before new supply resources are needed and thus constitutes an important ongoing tool in managing the water resources of the region. Accordingly, Water Utility hereby adopts and agrees to be bound by Seattle's 1% Water Conservation Program through the year 2010.

1. Performance Measurements. For the purposes of determining water conservation performance, Water Utility's water use shall be measured in conjunction with the use of all other participants in Seattle's 1% Water Conservation Program. The Operating Board may develop reasonable criteria to measure the participants' water conservation performance in accordance with such program.
18. Conservation Above the 1% Program. Water Utility acknowledges that water conservation beyond the 1% Water Conservation Program may be required as condition of State or federal regulations, court orders, settlements or agreements made to avoid litigation, fines or penalties, or as otherwise determined to be reasonably necessary by the Operating Board. The Operating Board may adopt reasonable additional conservation measures and targets for such purposes. Such conservation measures and targets shall apply in the same manner to all holders of Full and Partial Requirements contracts and to Seattle. Except as provided in the next subsection, Water Utility shall use reasonable efforts to abide by and perform such water conservation measures and to meet the adopted targets.
19. Water Utility's Option to be Conservation Service Provider. Water Utility may elect to provide its own water conservation program, beyond its commitment to the 1% Water Conservation Program to meet conservation targets adopted by the Operating Board or more stringent targets. Water Utility shall bear the costs thereof and shall be solely responsible for its implementation. Under this option, Water Utility shall be evaluated for meeting water conservation targets solely by its own performance.
20. Incentives and Penalties. The Operating Board may adopt penalties for shortfalls in water conservation and rewards for meeting or exceeding adopted targets. In the event Water Utility or Seattle fails to meet the adopted targets set by the Operating Board, the Operating Board may assess a penalty. Penalties may not exceed the cost of Seattle undertaking those conservation measures reasonably needed to achieve the adopted target.
21. Postponing The Need For New Water Supply Facilities. In order to avoid the necessity of developing new physical water supply facilities for as long as reasonably practicable, any water saved through conservation in either Seattle's or Water Utility's retail service areas shall be dedicated first to the municipal and industrial water supply requirements of the Seattle Water Supply System before any other use of such water may be undertaken.

SECTION III. CONDITIONS OF SERVICE

III.A. Minimum Hydraulic Gradient

1. Initial Minimum. Seattle shall maintain a minimum hydraulic gradient or head at a maximum flow rate in amounts and at locations described in Exhibit II attached hereto for each Service Connection from Seattle's Water Supply System to Water Utility's distribution system. Such gradients and locations shall be contained in Seattle's and Water Utility's future water system comprehensive plans. Seattle shall operate and maintain facilities necessary to carry out such obligation. If Seattle and the Operating Board find that a project resulting in the modification of such minimum gradient or head would benefit the Seattle Water Supply System as a whole, the minimum hydraulic gradient or head described in Exhibit II may be modified by Seattle if such modification is feasible from an economic, land use and engineering perspective taking into account the facilities required to carry out and for Water Utility to adapt to such modification. Seattle may make these modifications only once during any fifteen (15) year period provided that four (4) years advance written notice is given to Water Utility, unless a shorter notice is approved by the Operating Board.
22. Emergencies. If Seattle is prevented by emergency circumstances from providing such minimum hydraulic gradient, Seattle shall supply not less than the volume of water equivalent to the maximum 24-hour average flow rate required by Water Utility as shown on Exhibit II for each 24 hour period that the minimum hydraulic gradient is interrupted.
23. Additional Service Connections. Additional Service Connections between Water Utility's and Seattle's water systems or adjusted minimum gradients may be established from time to time by mutual agreement between Seattle and Water Utility subject to approval by the Operating Board. Exhibit II shall be appropriately amended to reflect such additions or adjustments.

III.B. Resale to Other Parties

Water Utility may sell water supplied by Seattle to water purveyors located outside of Water Utility's existing or future boundaries only upon the prior written consent of Seattle (or oral, in case of emergency). Agreements for resale of water by Water Utility listed in Exhibit I are hereby approved by Seattle subject to whatever written terms, conditions and limitations that Seattle has imposed on such resale.

III.C. Interconnection With Other Systems

1. Prohibition on Interconnection. Water Utility shall not interconnect any part of its system supplied with water from Seattle with other water systems without the prior written approval of the Operating Board, or, in case of emergency, upon oral approval by Seattle, which shall not be unreasonably withheld. Any such interconnection shall

be subject to the approval of the Washington State Department of Health and the installation of a meter. Such other systems must be in compliance with all applicable local, State and federal laws and regulations including the requirement that they have a valid operating permit issued by the Washington State Department of Health.

24. Requests by Seattle to Interconnect. Seattle may request that Water Utility interconnect its water system to the water system of an adjacent Wholesale Customer. Water Utility shall comply with that request subject to the terms and conditions set forth below.
25. Requirement for Interconnection. If Water Utility does not consent to Seattle's request for interconnection, Seattle may propose the interconnection of Water Utility's water system to the adjacent Wholesale Customer to the Operating Board. Water Utility may present facts and arguments to the Operating Board in opposition to the interconnection and/or to document its costs in making the interconnection and conveying water to the adjacent Wholesale Customer. The Operating Board shall hear and consider the matter. Upon (a) a written finding by the Operating Board that the proposed interconnection with an adjacent Wholesale Customer is feasible taking into account Water Utility's capabilities, limitations and obligations, (b) a written finding by the Operating Board that such interconnection benefits the Seattle Water Supply System and (c) a written demand of the Operating Board that Water Utility carry out the interconnection, Water Utility shall be required to interconnect its facilities to the adjacent Wholesale Customer for the purpose of supplying water to that Wholesale Customer through the distribution system of Water Utility, provided that the interconnection shall be performed in a location and according to a schedule which does not unduly disrupt Water Utility's operations.
26. Payment and Indemnity. Water Utility shall be paid its actual costs of providing such interconnection and water transmission service to the adjacent Wholesale Customer, plus a reasonable amount for overhead, administration and rate of return (equal to Rate of Return on Investment) on such costs, and Water Utility shall be indemnified from any liability that may result from providing such interconnection. The Operating Board may adopt a standard methodology for calculating costs that ensures that Water Utility is fairly compensated for such service.

III.D. Development of Regional Supply and Transmission Infrastructure

Final decisions and authority to approve construction of capital infrastructure related to the Seattle Water Supply System shall rest with the Seattle City Council. Capital construction activities include all renewals, replacements, upgrades, expansion and any other capital construction activities.

III.E. Metering Equipment

Seattle shall own and maintain appropriate metering devices to measure the amount of water delivered to Water Utility pursuant to this contract. At Water Utility's request and expense, Seattle shall install and maintain equipment selected by Water Utility and approved by Seattle to transmit signals to Water Utility's recording equipment (at locations determined by Water Utility) of the amount of water delivered as measured by Seattle's meter(s).

Until such time as Seattle determines it to be economical to install metering devices to measure the amount of water delivered from the Seattle Water Supply System to Seattle's distribution system, the amount of water delivered to the Seattle distribution system shall be measured indirectly by subtracting the metered water delivered to all of Seattle's Wholesale Customers from 98% of the total amount of water exiting Seattle's sources of supply as measured by the supply meters.

SECTION IV. COST OF WATER & TRANSMISSION

Cost-based rates are a water industry accepted practice and the historical practice of Seattle and the Wholesale Customers. The rate-making principles, policies and methodologies set forth in this Section IV are intended to meet the objective of equitable and cost-based rates.

IV.A. Rate-making Principles

The following general principles and policies shall apply to the establishment of all rates and charges for water supply and related services hereunder beginning on January 1, 2002. Prior to that date, the pricing method of the 1982 Water Purveyor Contract shall be maintained.

1. No expenses attributable to electric power development maybe allocated to the cost pools identified herein unless the pools are allocated a commensurate share of revenue derived from such development.
27. Seattle shall utilize generally accepted accounting principles consistently applied as a basis for developing the financial information upon which rates and charges are based.
28. Abrupt changes in financial policies should be avoided.
29. The rate structure should encourage the efficient use of water, conservation and the timely development of new environmentally responsible water sources and should incorporate seasonal rates and other pricing approaches to encourage efficient use.

30. The rate structure should be innovative, flexible and adaptive whenever it is cost effective and beneficial in furthering the rate-making policies.
31. The rate structure should be simple to administer and easily understandable.
32. The rate structure should be fair and equitable while balancing the needs of all parties.
33. Capital costs which benefit only a new Wholesale Customer shall be allocated to that customer and not to any cost pool described in this contract.
34. Seattle's distribution system which serves its retail customers shall be treated as the equivalent of a Wholesale Customer of the Seattle Water Supply System for the purpose of charging Seattle the same wholesale rates and charges as Water Utility for water supply and transmission. Costs calculated under the cost pools described below shall apply equally to Water Utility and to Seattle's distribution system which serves its retail customers.
35. The allocation of costs associated with capital construction activities within the Seattle Water Supply System shall be the responsibility of the Operating Board. The Operating Board shall use its best efforts to determine and approve a cost allocation method for infrastructure projects prior to the capital project obtaining construction approval from the Seattle City Council. Failure of the Operating Board to determine and approve a cost allocation method shall not hinder the Seattle City Council from approving capital infrastructure projects in order to assure Seattle's ability to fulfill the requirements of this contract.
36. The purveyor balance account as that term is defined in the 1982 Water Purveyor Contract between Seattle and Water Utility shall be credited to the Wholesale Customers in a ratable and equitable manner commencing with the application of rate making policies and framework.

IV.B. Ratemaking Framework

Subject to the foregoing principles, wholesale rates and charges for the services described in this contract shall be developed by Seattle based on the following framework:

1. Water Supply and Transmission Service. The costs of water supply and transmission of water shall be accounted for separately in the water supply and transmission cost pools described below. The price for each service shall be recovered through separate rates for each service. All direct costs incurred in providing water supply and transmission services shall be allocated to the appropriate cost pool and recovered through the rates for each service. In addition, certain indirect costs consisting of a reasonable overhead and administration cost shall be allocated to the appropriate cost pool and recovered through rates for each service.

37. Water Supply - Basic and Elective Services. The costs of supplying water falls into two categories – basic and elective services. Basic service costs includes direct and indirect costs attributable to the delivery of water to the Wholesale Customers and to Seattle's retail service area pursuant to the foregoing principles. Elective services are optional services, such as water quality laboratory services and specific engineering support that Seattle makes available.
38. Conservation. Costs incurred by Seattle for regional conservation shall be allocated to the Wholesale Customers through rates or FCs as determined by the Operating Board in the New Supply Cost Pool.

IV.C. Water Supply Pricing – Basic Services

1. Two Water Supply Cost Pools. For the purposes of determining costs of water supply, there shall be two cost pools: An existing supply cost pool ("Existing Supply Cost Pool") and a new supply cost pool ("New Supply Cost Pool").
- a. Existing Supply Cost Pool. The Existing Supply Cost Pool shall be accounted for as follows:
- i. A basic services rate for water supply shall be levied to recover the full costs of operating maintaining and replacing the Existing Supply Resources incurred by Seattle.
 - ii. All conservation programs undertaken by Seattle prior to the effective date of this contract with the exception of the costs of the 1% Program from January 1, 2002 through 2010, shall be considered an Existing Supply Resource cost.
 - iii. Renewal and replacement of Existing Supply Resources will be an Existing Supply Resource cost.
- b. New Supply Cost Pool. The New Supply Cost Pool shall be accounted for as follows:
- i. Water supply resources developed in the future ("New Supply Resources") that expand the capacity of the Seattle Water Supply System, including the costs of the 1% conservation program from January 1, 2002 through 2010 and a portion of the cost of the Tacoma Second Supply Project (as allocated from the Tacoma Second Supply Project Cost Pool as set forth in Section IV.E. 7), shall be included in the New Supply Cost Pool. If any portion of a New Supply Resource project enhances reliability of Existing Supply Resources, the costs thereof may be allocated to the Existing Supply Cost Pool if the Operating Board and Seattle both agree.

- ii. The cost of New Supply Resources plus Rate of Return on Investment may be recovered through FCs charged annually to the holders of Full Requirements Contracts, Partial Requirements Contracts and Seattle or through new supply rates based on the costs of such facilities. Such costs which are not recovered on an annual basis through FCs shall be recovered through new supply rates. The new supply rate shall be applied to all holders of Full Requirements Contracts and Partial Requirements Contracts and Seattle.
- iii. The Operating Board shall determine the portion of the New Supply Resource costs that shall be recovered through FCs or through new supply rates. The FCs and new supply rates may be scalable to create an incentive for developers to build housing or commercial units with efficient water usage levels. Water Utility, as well as each other Wholesale Customer and Seattle in setting rates for retail customers shall be free to choose the method of incorporating FCs or new supply rates into their own retail rates and charges.
- iv. Holders of Full and Partial Requirements Contracts who have not purchased water from Seattle under the 1982 Water Purveyor Contract between Seattle and the Wholesale Customer shall be assessed the full marginal costs of the operation, including Rate of Return on Investment, of the New Supply Facilities. This assessment may be satisfied by either paying FCs and new supply rates or arranging a special water supply rate in lieu of paying FCs.
- c. Emergency Surcharge. In the event of a drought, catastrophe or other extraordinary condition that requires emergency expenditures to maintain a sufficient water supply, Seattle may impose an emergency surcharge on all holders of Full and Partial Requirements Contracts in order to pay for such expenditures and/or maintain financial stability of the Seattle Water Supply System. Any such emergency surcharge shall be presented to the Operating Board prior to adoption by Seattle. Seattle shall consider the comments of the Operating Board but shall nevertheless have the full authority to adopt the charge.

IV.D. Transmission Pricing - Basic Services

- 39. Two Transmission Costs Pools. For purposes of determining the cost of the transmission of water to the Wholesale Customers there shall be two transmission cost pools consisting of an existing transmission cost pool ("Existing Transmission Cost Pool") and a new transmission cost pool ("New Transmission Cost Pool").
 - a. Existing Transmission Cost Pool. Costs to be allocated to the Existing Transmission Cost Pool shall consist of the following: operation, maintenance, repairs and replacements to the Seattle Transmission Facilities.
 - i. The Seattle Transmission Facilities are owned and operated as a regional network by Seattle to convey water to Wholesale Customers and to Seattle's

distribution system. Therefore, the price of transmission for Seattle water transmitted within the Seattle Transmission Facilities shall be calculated on the same basis to holders of Full Requirements Contracts and Partial Requirements Contracts and to Seattle.

- ii. Costs incurred for purposes of transmission reliability may be included in the Existing Transmission Cost Pool subject to the approval of the Operating Board and Seattle.
 - b. New Transmission Cost Pool. The cost of new transmission facilities shall be included in the New Transmission Cost Pool. The renewal, replacement or modification of existing transmission facilities which create an expansion of transmission capacity may be allocated to the New Transmission Cost Pool. The Operating Board shall decide what portion of costs of renewal, replacement or modification of transmission facilities may be treated as new transmission costs and the portion of the cost of a transmission project that extends the geographic extent of the transmission system that shall be recovered through the New Transmission Cost Pool or from a new Wholesale Customer. Except for costs allocated specifically to a specific Wholesale Customer, New Transmission Cost Pool costs shall be recovered through new transmission rates or FCs. The new transmission rate shall be applied in a uniform manner to all holders of Full Requirements Contracts and Partial Requirements Contracts and Seattle.
2. Demand Charge
- a. Seattle may adopt a demand charge in accordance with the methodology described in Exhibit III. The demand charge rate (i.e., dollars per 1000 gallons of deficient storage) shall be based on the equivalent cost of providing the deficient storage.
 - b. The proceeds of the demand charge will be treated in rate setting as a credit to the New Transmission Cost Pool.
 - c. Seattle shall suspend the demand charge rate in the event of emergencies and unforeseen conditions.
3. Cost of New or Changed Service Connection. If Seattle changes the location of the Service Connection to Water Utility for Seattle's benefit, then Seattle shall pay the cost and it shall be included in the appropriate transmission cost pool. If Water Utility requests the change in location, then Water Utility shall pay the cost of the new connection.

IV.E. Allocation of Costs and Revenues into Cost Pools

1. Accounting. Seattle shall maintain a cost accounting system consistent with the provisions of this contract and generally accepted accounting principles consistently applied in developing the financial information for determining the costs of construction, replacement, maintenance and operation of the facilities in each cost pool.
 - a. Asset Accounts. An asset account shall be maintained for each facility and within that account Seattle shall record the original cost of that facility plus betterments and less retirements.
 - b. Depreciation. Facilities shall be depreciated according to Standard Water System Asset Lives and a record of life-to-date depreciation shall be maintained for each facility. No depreciation shall be recorded in the first calendar year of operation of a facility. A full year's depreciation shall be recorded in every subsequent year.
 - c. Net Book Value. The net book value of any facility shall be its original cost plus betterments and less retirements as recorded in its facility asset account, less life-to-date depreciation.

40. Infrastructure Costs. Each cost pool shall include the infrastructure costs for its respective facilities, calculated on a utility, cash or other basis depending upon the facility and the cost pool as set forth below.

- a. Utility Basis. The utility basis shall be used to calculate the infrastructure costs for all Existing Supply Facilities and Existing Transmission Facilities, as well as their replacements and betterments. The utility basis may also be used for new supply facilities and new transmission facilities in Seattle's discretion. Under the utility basis, the infrastructure cost for a facility in any year shall be the sum of (i) the annual depreciation expense recorded for that facility and (ii) the product of the net book value of that facility and the Rate Of Return On Investment.

At Seattle's discretion, interest costs may be considered current infrastructure costs during the construction of a facility. However, any such interest costs must be considered contributions in aid of construction, and not included in the Net Book Value of the facility for purposes of calculating Utility Basis costs in future years.

- b. Cash Basis. The cash basis may be used in Seattle's discretion for new supply facilities and new transmission facilities, or a portion thereof. Under the cash basis, the infrastructure cost for a facility in any year shall be the actual cash expenditure made by Seattle in that year for either the payment of construction costs or actual principal and interest costs on debt issued to finance its

construction. In the event that the depreciation lifetime of the facility is less than the term of the debt issued to finance all or a portion of the facility, debt maturities will be selected such that the construction cost of the facility will be fully amortized at the end of its depreciation lifetime.

- c. Other Basis. Seattle, with the approval of the Operating Board may determine one or more other bases on which to calculate infrastructure costs and may apply these bases to facilities in the New Supply and New Transmission Cost Pools.
41. Operations Costs. The costs of operating the assets assigned to a cost pool shall be included in the cost pool. The annual operations costs of a cost pool shall be the labor, materials, equipment and other direct costs required for the operation and maintenance of the facilities in that cost pool, together with any net profit or expense from the disposition of facilities in that pool. Operations costs shall include the cost of general and administrative overhead applied in a manner consistent with its application to facilities construction projects.
- a. Existing Supply Operations Costs. The parties agree that an efficient way of handling operations costs for the Existing Supply Cost Pool shall be as follows: The Operations Cost base in the Existing Supply Cost Pool for the year 2001 shall be \$17,780,262.00. In each succeeding year, the amount from the previous year shall be adjusted by the percentage increase in cost in the supply cost centers identified in Exhibit IX, except that the increase in treatment operations costs caused by the first full year start-up of the Cedar Treatment Plant at Lake Youngs in or around 2005 shall not be included in the percentage adjustment. Any increase in Cedar Treatment operations costs for the first full year of operation of the plant shall instead be added directly to the Operations Cost total from the prior year as adjusted by the index. For each year after the first full year of operation, increases in Cedar Treatment operations costs shall be included in the adjustment index.
 - b. Existing Transmission Operations Costs. The parties agree that an efficient way of handling operations costs for the Existing Transmission Cost Pool shall be as follows: the Operations Costs base in the Existing Transmission Cost Pool for the year 2001 shall be \$4,531,931.00. In each succeeding year, the amount of these costs from the previous year shall be adjusted by the percentage increase in cost in the transmission cost center identified in Exhibit IX.
 - c. New Supply Operations Costs. The operation costs of the 1% Program after January 1, 2002 and the Second Supply Project, together with the costs of operating facilities assigned to the New Supply Cost Pool and any other costs approved by the Operating Board, shall be assigned to the New Supply Cost Pool. The base for operations costs for 2001 for the 1% Program shall be \$1,326,712.00. This amount shall be adjusted in each succeeding year by the

percentage increase in cost in the "1% Conservation" cost center as identified in Exhibit IX.

- d. New Transmission Operations Costs. The actual costs of operating facilities assigned to the New Transmission Cost Pool and any other costs approved by the Operating Board, shall be assigned to the New Transmission Cost Pool.
42. Disposition Costs. The costs of disposing of assets within a cost pool shall be included in the cost pool. Net disposition costs shall be calculated as follows:
- a. Disposition Under the Utility Basis. The net book value of the facility, less any sales, salvage, or other revenues derived from the disposition of that facility.
 - b. Disposition Under the Cash Basis. The value of principal of unpaid maturities of debt used to finance the construction cost of the facility, less any sales, salvage or other revenues derived from the disposition of that facility.
 - c. Disposition Under Other Basis. Disposition of any facilities whose infrastructure costs are calculated on another basis under section IVE.2.c. above shall be determined by the parties as part of the definition of such other basis.
43. Creation of Additional Cost Pools. Seattle, in its discretion, may create additional cost pools to provide equity and flexibility in payment arrangements and the allocation of costs as the Seattle Water Supply System expands to include new infrastructure and new customers. The costs in an additional cost pool, or a portion thereof, may be added to an existing cost pool subject to the consent of the Operating Board if the costs to be allocated satisfy the criteria for accounting in the existing cost pool.
44. Tacoma Second Supply Project Cost Pool. The Tacoma Second Supply Project Cost Pool shall be an Additional Cost Pool. The Tacoma Second Supply Project Cost Pool shall contain the infrastructure and operations costs associated with the Tacoma Second Supply Project. The New Supply Cost Pool shall be allocated that portion of the Tacoma Second Supply Project costs commensurate with the proportion of the benefits of the project received by Wholesale Customers with Full and Partial Requirements Contracts.
45. Facilities Charge Revenues. Supply FC revenues shall offset infrastructure costs in the News Supply Cost Pool allocated to the Supply FC by the Operating Board. Surpluses and deficits in actual Supply FC revenues over cost allocated to the Supply FC shall be carried forward and earn simple interest at Seattle's Average Cost of Debt. Any current-year deficit (including any surplus balance available from previous years) shall be paid by rates for the New Supply Cost Pool. New Supply Cost Pool rates shall be discounted by surplus Supply FC revenues until any deficit Supply FC balance is repaid, except the amount of this discount shall not exceed, without the agreement of the Operating Board, twice the maximum annual deficit paid by the rate

for the New Supply Cost Pool in any one year. In the event that Supply FC surplus balances exceed the Net Book Value of assets whose costs are allocated to the Supply FC, the difference between the Supply FC balance and the Net Book Value of these assets shall be used to discount the rate for the New Supply Cost Pool (and the Supply FC surplus balance shall be reduced by the amount of this discount). The use and accounting for transmission FCs shall be done in a like manner to supply FCs. Seattle and Water Utility agree that FC revenues are the sole property of Seattle.

46. Allocation of Cost Pools by Customer Class. The costs in cost pools shall be allocated within the pools as follows:

a. Allocation of Existing Supply Cost Pool. The total cost of the Existing Supply Cost Pool shall be allocated to two customer classes as follows:

i. Block Purchase Customer Class. The portion of costs in the Existing Supply Cost Pool allocated to holders of Block Purchase Contracts shall be determined pursuant to those contracts.

ii. Full and Partial Requirements Customer Class. The holders of Full Requirements Contracts and Partial Requirements Contracts and Seattle shall be allocated the remaining costs in the Existing Supply Cost Pool.

b. Allocation of New Supply Cost Pool. The costs allocated to the New Supply Cost Pool shall be:

i. Block Purchase Customer Class. The holders of Block Purchase Contracts shall be allocated no costs from the New Supply Cost Pool.

ii. Full and Partial Requirements Customer Class. The holders of Full Requirements Contracts and Partial Requirements Contracts and Seattle shall be allocated all costs in the New Supply Cost Pool.

c. Allocation of Existing Transmission Cost Pool. The costs of the Existing Transmission Cost Pool shall be allocated as follows:

i. Block Purchase Customer Class. The proportion of costs in the Existing Transmission Cost Pool allocated to holders of Block Purchase Contracts shall be determined pursuant to those contracts.

ii. Full and Partial Requirements Customer Class. The holders of Full Requirements Contracts and Partial Requirements Contracts and Seattle shall be allocated the remaining costs in the Existing Transmission Cost Pool.

- d. Allocation of New Transmission Cost Pool.
 - i. Block Purchase Customer Class. The holders of Block Purchase Contracts shall be allocated no costs from the New Transmission Cost Pool.
 - ii. Full and Partial Requirements Customer Class. The holders of Full Requirements Contracts and Partial Requirements Contracts and Seattle shall be allocated all costs in the New Supply Cost Pool.
 - e. Allocation of Additional Cost Pools. The costs in any additional cost pool created by Seattle pursuant to the terms of this contract, or portion thereof, may be allocated to an existing cost pool identified above with the consent of the Operating Board.
47. Facilities Charges. If Seattle establishes FCs as authorized herein, then such charges shall be calculated as follows:
- a. ERU Definition. Seattle shall develop a definition of an Equivalent Residential Unit ("ERU") based on meter size as set forth in Exhibit VI, number of residential units, water use, or other basis which shall be consistent with accepted industry standards. The Operating Board shall have the right to review and comment on the definition and Seattle shall consider the Operating Board's comments.
 - b. Record-Keeping. Water Utility shall provide Seattle with an annual accounting of its water connections by January 31st of each year, which shall be accurate as of December 31st of the preceding year. Water Utility shall report the size of the meter and other pertinent data such as the number of residential units or square footage served or water use. Seattle shall provide Water Utility with an annual accounting of its retail service connections on the same basis. Upon reasonable notice, Water Utility shall make its billing and connection records available to Seattle for inspection and copying during normal business hours, and Seattle's billing and connection records shall be made available to Water Utility on the same basis.
 - c. Annual Calculation of ERU's. Until such time as Seattle develops another basis, the calculation of ERU's in any year shall be the greater of:
 - i. Method One: The annual growth in the number of meters installed by Water Utility during the year taking into account the size of each meter, or
 - ii. Method Two: The annual growth in total water consumption of Water Utility divided by the annual average use of a single-family residential household of Seattle and all of its Wholesale Customers. The average annual growth shall be measured by a rolling three-year average of the most recent three years.

Water use resulting from catastrophes, e.g. large fire, shall be excluded for purposes of this calculation.

- d. Imposition of Facilities Charges. Seattle shall collect and Water Utility shall pay FCs based on the number of ERU's added during the previous month determined by the number of meters installed. Seattle shall pay FCs into the accounts of the Seattle Water Supply System on the same basis. Seattle shall prepare and distribute a report no later than March 31st of each year showing the ERU count of Seattle and each Wholesale Customer on such basis for the previous year and each year since the effective date of this contract.

Beginning in the June billing for each year, a truing charge for any underpayment of ERU's taking into account method two described above shall be added to Water Utility's bill in six equal installments.

- e. Emergency Situations. Water Utility and Seattle agree that emergency situations may arise that require a Partial Requirements Customer to temporarily demand water in excess of its long-term annual demand. In the event of an emergency, Seattle may suspend the use of Method Two identified above in the calculation of the ERU count for any such Partial Requirements Customer for a period not longer than two consecutive years.

- 48. Rate Setting. The structure of FCs water rates for water charged to the holders of Full Requirements Contracts and Partial Requirements Contracts shall be determined by Seattle, in its sole discretion, except that the price may not, without the consent of Water Utility, be set to collect more than the costs forecast under Section IV hereof and Rate of Return on Investment. FCs shall be calculated as set forth on page 1 of Exhibit VI.

- 49. Cost Audit. At the end of each fiscal year, Seattle shall provide a statement of actual costs allocated to each cost pool and other costs and revenues received, which statement may be audited by an external auditor selected by the Operating Board. In addition, Water Utility may have the statement audited by an external auditor of its choice, solely at Water Utility's expense.

- 50. Transition. Notwithstanding the foregoing, Water Utility and Seattle agree that it is appropriate to adjust certain terms of this contract for the period commencing with the date of this contract to December 31, 2011 ("Transition Period").

- a. Waiver of Supply FCs. Seattle shall not levy Supply FCs on Water Utility as long as the amount of water it purchases from Seattle does not exceed its old water allowance under the 1982 Water Purveyor Contract. This waiver shall continue until the earlier of (i) January 1, 2012; or, (ii) the year in which the average annual water demand of Water Utility exceeds its old water allowance. This waiver,

however, shall not relieve Water Utility from the record-keeping requirement of subsection 9 above.

- b. Transition Growth Surcharge. A transition growth surcharge of \$0.60 per CCF shall be applied to the rates of Water Utility for delivery of water in excess of the old water allowance of the 1982 Water Purveyor Contract for the Transition Period. The revenue from this surcharge shall be used to discount the base rates of the holders of Full and Partial Requirements Contracts by not more than \$0.16 per CCF. In the event that the revenues generated by the surcharge exceed those required to fund the discount, Seattle may keep the difference.

IV.F. Elective Services

1. Water Supply Services. Seattle may provide certain elective services (e.g. conservation, engineering) to Water Utility upon request by Water Utility. Such services shall be negotiated and contracted for separately between Water Utility and Seattle.
51. Transmission Wheeling. In consultation with the Operating Board, excess transmission capacity may be made available by Seattle for a fee for purposes of wheeling water between points within the Seattle Water Supply System to Water Utility or to others.
52. Water Quality. So long as Seattle owns and operates a water quality lab, Water Utility may use the services of that lab based on its published rates.

IV.G. Rate Adjustment

1. Rate Adjustment. Upon 120-days notice of its intent to do so (except for rates effective January 1, 2002, for which 30 days notice would be provided), Seattle may adjust water service rates and FCs to Water Utility subject to the terms of this contract. Rate adjustments will be effected only within five years of the completion of a cost of service study to be conducted by Seattle which shall include an analysis of the allocation of operation, maintenance and capital costs between cost pools. Such study shall be prepared in accordance with accepted industry standards. In addition, Seattle shall review the Operating Board's comments and recommendations on the rate proposal and provide a written explanation of any recommendations that are not accepted.
53. Rate Consultant. An independent rate consultant shall be selected by Seattle in consultation with the Operating Board. Detailed information and progress reports from the consultant will be made to Water Utility during the course of the study upon drafting of each major study section directly affecting Water Utility and other Wholesale Customers. A final consultant report shall be made available to Water

Utility not less than 30 days before Seattle formally transmits any resulting rate adjustment proposal to the Operating Board.

IV.H. Retail Rate-Setting

Each party to this contract shall have sole authority for establishing retail rates, connection charges and other fees and charges within its respective jurisdiction.

IV.I. Truing Actual Costs and Actual Revenues

A mechanism for reconciling revenue targets for the various cost pools and the actual revenues received during each year shall be implemented by Seattle as follows:

1. For each previously identified class of customers in each cost pool, Seattle shall maintain a running balance of the excess or deficit of actual rate revenues collected less actual expenses incurred. Each balance shall earn simple interest at the rate of Seattle's Average Cost of Debt. At the end of each year, each balance shall be adjusted to reflect the operating results of that year. The statement of these balances shall be reviewed and approved by an external auditor.
54. FC balances shall be carried forward as set forth in Section IV.E.7.
55. Each wholesale rate study shall adjust rates to eliminate the cost pool balances. ERU fees shall be based on the costs of increments in supply and transmission capacity, and shall not be adjusted to reflect surpluses or deficits in FC revenues.

SECTION V. OPERATING BOARD

1. Purpose. The purpose of the Operating Board is to provide certain limited authority to a board of representatives elected by the Wholesale Customers over policy and operational matters as they affect the Seattle Water Supply System.
2. Structure and Authority. The Operating Board shall have the powers and authority as set forth herein. Exhibits IV and V describe the structure and authority of the Operating Board. The matrix provided in Exhibit V is for illustrative purposes only. In the event of a conflict between provisions of this contract which grant specific powers to the Operating Board and Exhibits IV and V, such grants of specific powers shall control. The Operating Board shall not be formed until such time as there are six (6) signatories to Full or Partial Requirements contracts, or January 1, 2002, whichever comes first.
3. Review. The structure and authority of the Operating Board may be reviewed as of January 1, 2007 and every five years thereafter to determine its effectiveness in addressing regional and contractual issues. The review may address the composition of the Board and its powers and authority as set forth in Exhibits IV and V, provided

that notwithstanding any other term or provision of this contract, Seattle shall not have the power to disband the Operating Board nor take away or diminish the powers vested in the Operating Board as set forth in Sections II, III and IV of this contract. Either party may initiate the review. The reviewing party shall provide the other with its comments and proposals. The parties agree to consider the other party's comments and proposals and to respond in writing stating its reasons for rejecting any proposals and the reasons for its own counter-proposal. After consideration of all comments and proposals at each five year interval, Seattle may make changes in the structure and authority of the Operating Board that are not inconsistent with the provisions of this subsection.

SECTION VI. PLANNING

VI.A. Reporting of Planning Data

1. By no later than April 1 of each year, Water Utility shall report to Seattle and the Operating Board as follows:
 - a. Its annual and peak day total system demand for each year, during the term of this contract, as of December 31st of the previous year.
 - b. Its forecast of Full Water Requirements for the year including estimates of annual water consumption and maximum 24-peak demand for the ensuing calendar year, and for the fifth, tenth, and fifteenth year in the future. Such forecasts shall reflect the best judgment of Water Utility.
56. Water Utility shall report other data relating to water supply and demand as may be reasonably requested by Seattle for water planning purposes.
57. Records relevant to water supply and consumption within the possession of Seattle or Water Utility shall be provided to the other upon reasonable request.

VI.B. Submittal of Water Utility Comprehensive Plans

Water Utility shall provide a copy of its water comprehensive plan, including any amendments, to Seattle for inclusion in Seattle's Water System Comprehensive Plan.

VI.C. Seattle as Water Planning Agency

Seattle shall be the lead agency and primary planning authority for the purposes of fulfilling its obligations to provide for the Full Water Requirements of Water Utility. Seattle, in consultation with the Operating Board, shall examine and investigate water supplies suitable and adequate to meet the present and reasonable future needs of Seattle and the Wholesale Customers. Seattle shall prepare and adopt a plan for acquiring such water supplies in a timely fashion. The plan shall provide for the lands, waters, water

rights and easements necessary therefor, and facilities for retaining, storing and delivering such waters, including dams, reservoirs, aqueducts and pipelines to convey same throughout the Seattle Water Supply System. In preparing or adopting the plan, Seattle shall consider as possible alternatives or additional water supply sources the acquisition of water from sources controlled and/or developed by individual water utilities, legally constituted groups of water utilities and utilities which are not presently supplied by the Seattle Water Supply System. Seattle has final responsibility for the plan and for fulfilling the obligations of this contract. However, the Operating Board may participate in developing the plan by proposing goals and objectives for the Seattle Water Supply System, by making any additional suggestions and by acting in a review capacity.

VI.D. Comprehensive Capital Facilities Plan

Before ordering any major improvements to fulfill the requirements of this contract, Seattle shall adopt and maintain a comprehensive capital facilities plan for the Seattle Water Supply System, which provide for such improvements. When such plan is updated or amended, it shall be reviewed by the Operating Board prior to submission to the Seattle City Council. The Operating Board shall respond within 60 days of receipt of the plan, or its approval shall be presumed to be given. The response submitted by the Operating Board regarding facilities substantially affecting Water Utility and other Wholesale Customers shall be seriously considered by Seattle. Seattle shall reply to the Operating Board within 90 days with its comments. The Operating Board and Seattle shall use their best efforts to arrive at a mutually acceptable plan.

VI.E. Emergency Planning

An emergency plan shall be prepared and maintained by Seattle as part of its Water System Comprehensive Plan to provide for water supply in the event of drought or disaster. Such plan shall be prepared pursuant to the procedure outlined in Section VI.D. Water Utility shall use reasonable efforts to comply with the provisions of such plan, or alternatively, Water Utility may adopt its own emergency plan if it believes it is prudent to do so.

SECTION VII. PAYMENT

VII.A. Collection of Money Due City

Seattle shall bill Water Utility on a monthly basis for all charges due under this contract. Water Utility shall pay such charges within 60 days of the billing date. Any amounts disputed by Water Utility shall be paid under protest within the 60-day time period.

VII.B. Penalties for Late Payment

All late payments, and any refund of an amount in dispute that was paid under protest, shall accrue interest at 1% per month.

VII.C. Disputes

Water Utility may dispute the accuracy of any portion of charges billed by Seattle by taking the following actions within the 60-day payment period by notifying Seattle in writing of the specific nature of the dispute and paying the undisputed portion of the charges.

Seattle shall consider and decide any billing dispute in a reasonable and timely manner. Any billing disputes that remain after such consideration shall be reconciled pursuant to the dispute resolution procedures of this contract.

SECTION VIII. CONTRACT AMENDMENTS

Seattle shall notify Water Utility and all other holders of Full Requirements Contracts of any amendments to such contracts within 30 days of the execution of such amendment. Water Utility shall then have 90 days to decide whether to include such amendment in this contract by giving written notice to Seattle of its election to do so. Upon the issuance of such notice, Seattle shall issue the amendment to Water Utility and the amendment shall be final and binding upon both parties upon mutual execution.

SECTION IX. DISPUTE RESOLUTION

Dispute resolution shall proceed in four steps as follows:

IX.A. Operating Board Review

Any dispute regarding the terms of this contract shall first be referred to the Operating Board for consideration and recommendation. Each party shall submit a written statement regarding the dispute to the Operating Board.

1. If the dispute cannot be resolved in discussions with the Operating Board, then the Operating Board shall provide written recommendations to each parties within 60 days of the above submittal setting forth its interpretation of the applicable facts and law.
58. If either party rejects the written recommendation of the Operating Board, that party shall within 10 days, notify the other party in writing of its reasons.

IX.B. Seattle City Council Review

The written statements of the parties, the recommendations of the Operating Board and the written reasons for either party's rejection of those recommendations shall then be submitted to the Seattle City Council for review.

1. Within 60 days of the submittal of the written materials, the Seattle City Council shall provide written recommendations to resolve the dispute.

59. If either party rejects the written recommendation of the Seattle City Council, that party shall within 10 days notify the other party in writing its reasons.

IX.C. Non-binding Mediation

Within 10 days of receiving the written rejection of the Seattle City Council's recommendations by one or both parties, each party shall designate in writing not more than 5 candidates it proposes to act as a non-binding mediator.

1. If the parties cannot agree on one of the mediators from the combined list within 5 days, the Operating Board shall within an additional 5 days select one of the mediators from either list to serve as mediator.

60. Upon selection of the mediator, the parties shall use reasonable efforts to resolve the dispute within 30 days with the assistance of the mediator.

IX.D. Resort to Litigation

If mediation fails to resolve the dispute within 30 days of selection of the mediator, the parties may thereafter seek redress in court subject to Section X.H. below.

SECTION X. MISCELLANEOUS

X.A. Notification

Whenever written notice is required by this contract, that notice shall be given to the following representatives by actual delivery or by the United States mail (registered or certified with return receipt requested,) addressed to the respective party at the following addresses or a different address hereafter designated in writing by the party):

SEATTLE:

Director
Seattle Public Utilities
Dexter Horton Building, 10th Floor
710 Second Avenue
Seattle, WA 98104

WATER UTILITY:

Manager
Shoreline Water District
P.O. Box 55367
Shoreline, WA
98155

The date of giving such notice shall be deemed to be the postmarked date of mailing.

X.B. Severability

The purpose of this contract is to provide for long-term water supply planning and certainty for both Seattle and Water Utility through adoption of orderly plans calling for the expenditure of vast sums of money for regional water supply and transmission facilities. It is the intent of the parties that if any provision of this contract or its application is held by a court of competent jurisdiction to be illegal, invalid, or void, the validity of the remaining provisions of this contract or its application to other entities, or circumstances shall not be affected. The remaining provisions shall continue in full force and effect, and the rights and obligations of the parties shall be construed and enforced as if the contract did not contain the particular invalid provision; provided, however, if the invalid provision or its application is found by a court of competent jurisdiction to be substantive and to render performance of the remaining provisions unworkable and non-feasible, is found to seriously affect the consideration and is inseparably connected to the remainder of the contract, the entire contract shall be null and void.

X.C. Consent

Whenever it is provided in this contract that the prior written consent or approval of either party is required as a condition precedent to any actions, in each such instance said consent or approval shall not be unreasonably withheld, and in each such instance where prior consent is sought, failure of the party to respond in writing within 90 days of the request shall be deemed as that party's consent or approval unless expressly stated herein. This provision does not apply to requests for amendments of this contract.

X.D. Emergency Situations

Nothing in this contract shall be deemed to preclude either party from taking necessary action to maintain or restore water supply in emergency situations and such action shall not be deemed a violation of this contract.

X.E. No Joint Venture - Individual Liability

This is not an agreement of joint venture or partnership, and no provision of this contract shall be construed so as to make Water Utility individually or collectively a partner or joint venturer with any other Wholesale Customer or with Seattle. Neither party is an agent of the other. Neither Seattle nor Water Utility shall be liable for the acts of the other in any representative capacity whatsoever.

X.F. Complete Agreement

This contract represents the entire agreement between the parties hereto concerning the subject matter hereof. This contract may not be amended except as provided herein.

X.G. Relinquishment of Prior Contract

Upon entering into this contract, Water Utility relinquishes its then existing 1982 Water Purveyor Contract with Seattle and the terms and conditions of that 1982 Water Purveyor Contract shall have no further force and effect.

X.H. Venue, Jurisdiction and Specific Performance

In the event of litigation between the parties, venue and jurisdiction shall lie with the King County Superior Court of the State of Washington. The parties shall be entitled to specific performance of the terms hereof.

X.I. Default

In the event of default of any provision of the contract, the non-defaulting party shall issue written notice to the other party setting forth the nature of the default. If the default is for a monetary payment due hereunder, the defaulting party shall have thirty (30) days to cure the default. In the event of other defaults, the non-defaulting party shall use its best efforts to cure the default within ninety (90) days. If such default cannot be reasonably cured within such ninety (90) day period, the non-defaulting party shall, upon written request prior to the expiration of the ninety (90) day period be granted an additional sixty (60) days to cure the default.

X.J. Force Majeur

The time periods for Seattle's performance under any provisions of this contract shall be extended for a reasonable period of time during which Seattle's performance is prevented, in good faith, due to fire, flood, earthquake, lockouts, strikes, embargoes, acts of God, war and civil disobedience. If this provision is invoked, Seattle agrees to immediately take all reasonable steps to alleviate, cure, minimize or avoid the cause preventing such performance, at its sole expense.

X.K. Successors

This contract shall inure to the benefit of and be binding upon the parties and their successors and assigns.

X.L. Exhibits

Exhibits I through IX are attached hereto and are hereby incorporated by reference as if set forth in full herein.

SIGNATURE PAGE

IN WITNESS WHEREOF, the parties hereby execute this contract.

SHORELINE WATER DISTRICT

BY: [Signature]
TITLE: PRESIDENT of BOC
DATE 11-5-01

AUTHORIZING LEGISLATION: ORDINANCE/RESOLUTION 2001-11-18

THE CITY OF SEATTLE

BY: [Signature]
Director, Seattle Public Utilities

DATE: 11-5-01

AUTHORIZING LEGISLATION: ORDINANCE _____

LIST OF EXHIBITS

- I. Contracts, etc.
- II. Minimum Hydraulic Gradient of Water Supplied
- III. Demand Charge Methodology
- IV. Operating Board Structure
- V. Contract Authority Matrix
- VI. Calculation of ERU's as a Part of Facilities Charges
- VII. List of Supply Facilities
- VIII. List of Transmission Facilities
- IX. Cost Centers used for Operations Cost Indexes

EXHIBIT I

List of documents, commitments, adjustments, reductions, agreements, and/or written approvals by Seattle regarding the supply, purchase and/or resale of water according to Sections I.B. and II.B. of this Contract:

1. Intertie Agreements:

- a. A Resolution Approving Interlocal Agreement with the City of Mountlake Terrace to Construct and operate (2) Emergency interties (Res. 95--38) 10.17.95
- b.
- c.

2. Independent Well Sources:

- a.
- b.
- c.

3. Water Supply Contracts To Other Water Utilities:

- a.



City of Seattle

Gregory J. Nickels, Mayor

Seattle Public Utilities

Chuck Clarke, Director

Attachment A

July 7, 2005

Stu Turner, Manager
Shoreline Water District
P. O. Box 55367
Shoreline, WA 98155

Re: Modification to Exhibit II of Wholesale Water Supply Contract

Dear Mr. Turner:

Earlier this year, the Operating Board agreed with a Seattle recommendation that a footnote should be added to Exhibit II of the new wholesale contracts to clarify that responsibilities related to meeting fire flows reside with the retail provider. The following language has been added to the attached new version of Exhibit II:

"All Points of Delivery provide a wholesale level of service. Seattle bears no responsibility for retail service level obligations, such as fire flow or emergency backup."

We have also made one additional small change to Exhibit II for your district, which is to insert standard language that appears on other wholesale customers' Exhibit IIs related to maximum flow rates.

Please sign in the space below on the two originals provided to indicate that you acknowledge and accept the new version of Exhibit II, return one of the originals to me for our records and retain one for your records. If you have any questions, please contact me at (206) 684-7936, or Celia Kennedy, Associate Wholesale Contracts Manager at (206) 684-4606.

Thank you for your attention to this matter.

Sincerely,


Lisa Espinosa
Wholesale Contracts Manager


Stu Turner
Shoreline Water District

CUSTOMARY POINTS OF DELIVERY, MINIMUM HYDRAULIC GRADIENTS, AND MAXIMUM FLOW RATES OF WATER SUPPLIED

METER SERVICE				MINIMUM HYDRAULIC GRADIENT FOR PLANNING PURPOSES AT STATION UPSTREAM OF METER (FEET NAVD-88 Datum)	MAXIMUM FLOW RATE UP TO WHICH THE MINIMUM HYDRAULIC GRADIENT APPLIES (gpm) ⁽²⁾
LOCATION	STATION NUMBER ⁽¹⁾	PIPELINE SEGMENT NUMBER ⁽¹⁾	SIZE OF METER (IN.)		
8 th Ave NE & NE 160 th Street	101	7	10	505	805
16 th Ave NE & NE 192 nd Street	102	7	10	520	735
32 nd Ave NE & NE 195 th Street	103	7	6	525	325
8 th Ave NE & NE 185 th Street	104	7	8	515	965
TOTAL:					2,830

Notes:

- (1) Station and Pipeline Segment Numbers pertain to the demand metering program.
- (2) City of Seattle's estimate of Water Utility's average daily demand for 2020 with a peaking factor of 2.0 for peak day.
- (3) All Points of Delivery provide a wholesale level of service. Seattle bears no responsibility for retail service level obligations, such as fire flow or emergency backup.

EXHIBIT II

CUSTOMARY POINTS OF DELIVERY, MINIMUM HYDRAULIC GRADIENTS, AND MAXIMUM FLOW RATES OF WATER SUPPLIED

SECTION XI. METER SERVICE					MINIMUM HYDRAULIC GRADIENT FOR PLANNING PURPOSES AT STATION UPSTREAM OF METER (FEET NAVD-88 Datum)	MAXIMUM FLOW RATE UP TO WHICH THE MINIMUM HYDRAULIC GRADIENT APPLIES ² (gpm)
LOCATION	STATION NUMBER (1)	PIPELINE SEGMENT NUMBER ¹	SIZE OF METER (IN.)			
8 th Ave NE & NE 160 th Street	101	7	10		505	805
16 th Ave NE & NE 192 nd Street	102	7	10		520	735
32 nd Ave NE & NE 195 th Street	103	7	6		525	325
8 th Ave NE & NE 185 th Street	104	7	8		515	965
TOTAL:						2,830

Notes:

- (1) Station and Pipeline Segment Numbers pertain to the demand metering program.
 (2) City of Seattle's estimate of Water Utility's average daily demand for 2020 with a peaking factor of 2.0 for peak day use.

EXHIBIT III**DEMAND CHARGE METHODOLOGY**

The policy of Seattle Public Utilities is to supply water to its Wholesale Customers at, as near as is practical, the twenty-four hour average flow rate, during the peak demand season (June through August). To comply, the Wholesale Customers have to construct adequate storage volume within their individual systems, or sometimes collectively, so as to avoid excessive peak flow withdrawals from the Seattle transmission pipelines. The Demand Metering Program is established to set performance standards, and to monitor the Wholesale Customer's compliance with this policy. If an individual Water Utility exceeds the prescribed threshold, a "demand charge" is calculated.

Except where other agreements supersede the provisions of this contract, each Water Utility shall be subject to a demand charge based on effective deficient storage, as determined by the peak instantaneous flow rate, and the equivalent financing costs to provide storage. The demand charge rate (i.e., dollars per 1000 gallons of deficient storage) shall be based on the equivalent cost of providing the deficient storage. This rate will be determined as part of each rate study.

The Demand Metering Program is charged with implementation of the "demand charge" methodology. It shall be the responsibility of the Seattle, in consultation with the Operating Board, to determine the appropriate means to achieve the program's purpose. The options that may be considered range from temporary suspension on a year by year basis to full activation, as described below.

There shall be no requirement for Seattle to install demand-metering equipment at each Service Connection in order to assess a demand charge. Seattle may choose to apply "demand metering" selectively to certain parts of the transmission network that are designated as "critical" from the standpoint of hydraulic capacity or other operational considerations. Seattle may choose to apply "demand metering" intermittently in various parts of the transmission network for the purpose of monitoring for compliance by individual Wholesale Customers or groups of Wholesale Customers on a given line segment.

EXHIBIT IV**OPERATING BOARD STRUCTURE**

1. **Structure.** The Operating Board (or "Board") shall be structured as follows:
 - a. The Board shall consist of seven (7) members, composed of three members representing Seattle Public Utilities (SPU), three members representing Seattle's Wholesale Customers selected as described below and one independent party selected as set forth below to be a tie-breaker as needed. Board members shall, to the best of their ability, act in the best interests of the Seattle Water Supply System as a whole and shall not represent the interest of a group of utilities or an individual utility.
 - b. The term of each Board position shall commence on January 1 and shall be for four (4) years. Terms of each Board position shall be staggered such that no more than two positions are renewed in any single year. Board members may serve not more than three successive terms.
 - c. Three Board members representing the Wholesale Customers will be selected from persons nominated by the holders of Full Requirements and Partial Requirements Contracts and sorted into three categories based on utility size, calculated by ERU's. The selected categories will be small, medium and large utilities, which will be made up from approximately equal numbers of contract holders. Each category of utility may elect, by majority vote (one vote per utility) its representative to the Operating Board.
 - d. The initial Operating Board will be created when there are at least six (6) signatories to the Full and Partial Requirements Contracts or January 1, 2002, whichever comes first. The initial Board will then be recomposed pursuant to the above subsection on January 1, 2002 and every 5 years thereafter.
 - e. The seventh member of the Board shall be a person having expertise in the operations of regional water supply systems. Such person shall be selected by majority vote of the other Board members. In the event of a deadlock in selecting the independent representative, the independent board member shall be selected by Judicial Arbitration and Mediation Services Inc., of Seattle, Washington or its successor. The seventh member shall not vote on issues coming before the Board unless there is a deadlock in the voting among the other six Board members. The seventh member may nevertheless express his or her opinions in Operating Board discussions. Such member shall have no employment, financial or contractual relationship with Seattle nor any Wholesale Customer and shall have no other actual or apparent conflict of interest in holding this position.

2. Voting Except as otherwise provided above, each member of the Board shall have one vote on all matters coming before the Board. Each Board member may appoint an alternate to vote in his or her absence. A quorum of four (4) Board members present shall be required for any vote. Members of the Board may not grant proxies for any vote.
3. Chairperson The Board shall have a Chairperson who will be selected and have duties as defined below:
 - a. The Chairperson shall be selected at the first regularly scheduled meeting of each new year.
 - b. For the initial year, a designated representative of SPU shall be the Chairperson of the Board. All Chairpersons thereafter shall be selected by the Board using a nomination and voting process.
 - c. Nominations for the position of Chairperson shall be taken from Board members. The Chairperson shall be selected based upon the simple majority vote of Board members. Should the Board fail to elect a Chairperson at the first regularly scheduled meeting of the new year, a designated representative from SPU shall be the acting Chairperson until such time as the Board elects a Chairperson.
 - d. The Chairperson shall have the responsibility to call meetings, determine the agenda and preside over meetings. In the absence of the Chairperson, for whatever reason, a designated representative from SPU shall be the Acting Chairperson for that meeting. The Chairperson shall also act as the spokesperson for the Board and liaison between the Administrator and the Seattle City Council's Committee on Water Resources and Public Health or successor committees.
4. Schedule / Procedures. The Board shall adopt a regular meeting schedule and notify all Wholesale Customers of the schedule. The Operating Board may adopt its own internal procedures. The latest edition of Roberts Rules of Order shall, in the absence of agreement by the Operating Board on procedural matters, govern all meetings and votes of the Operating Board.
5. Reporting. The Board will provide reports to the Wholesale Customers and to the Seattle City Council Committee on Water Resources, or successor City Council committee, on its decisions and recommendations in a timely manner.
6. Responsibilities and Authority of the Board. The Contract Authority Matrix, attached as Exhibit V, provides an outline of the responsibilities and authority of the Board for illustration purposes only. It also provides details of the relationship between the Operating Board, the Seattle City Council, and the Seattle Public Utilities. Where no clear responsibility or authority on an issue is established in this contract the responsibility and authority shall rest with the Seattle City Council.
7. Expenses. The Board shall be authorized to incur reasonable expenses which will be allocated by the Board to either or both of the New Transmission or Supply Cost Pools.

EXHIBIT V

CONTRACT AUTHORITY MATRIX

	SPU ADMINISTRATOR	OPERATING BOARD	COUNCIL
CONTRACT			
Terms & conditions (amendments)	Implements	Recommends	Authorizes
OPERATING BOARD			
Structure & responsibilities	Recommends	Recommends	Authorizes
FINANCIAL			
Cost allocation structure	Recommends	Reviews & Recommends	Authorizes
Wholesale Rates	Develops & Implements	Review & Recommends	Authorizes
New Financial Policies	Develops & Implements	Reviews & Recommends	Authorizes
Purchase and disposal of regional property	Recommends	Recommends	Authorizes
Allocation of new regional projects costs	Recommends	Authorizes	Reviews
Issuance of Bonds	Implements	-	Authorizes
Regional Budget	Develops & Implements	Reviews & Recommends	Authorizes
Selection of vendors, consultants & contractors (for regional projects)	Authorizes	Recommends	-
Regional CIP	Develops & Implements	Recommends	Authorizes

	SPU ADMINISTRATOR	OPERATING BOARD	COUNCIL
SUPPLY			
Yield Analysis	Develops	Reviews	Reviews
Selections of new sources	Recommends	Recommends	Authorizes
New source criteria	Implements	Authorizes	Reviews
New supply cost allocation	Develops & Implements	Authorizes	Reviews
Allocation of supply to new customers	Recommends	Recommends	Authorizes
Reserves	Develops & Implements	Authorizes	Reviews
Allocation of block sales quantities	Implements	Recommends	Authorizes
Water Shortage Contingency Plan	Implements	Develops & Recommends	Authorizes
WATER CONSERVATION			
1% Program	Develops & Implements	Reviews	Reviews and Approves
New Goals	Implements	Develops & Authorizes	Reviews
Incentive & disincentive programs	Implements	Develops & Authorizes	Reviews
Conservation Potential Assessment	Develops & Approves	Reviews	Reviews

	SPU ADMINISTRATOR	OPERATING BOARD	COUNCIL
WATER QUALITY			
Monitoring responsibility	Develops & Approves	Reviews	Reviews
Selection of new treatment techniques	Reviews & Implements	Recommends	Authorizes
New treatment cost allocation	Recommends & Implements	Authorizes	Reviews
New treatment regulations	Reviews & Implements	Reviews	Reviews
Flushing allowances	Reviews	Authorizes	Reviews
Solutions to identified regional water quality deficiencies	Recommends & Implements	Recommends	Authorizes
REGIONAL INFRASTRUCTURE			
Operation of System	Implements	Recommends	Authorizes
Access to transmission	Recommends	Recommends	Authorizes
Allocation of excess capacity	Recommends & Implements	Recommends	Authorizes
Transmission capacity cost allocation	Recommends & Implements	Authorizes	Reviews
New regional infrastructure	Recommends	Authorizes	Authorizes
New regional project cost allocation	Recommends	Authorizes	Reviews
Wheeling	Recommends	Recommends	Authorizes
Wheeling cost	Develops & Implements	Reviews & Recommends	Authorizes

Regional CIP prioritization	Develops & Recommends	Reviews & Recommends	Authorizes
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	SPU ADMINISTRATOR	OPERATING BOARD	COUNCIL
OPERATIONS & MAINTENANCE			
Best Management Practices	Recommends & Implements	Develops & Approves	Reviews
Demand Forecast	Develops & Approves	Reviews	Reviews
Reliability standard	Develops & Recommends	Reviews & Recommends	Authorizes
REGIONAL ISSUES			
CPS Water Suppliers Forum	Represents	-	Reviews
Tacoma Second Supply Project	Represents	Recommends	Represents
HCP's	Represents	Recommends	Authorizes
Regional conservation organizations	Represents	Recommends	Authorizes

EXHIBIT VI**Calculation of ERU's as a Part of Facilities Charges**

The ERU Fee is:

- the flat debt service payment required to finance the facility providing the ERU over the lesser of (i) the facility life or (ii) the period over which new demand will fully utilize the facility's supply
- divided by -
- the number of new ERU's of demand expected in each year.

Seattle's Average Cost of Debt shall be used as the interest rate in this calculation. In the event that several new supply facilities are added simultaneously, the facilities may be considered together as providing a total new supply capacity for a total construction cost.

Example: A new facility costing \$100 million is built with a capacity of 100,000 ERU's.

Growth of 5,000 ERU's per year is expected over the next 20 years, so the facility is projected to be supplying its full capacity in 20 years. Were this facility financed over 20 years at 6% interest, the flat annual debt service payment would be \$8.7 million. Each ERU would cost 0.02% of this annual amount, or about \$1,740.

At the time a new supply facility is added, the ERU price for this supply shall be calculated. This ERU price shall then be averaged with the then-current ERU Fee. This average shall be weighted by the number of unpurchased ERU's available at the then-current ERU fee and the number of new ERU's being added at the new ERU price. This weighted average shall be the new ERU Fee, and the number of ERU's available at the fee shall be the sum of the unsold ERU's at the previous fee and the ERU capacity of the new facility.

Example: 10 years ago, a \$100 million facility was constructed that can supply 100,000 ERU's. Growth and demand projections have proven accurate, and now 50,000 ERU's have been purchased, each for \$1,740. The facility also has an additional 50,000 ERU's still available at the same price. This year, we construct a facility worth \$70 million, with a capacity of 40,000 ERU's. Based on demand projections, this facility (on it's own) would be fully utilized in 10 years, and it's ERU price is therefore \$2,375. The average price of any of the 90,000 available ERU's is therefore \$2,022.

EXHIBIT VI**ERU's by Connection Size**

<u>Connection Size</u>	<u>Number of ERU's</u>
¾" and smaller	1
1"	2
1 1/2"	5
2"	8
3"	22
4"	31
6"	66
8"	112
10"	169
12"	238

ERU Proving Methodology

The size of the water service connection used to serve an establishment depends upon both the total demand of that establishment and the instantaneous flow required by that establishment. For this reason, connection size is only a general indicator of the annual demand placed on water supplies by the establishment.

EXHIBIT VII**List of Seattle Supply System Facilities****1. Cedar Source**

- All roads, buildings, structures, water supply facilities, recreational and educational facilities, and fisheries enhancement and mitigation facilities located within or close to the Cedar River Hydrographic Watershed boundary as defined by Seattle land ownership, including the land itself, and any capitalized studies related to the above. Excepted are facilities solely owned by Seattle City Light for the purpose of power generation. Facilities shared by Seattle City Light and Seattle Public Utilities shall be part of the Seattle Supply System only to the extent of SPU share or responsibility.
- All facilities located within the Lake Youngs Reservation as defined by Seattle ownership of the land except for conveyance facilities used to transport finished water during non-emergency operation
- All facilities located within the Lake Youngs Aqueduct, the Landsburg Tunnel, and the Lake Youngs Supply Lines right-of-way, including the right-of-way itself
- Existing Morse Lake Floating Pump Stations

2. Tolt Source

- All roads, buildings, structures, water supply facilities, recreational and educational facilities, and fisheries enhancement and mitigation facilities located within or close to the South Fork Tolt River Hydrographic Watershed boundary as defined by Seattle land ownership, including the land itself, and any capitalized studies related to the above. Excepted are facilities solely owned by Seattle City Light for the purpose of power generation. Facilities shared by Seattle City Light and Seattle Public Utilities shall be part of the Seattle Supply System only to the extent of SPU share or responsibility.
- Tolt Treatment Facility

3. Highline Wellfield

- Riverton Wells, including all pumping and treatment equipment, original yard piping, to the connection to CRPL4, and the low flow piping to Riverton Reservoir
- Boulevard Well, including all pumping and treatment equipment, and all piping up to the connection to CRPL4

4. Other

- Water Reuse Program
- One Percent Conservation Program through December 31, 2001
- Commercial Incentive Program
- Commercial Toilet Retrofit Program
- Showerhead retrofit Program
- The Seattle Forecasting Model (SEAFM Model)

- GIS Projects related to facilities identified herein as part of the Seattle Supply System

EXHIBIT VIII**List of Seattle Transmission Facilities****1. Pipelines**

- Tolt Pipeline No. 1 from the Tolt Regulating Basin to Lake Forest Reservoir, including any transfer and ancillary small diameter parallel pipes
- Tolt Pipeline No. 2 (where constructed), including any transfer and ancillary small diameter parallel pipes
- Tolt Tieline
- Tolt Eastside Supply Line (from TESS Junction to the intersection of SE 16th ST and 145th Place SE)
- Tolt Eastside Line Extension (from the intersection of SE 16th ST and 145th Place SE to Eastside Reservoir)
- The 540 head Pipeline from Maple Leaf Reservoir to Lake Forest Reservoir
- Lake Youngs Bypass No. 4 from the outlet of each of the Cedar Treatment Facility clearwells to Control Works
- Lake Youngs Bypass No. 5 from the outlet of each of the Cedar Treatment Facility clearwells to the Lake Youngs Tunnel
- The Lake Youngs Tunnel (from the original lake outlet to Control Works)
- The Maple Leaf Pipeline (from the intersection of 18th Avenue E. and E. Prospect Street to Maple Leaf Reservoir)
- Cedar River Pipeline No. 1 from Control Works to Volunteer Reservoir
- Cedar River Pipeline No. 2 from Control Works to Lincoln Reservoir
- Cedar River Pipeline No. 3 from Control Works to the intersection of 18th Avenue E. and E. Prospect Street
- 30" intertie between Cedar River Pipelines 2 and 3 in east Olive Street
- Cedar River Pipeline No. 4 from Control Works to the West Seattle Pipeline
- Cedar Eastside Supply Line (from the Cedar Wye to the intersection of SE 16th St and 145th Place SE)
- West Seattle Pipeline from Augusta Gatehouse to Cedar River Pipeline 4
- The 8th Avenue S. Pipeline between S. 146th Street and S. 160th Street
- The Bow Lake Pipeline (between 8th Avenue S. and CRPL 4, and as relocated outside runways at Seatac Airport)
- The Burien Feeder (in S. 146th Street between 8th Avenue S. and CRPL 4)
- The Fairwood Line (between Fairwood Pump Station and Soos Reservoirs)
- The 24-inch discharge pipeline of Lake Youngs Pump Station up to Soos Reservoirs
- The 12-inch discharge pipeline of Lake Youngs Pump Station up to Soos Reservoirs
- The 630 head pipeline between Lake Youngs Pump Station and the Cedar River WSD pump station at the eastern boundary of the Lake Youngs Reservation

2. Reservoirs, Tanks, and Standpipes, including overflow pipes, all valves, appurtenances, and disinfection facility located on the premises of each storage facility, unless otherwise noted

- Lake Forest Reservoir
- Eastside Reservoir
- Riverton Reservoir
- Maple Leaf Reservoir (excluding Roosevelt Way Pump Station and its suction and discharge piping, Maple Leaf Tank and 520 zone piping, except where solely serving the disinfection facility)
- Soos Reservoirs

3. Pump Stations, Major Valve Structures, and other Facilities

- Eastgate Pump Station
- TESS Junction Pump Station
- Lake Hills Pump Station
- Maplewood Pump Station
- Maple Leaf Pump Station
- Bothell Way Pump Station
- Fairwood Pump Station
- Lake Youngs Pump Station
- The Control Works
- Augusta Gatehouse

Purveyor tap and meter installations shall not be part of the Regional Transmission System. The cost of improvements to such installations shall be borne by the purveyor served by the installation regardless of the cause for the improvements provided that such cause is consistent with AWWA and safety standards and practices.

The facilities include the appurtenance of these transmission facilities including but not limited to rights of way, line valves, system meters and remote automation devices.

EXHIBIT IX**Cost Centers Used for Operations Cost Indices**

The following costs centers or successor cost centers that capture the direct costs of operation of Existing Supply Facilities, Existing Transmission Facilities and the 1% Program shall be used as the indices for operations cost in the Existing Supply Cost Pool, Existing Transmission Cost Pool and for the 1% Program in the New Supply Cost Pool.

Supply

Program	Project	Project Name	Activity
Communications	N1203	Communications Activity Group	N120304 Purveyor Relations
Audit & Accounting	N3303	Customer Audit	N330303 Purveyor Audit
Watershed Management	N5401	Program Management	N540194 Department Support
Watershed Management	N5401	Program Management	N540195 General Expense
Watershed Management	N5401	Program Management	N540196 General Management
Watershed Management	N5401	Program Management	N540197 Training
Watershed Management	N5401	Program Management	N540198 Safety
Watershed Management	N5401	Program Management	N540199 Personnel
Watershed Management	N5401	Program Management	N540289 Capital Purchase
Watershed Management	N5403	Support Services	N540301 Modified Duty
Watershed Management	N5403	Support Services	N540302 Procuring/Paying/Receiving
Watershed Management	N5403	Support Services	N540303 Vehicle Equipment Downtime
Watershed Management	N5404	Watershed Protection	N540401 Hydrological Data Collection
Watershed Management	N5404	Watershed Protection	N540402 Fire Protection
Watershed Management	N5404	Watershed Protection	N540403 Inspection
Watershed Management	N5404	Watershed Protection	N540404 Boundaries
Watershed Management	N5405	Facility Management	N540501 WS Grounds
Watershed Management	N5405	Facility Management	N540502 WS Buildings
Watershed Management	N5405	Facility Management	N540503 WS Facilities & Roads
Watershed Management	N5406	Watershed Road Maintenance	N540601 Grade/Gravel/Ditching
Watershed Management	N5406	Watershed Road Maintenance	N540602 Bridges/Streams Culvert
Watershed Management	N5406	Watershed Road Maintenance	N540603 Roads/Row/Vegetation Cutting
Watershed Management	N5406	Watershed Road Maintenance	N540604 Tolt Roads & Streams
Watershed Management	N5407	Watershed Operations Support	N540701 Veh/Equipment Management
Watershed Management	N5407	Watershed Operations Support	N540702 Veh/Equip/Tool Repair
Watershed Management	N5408	Water Quality & Hydrology	N540801 Water Quality Monitoring
Watershed Management	N5408	Water Quality & Hydrology	N540802 Hydrological Monitoring
Watershed Management	N5409	Public/Cultural Programs	N540901 Recreation Planning
Watershed Management	N5409	Public/Cultural Programs	N540902 Management & Research
Watershed Management	N5409	Public/Cultural Programs	N540903 Watershed Education
Watershed Management	N5409	Public/Cultural Programs	N540904 Watershed Public Information
Watershed Management	N5410	Wildlife & Fisheries Programs	N541001 Program Planning & Evaluation
Watershed Management	N5410	Wildlife & Fisheries Programs	N541002 Interagency/Public Involvement
Watershed Management	N5410	Wildlife & Fisheries Programs	N541003 Ecological Monitoring & Research
Watershed Management	N5410	Wildlife & Fisheries Programs	N541004 Habitat & Species Inventory
Watershed Management	N5410	Wildlife & Fisheries Programs	N541005 Habitat Enhancement/Restoration

Watershed Management	N5411	Resource Information Mgmt	N541101 Program Plan/Evaluation
Watershed Management	N5411	Resource Information Mgmt	N541102 Information Maintenance
Watershed Management	N5411	Resource Information Mgmt	N541103 Information Services
Watershed Management	N5412	Special Projects	N541202 Silviculture
Watershed Management	N5412	Special Projects	N541205 Land Exchanges/Acquisitions
Watershed Management	N5415	Cedar HCP	N541501 ASSESS OF EXPAND FOREST STAND
Watershed Management	N5415	Cedar HCP	N541502 ASSESS EXPAND FOREST ATTRIBUTE
Watershed Management	N5415	Cedar HCP	N541503 AUGMENT FOREST HABITAT INV
Watershed Management	N5415	Cedar HCP	N541504 LONG-TERM FOREST HABITAT
Watershed Management	N5415	Cedar HCP	N541505 OLD-GROWTH CLASSIFICATION
Watershed Management	N5415	Cedar HCP	N541506 RIPARIAN RESTOR PROJECT MONIT
Watershed Management	N5415	Cedar HCP	N541507 UP0LAND FOREST RESTOR PROJ MONT
Watershed Management	N5415	Cedar HCP	N541515 GIS DATA COMPATIBILITY STUDY
Watershed Management	N5415	Cedar HCP	N541516 FOREST HABITAT MODELING
Watershed Management	N5415	Cedar HCP	N541517 SPECIE HABITAT RELATION MODEL
Watershed Management	N5416	Cedar HCP	N541601 CRHCP GIS SUPPORT
Watershed Management	N5416	Cedar HCP	N541603 CRHCP TECHNICAL SUPPORT
Watershed Management	N5417	Cedar HCP	N541701 ROAD MAINTENANCE
Watershed Management	N5418	Cedar HCP	N541801 EXPERIMENTAL STREAM MONITORING
Watershed Management	N5418	Cedar HCP	N541802 LONG-TERM STREAM MONITORING
Watershed Management	N5418	Cedar HCP	N541803 AQUATIC RESTORATION MONITORING
Watershed Management	N5418	Cedar HCP	N541804 BULL TROUT SURVEYS (ADULT)
Watershed Management	N5418	Cedar HCP	N541805 BULL TROUT SPAWNING SURVEY
Watershed Management	N5418	Cedar HCP	N541806 BULL TROUT FRY/JUVENILE SURVEY
Watershed Management	N5418	Cedar HCP	Riparian Zone Studies
Watershed Management	N5418	Cedar HCP	N541809 BULL TROUT STREAM DISTRIBUTION
Watershed Management	N5418	Cedar HCP	N541810 BULL TROUT REDD INUNDATION STU
Watershed Management	N5418	Cedar HCP	N541811 COMMON LOON MONITORING
Water Quality & Supply	N5503	Water System Operations	N550301 Water Management
Water Quality & Supply	N5503	Water System Operations	N550302 Water System Control
Water Quality & Supply	N5503	Water System Operations	N550303 Anadromous Fishery Mgmt
Water Quality & Supply	N5503	Water System Operations	N550304 SCADA Management
Water Quality & Supply	N5503	Water System Operations	N550305 Highline Well Field
Water Quality & Supply	N5503	Water System Operations	N550306 Morse Lake PS
Water Quality & Supply	N5503	Water System Operations	N550307-SAFETY PROCESS MGMT COMPLIANCE
Water Quality & Supply	N5503	Water System Operations	N550308-EPA RISK MGMT COMPLIANCE
Water Quality & Supply	N5504	Water System Analysis	N550401 Eng Analysis/Modeling
Water Quality & Supply	N5504	Water System Analysis	N550402 Water Rights Mgmt

Water Quality & Supply	N5504	Water System Analysis	N550403 DEMAND METERING
Water Quality & Supply	N5505	Surface Water Trtmnt Rule	N550501 Monitoring, Reporting & Admin
Water Quality & Supply	N5505	Surface Water Trtmnt Rule	N550502 Cholrination Facilities O&M
Water Quality & Supply	N5505	Surface Water Trtmnt Rule	N550503 Watershed Management
Water Quality & Supply	N5506	Total Coliform Rule Compl.	N550601 Monitoring, Reporting & Admin
Water Quality & Supply	N5508	Lead & Copper Rule Compl.	N550801 Monitoring, Reporting & Admin
Water Quality & Supply	N5508	Lead & Copper Rule Compl.	N550802 Corrosion Trtmnt Facil O&M
Water Quality & Supply	N5509	Fluoridation Program	N550901 Fluoridation Program O&M
Water Quality & Supply	N5510	Other Reg Comp/Monitoring	N551001 Otr Reg/Operational Analysis
Water Quality & Supply	N5510	Other Reg Comp/Monitoring	N551002 Disinfection By-Product Rule
Water Quality & Supply	N5510	Other Reg Comp/Monitoring	N551003 Limnology
Water Quality & Supply	N5510	Other Reg Comp/Monitoring	N551005 WQ Lab
Water Quality & Supply	N5510	Other Reg Comp/Monitoring	N551006 DW Reg Dev & App Research
Water Quality & Supply	N5510	Other Reg Comp/Monitoring	N551007 Public Information/Notification
Water Quality & Supply	N5511	Special Projects	N551104 LIMS & QA/QC
Water Quality & Supply	N5512	Cedar HCP	N551201 INTERIM CHINOOK COHO
Water Quality & Supply	N5513	Cedar HCP	N551301 HCP STREAMFLOW GAUGING
Water Quality & Supply	N5513	Cedar HCP	N551302 SWITCHING CRITERIA STUDY
Water Quality & Supply	N5513	Cedar HCP	N551303 STEELHEAD REDD MONITORING
Water Quality & Supply	N5513	Cedar HCP	N551304 CHINOOK STUDIES
Water Quality & Supply	N5513	Cedar HCP	Salmonid Studies
Water Quality & Supply	N5514	WQ Monitoring	N551403 DRINKING WATER QUALITY MONITOR
Water Quality & Supply	N5515	HCP Fisheries	N551501 FRY CONDITION AT RELEASE
Water Quality & Supply	N5515	HCP Fisheries	N551502 FRY MARKING & EVALUATION
Water Quality & Supply	N5515	HCP Fisheries	N551503 FRY TRAPPING & COUNTING
Water Quality & Supply	N5515	HCP Fisheries	N551504 FISH HEALTH
Water Quality & Supply	N5515	HCP Fisheries	N551505 SHORT-TERM FRY REARING
Water Quality & Supply	N5515	HCP Fisheries	N551506 LAKE WASHINGTON PLANKTON STUDY
Water Quality & Supply	N5515	HCP Fisheries	N551508 ADULT SURVIVAL DISTRIBUTION
Water Quality & Supply	N5515	HCP Fisheries	N551509 PHENOTYPIC & GENETIC STUDY
Water Quality & Supply	N5516	Tolt DBO	N551601-CONTRACTOR PAYMENTS
Water Quality & Supply	N5516	Tolt DBO	N551603-MANAGEMENT COSTS
Resource Planning	N5609	Water Resource & Habitat Issues	N560903-ESA

Transmission

Program	Project	Project Name	Activity
Water Operation	N6540	WT - Headwork/Storage	N654001 Program Maintenance
Water Operation	N6540	WT - Headwork/Storage	N654002 Event Driven Repairs
Water Operation	N6541	WT - Transmission Pipeline Maint	N654101 Program Maintenance
Water Operation	N6541	WT - Transmission Pipeline Maint	N654102 Event Driven Repairs
Water Operation	N6542	WT - Value Op/Maint - Water Tran	N654201 Program Maintenance
Water Operation	N6542	WT - Value Op/Maint - Water Tran	N654202 Event Driven Repairs
Water Operation	N6543	WT - Grounds/Roads/ROW	N654301 Grade/gravel roads - P
Water Operation	N6543	WT - Grounds/Roads/ROW	N654302 Grade/gravel roads - E
Water Operation	N6543	WT - Grounds/Roads/ROW	N654303 Bridges/culverts - P
Water Operation	N6543	WT - Grounds/Roads/ROW	N654304 Bridges/culverts - E

Water Operation	N6543	WT - Grounds/Roads/ROW	N654305 Fences/gates - P
Water Operation	N6543	WT - Grounds/Roads/ROW	N654306 Fences/gates - E
Water Operation	N6543	WT - Grounds/Roads/ROW	N654307 Mow ROW - P
Water Operation	N6543	WT - Grounds/Roads/ROW	N654308 Mow ROW - E
Water Operation	N6543	WT - Grounds/Roads/ROW	N654309 Mow Other
Water Operation	N6544	WT - Facility Maintenance	N654401 Program Maintenance
Water Operation	N6544	WT - Facility Maintenance	N654402 Event Driven Repairs
Water Operation	N6545	WT - Castings	N654501 Casting Adjustments
Water Operation	N6546	WT - Customer Services	N654601 Communications/Dispatch
Water Operation	N6546	WT - Customer Services	N654602 Locating/Marking
Water Operation	N6547	WT - Damage by Others	N654701 P/L/ROW/Facility
Water Operation	N6548	WT - Transmission Shops	N654801 Shops/Fabrication
Water Operation	N6549	WT - General Expenses	N654905 Tools/small equipment
Water Operation	N6549	WT - General Expenses	N654906 Standby
Water Operation	N6549	WT - General Expenses	N654907 Truck Inventory
Water Operation	N6549	WT - General Expenses	N654908 Downtime - Job Related
Water Operation	N6549	WT - General Expenses	N654909-DISASTER-EMERG RESPONSE

1% Program

Program	Project	Project Name	Activity
Community Services	N5303	Resource Conservation	N530301 1% Conservation

RESOLUTION 97-32

A RESOLUTION APPROVING EKCRWA AGREEMENT ESTABLISHING WATER SERVICE AREA BOUNDARIES

Background

1. Shoreline Water District is a signator to the 1989 East King County Coordinated Water System Plan (CWSP).

2. East King County Regional Water Authority (EKCRWA) has recently updated the service area boundary agreement for the 1996 CWSP Update, and now requests that the District execute the document. It is entitled Agreement For Establishing Water Utility Service Area Boundaries as Identified by the East King County Coordinated Water System Plan, a copy of which is attached.

3. The District staff has determined that it does not have any boundary disputes with members of EKCRWA, and thus can agree to the updated service boundary agreement. The District staff recommends that the service boundary agreement be approved.

4. The District staff does, however, advise that it does have a dispute with the City of Seattle regarding service along the boundary between the District and Seattle. Resolution of that issue is being addressed between the District and Seattle. As Seattle is not a member of EKCRWA and is not a signator to the ECKRWA CWSP, the District's approval to the revised service boundary agreement does not in any way affect the boundary issues between the District and Seattle.

Action

IT IS RESOLVED THAT:

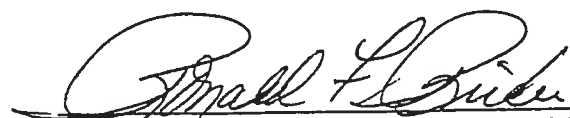
5. The District approves the attached Agreement for Establishing Water Utility Service Area Boundaries as Identified by the East King County Coordinated Water System Plan, and authorizes the District Manager to execute the document.

ADOPTED by the Board of Commissioners of Shoreline Water District at an open public meeting this 9 day of SEP 1997

ATTEST:



Bob Chute, Secretary



Ronald F. Ricker, President



Mike Harrigan, Vice-President

THE STATE OF NEW YORK
IN SENATE
January 12, 1911.

REPORT

OF THE
COMMISSIONERS OF THE LAND OFFICE
IN RESPONSE TO A RESOLUTION
PASSED BY THE SENATE
MAY 1, 1909,
RELATIVE TO THE
LANDS BELONGING TO THE STATE.

ALBANY:
J. B. LEECH, STATE PRINTER,
1911.

THE STATE OF NEW YORK
IN SENATE
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REPORT
OF THE
COMMISSIONERS OF THE LAND OFFICE
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LANDS BELONGING TO THE STATE.

ALBANY:
J. B. LEECH, STATE PRINTER,
1911.

**AGREEMENT
FOR ESTABLISHING WATER UTILITY SERVICE AREA BOUNDARIES
AS IDENTIFIED BY THE EAST KING COUNTY
COORDINATED WATER SYSTEM PLAN**

PREAMBLE

The Agreement for the water utility service area boundary identifies the external boundary of the service area for which the designated water purveyor has assumed direct retail water service responsibility. The responsibilities accepted by the water purveyor are outlined in the East King County Coordinated Water System Plan (CWSP), and as defined by the adopted rules and regulations of the Department of Health (DOH). This agreement does not give new authorities or responsibilities to the water purveyor or to the County or State regulatory agencies, but rather acknowledges the geographical area for these designated service responsibilities.

The terms used within this Agreement shall be as defined in the implementing regulations of Chapter 70.116 RCW, except as identified below.

1. East King County Critical Water Supply Service Area Map shall mean the map referenced in the Agreement as Attachment A for the retail service area, except as amended in accordance with the CWSP procedures and with the concurrence of the affected water purveyors.
2. Retail Service Area shall mean the designated geographical area in which a purveyor shall supply water either by direct connection, by a satellite system, or through interim service by an adjacent utility or Satellite System Management Agency under agreement with the designated utility.
3. Wholesale Service Area shall mean the designated geographical area in which a purveyor, a group of purveyors, or another organization provides water to other water purveyors on a wholesale basis. A wholesale water supplier shall not provide water to individual customers in another purveyor's retail service area except with the concurrence of the purveyor responsible for the geographical area in question.
4. Lead Agency for administering the Agreement for Establishing Water Utility Service Area Boundaries shall be King County, unless otherwise established by amendment to the CWSP.

The authority for this Agreement is granted by the Public Water System Coordination Act of 1977, Chapter 70.116 RCW.

WHEREAS, Such an Agreement is required in WAC 248-56-730, Service Area Agreements-Requirement of the Public Water System Coordination Act; and

WHEREAS, Designation of retail water service areas, together with the cooperation of utilities, will help assure that time, effort, and money are best used by avoiding unnecessary duplication of service; and

WHEREAS, Definite future service areas will facilitate efficient planning for, and provision of, water system improvements within East King County as growth occurs; and

WHEREAS, Definite retail and wholesale service areas will help assure that water reserved for public water supply purposes within East King County will be utilized in the future in an efficiently planned manner,

NOW, THEREFORE, the undersigned party, having entered into this Agreement by signature of its authorized representative, concurs with and will abide by the following provisions:

Section 1. Service Area Boundaries. The undersigned party acknowledges that the East King County Critical Water Supply Service Area Map, included as Attachment A to this Agreement and as may be subsequently updated, identifies the utility's future water service area. The undersigned further acknowledges that there are no service area conflicts with adjacent water utilities, or, where such conflicts exist, agrees that no new water service will be extended within disputed areas until such conflicts are resolved.

Section 2. Common Service Area Transfer. It is understood that utilities may initially continue existing water service within the boundaries of neighboring utilities, as defined in Section 1 hereof. Such common service areas, if they exist, are described in Attachment B to this agreement. Also included in Attachment B are copies of, or a list of, all resolutions, ordinances, or agreements enabling these uncontested overlays. The undersigned party agrees that any water line for retail service extending outside of the retail service area boundary, as set for in Section 1, shall be phased out and service transferred to the designated adjacent utility on an economic basis or by mutual agreement.

Economic basis considerations may include, but are now limited to:

- (a) A determination by the present owner of service lines that maintenance, repair, and/or replacement costs exceed attributable income.
- (b) Planned or imminent major street improvements or major

improvements to either or both water systems which include an opportunity to transfer service. The terms of the transfer of service are described in this Section shall be established in a separate agreement among the adjacent utilities whose boundaries are affected.

Section 3. Boundary Streets. Unless separate agreements exist with adjacent utilities concerning water services or other utility services, this party agrees that the water utility which is located to the north and/or east of boundary streets between this party and adjacent utilities will be entitled to provide future water service on both sides of those streets. Depth of service on boundary streets shall be limited to one platted lot or as otherwise agreed by the utilities. Existing services on boundary streets shall remain as connected unless transfer of service is agreed to by both parties, as per Section 2. These provisions do not disallow the placement of mains in the same street by adjacent utilities where geographic or economic constraints require such placement for the hydraulic benefit of both utilities.

Section 4. Boundary Adjustments. If, at some time in the future it is appropriate for the undersigned party to make service area boundary adjustments, such modifications must receive written concurrence (which shall not be unreasonably withheld) of all utilities that would be directly affected by such a boundary adjustment and the proper legislative authority(ies). This provision does not apply where boundary adjustments are made as a result of municipal annexations or incorporations, nor is it intended to modify the provisions of state law. These written modifications must be noted and filed with the designated King County lead agency and DOH. It is understood by the undersigned party that if, as provided by RCW 70.116.040, it is unable to provide service within its designated service area boundary it may decline to do so. But, in that case, an applicant may be referred to other adjacent utilities, to a pre-qualified Satellite System Management Agency (SSMA), or a new utility may be created and the original service area boundary will be adjusted accordingly.

Section 5. Service Extension Policies. The undersigned party agrees that in order to expand its water service area, other than by addition of retail customers to existing water mains, or to serve in the capacity of a pre-qualified SSMA, it shall have adopted design standards and Utility Service extension policies. The design standards shall meet or exceed the East King County Minimum Design Standards.

Municipalities further agree that if they identify a service area outside of their existing municipal corporate boundaries, the municipality will assume full responsibility for providing water service equivalent to (excluding rates and charges) the level of service provided for their inside-city customers. This will be in conformance with applicable land use policies.

The agreement by reference includes the following attachments:

Attachment A - East King County Critical Water Supply Service Area Map. (see Section 1)

Attachment B - Common Service Area Agreement - Option - Utility may attach copies or list such agreements if relevant (see Section 2)

IN WITNESS WHEREOF, the undersigned party has executed this Agreement as of 9th of September 1997.

Shawling Water District
Water Utility

Cynthia L. Discei
Representative

District Manager
Title

Receipt Acknowledged:

King County

Date

Department

INTERLOCAL AGREEMENT

BETWEEN
THE CITY OF MOUNTLAKE TERRACE
AND
THE SHORELINE WATER DISTRICT

TO CONSTRUCT & OPERATE EMERGENCY INTERTIES

OCTOBER 12, 1995



Shoreline Water District

Guillemette Regan, President
Cynthia Driscoll, General Manager

City of Mountlake Terrace

Honorable Roger Bergh, Mayor
Walter Fehst, City Manager

SHORELINE WATER DISTRICT

RESOLUTION 95-38

A RESOLUTION APPROVING INTERLOCAL AGREEMENT WITH THE CITY OF MOUNTLAKE TERRACE TO CONSTRUCT AND OPERATE EMERGENCY INTERTIES

Background

1. The District identified in the 1991 Comprehensive Plan the installation of two (2) emergency interties with the City of Mountlake Terrace to provide redundant water supply. The District obtained approval in 1993 for a state Public Works Trust Fund loan to fund the interties.
2. The District authorized the District Engineer, RH2 Engineering, P.S., to design the interties, and to coordinate with the City of Mountlake Terrace regarding the circumstances by which the emergency interties could be constructed and operated.
3. The District Engineer, District Manager, and District Attorney consulted with the City of Mountlake Terrace, and jointly prepared an Interlocal Agreement which incorporates the terms and conditions by which the emergency interties can be constructed and operated for at least a twenty-year Term.
4. The District Manager, District Engineer, and District Attorney recommend that the Board of Commissioners approve the enclosed Interlocal Agreement with the City of Mountlake Terrace.

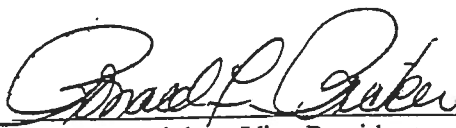
Action

IT IS RESOLVED THAT:

5. The enclosed Interlocal Agreement Between Shoreline Water District and the City of Mountlake Terrace for Emergency Interties is approved. The President of the Board of Commissioners and the District Manager are authorized to execute the Interlocal Agreement on behalf of the Board of Commissioners.

ADOPTED by the Board of Commissioners of Shoreline Water District at an open public meeting this 17th day of October, 1995.

Guillemette A. Regan, President



Ronald F. Ricker, Vice President



Mike Harrigan, Secretary

**INTERLOCAL AGREEMENT BETWEEN
SHORELINE WATER DISTRICT
AND
CITY OF MOUNTLAKE TERRACE
FOR EMERGENCY INTERTIES**

1.0 Parties

This Agreement is between the Shoreline Water District (the "District"), a special purpose district organized under Title 57, Revised Code of Washington, and the City of Mountlake Terrace (the "City"), a municipal corporation organized under Title 35A, Revised Code of Washington.

2.0 Purpose

The purpose of this Interlocal Agreement ("Agreement") is to provide for the design, construction, operation, and maintenance of two interties between the water systems of the District and the City to allow water to be transferred between the systems in emergency situations.

3.0 Background

3.1 The District operates a water system in North King County that serves approximately 8,000 customer accounts. The District obtains its water from the City of Seattle.

3.2 The City operates a water system in South Snohomish County that serves approximately 5,400 customer accounts. The City obtains its water from the Alderwood Water District which in turn obtains the water from the City of Everett.

3.3 There has been recent commercial development in the northern part of the District's system and the southern part of the City's system, resulting in increasingly large fire flow requirements in the area. Construction of emergency interties to be available for use during fire, earthquake, or other natural disasters would allow the existing fire flow capacity of each water system to be supplemented from the other system.

3.4 The capital improvement plans of the District's 1991 Comprehensive Water System Plan and the City's 1986 Comprehensive Water Plan list the construction of at least one emergency intertie between the two systems. The District has an approved State Public Works Trust Fund Loan for funding the proposed interties.

3.5 The parties desire to cooperate and facilitate the action described in this Agreement. Accordingly, the parties enter into this Agreement under the authority granted them by RCW 57.08.045 (District) and RCW 35A.11.040 (City) and under the supplemental authority provided by the Interlocal Cooperation Act, RCW, 39.34.

IN CONSIDERATION of the mutual benefits and covenants of this Agreement, the parties agree as follows:

4.0 Terms and Conditions

4.1 Location. The District shall construct two emergency interties at the following locations (indicated on Attachment A):

a) Near the intersection of SW 244th Street and 56th Avenue West, based on Snohomish County street names, or NE 205th Street and 19th Avenue NE, based on King County street names. The intertie will be located in the southeast quadrant of the intersection, adjacent to the existing AM/PM Mini-Mart along 19th Avenue NE and within the Mini-Mart's landscape area. The intertie will be partially in the King County right-of-way, the City of Mountlake Terrace right-of-way, and an easement on private property.

b) Near the intersection of SW 244th Street and 59th Avenue West. The intertie will be located on the north side of the Ballinger Village Shopping Center and partially within the planter strip along SW 244th Street (or NE 205th Street). The intertie will be partially in the King County right-of-way, the City of Mountlake Terrace right-of-way, and an easement on private property.

The District shall be responsible for obtaining the right to construct the interties in the indicated locations, either by way of negotiation or condemnation, and all permits necessary to do so.

4.2 Time of Construction. The District shall complete construction of the interties within three years of the effective date of this Agreement, or all obligations hereunder are null and void.

4.3 Emergency Water Supply. Each party agrees that during an emergency, the interties may be opened and water will be supplied from one water system to the other. An "emergency" is defined as any situation where water supply is required to mitigate an immediate threat to life or property. For example, an emergency would exist if a fire, earthquake, or major main break affected either water system. The interties will not be used to supplement existing supply to meet day to day demands. Each party is exempt from its obligation to provide water if water is not available due to unavoidable accidents, acts of God, or any conditions beyond the control of either party.

4.4 Ownership and Costs. The District shall be the owner of the interties and all related improvements installed up to the connections to the City's existing water system and shall be responsible for all costs associated with the planning, design, construction, and services during construction of the interties. The remote telemetry units (RTU's) and connections to the telephone system at each intertie are part of the related improvements.

4.5 Description. Each intertie will primarily consist of 10-inch diameter piping connecting the two water systems and a precast concrete utility vault located underground, which will house all of the mechanical, electrical, and SCADA equipment. The Preliminary Site Plan attached as Attachment B illustrates the proposed piping improvements and connections to each system. The Preliminary Mechanical Plan attached as Attachment C illustrates the proposed precast concrete vault and other proposed equipment to be housed in the vault. "Substantial changes" to the system of components, as presented on Attachments B and C shall require prior written approval by the City. "Substantial changes" include, but are not limited to, changes that modify means or methods of operating and monitoring the interties.

4.6 Design. The interties will be designed and constructed in accordance with all applicable AWWA, DOH, DOE, WSDOT/APWA, District, and City standards and specifications. The construction plans, contract documents, and specifications for the interties will be submitted to the City for review and approval prior to the District advertising the project for construction bids. The City will review and respond to submitted construction documents within a reasonable period of time.

4.7 Approvals. It is expected that the City will have to obtain approval of the interties from Alderwood Water District and the City of Everett. The District will assist the City to do so. The District will obtain approval of the interties from the Department of Health, Department of Ecology, the City of Seattle, and King County. Connections between the District's and City's water systems shall not be made prior to obtaining the necessary approvals from these governmental entities.

4.8 Intertie Operation. The interties will be designed and constructed so that water can be provided from either system to the other during emergency situations.

a. Valves. The interties will be constructed with an isolation valve which must be opened manually to allow water to flow between the systems, and a bi-directional control valve which automatically operates the interties when they are in operation. The isolation valve shall remain in the closed position except during emergency situations. The control valves will be set to ensure that the system providing water in an emergency situation does not experience an undesirable drop in pressure in its own system. Therefore, opening set points and back pressure sustaining or closing set

points will be set after construction is completed and prior to the interties being placed in service.

b. Set Points. The back pressure sustaining set points will be based upon studies and field measurements and tests provided by the District, and reviewed and approved by the District and City. The set points shall be set to maintain a minimum service pressure of at least 35 pounds per square inch (psi) at all customer meters within the City's 530 Zone when water is being supplied from the City's system to the District's system. The set points will be established by mutual agreement in writing between the District and City and may be changed at any time thereafter by mutual agreement in writing.

c. Meter. A bi-directional flow meter will measure the flow rates and volumes of flow through the meter in both directions.

d. Telemetry. Two remote telemetry units and connections to the telephone system will be provided at each intertie for remote control and monitoring of the interties from both the District and City. One remote telemetry unit will be provided for connection to the District's existing telemetry and supervisory control system. The other remote telemetry unit will be provided by the District at a later date for future connection by the City to the City's planned telemetry and supervisory control system to ensure equipment compatibility.

e. Valve Operation. Except for control of fires requiring supplementary flow through the interties, isolation valves shall be operated either by District or City personnel upon mutual determination by the District Manager and the City's Public Works Director that an emergency exists. If the emergency is a fire, personnel of the responding fire department are authorized to operate isolation valves in addition to District and City personnel without approval by the District Manager and the City's Public Works Director.

4.9 Operations and Maintenance. The interties and all related improvements will be operated, maintained, repaired, and replaced by the District at its expense.

a. Meters. The District shall test the accuracy of the flow meters in accordance with AWWA standards as part of the District's meter maintenance program.

b. Entry. City staff will be allowed right of entry to each intertie upon reasonable notice for any reason. The City will provide a no-fee street use permit to the District upon request to work on the portion of the intertie improvements located within the City right-of-way.

c. Operations Manuals. Upon completion of construction of the interties, operations and maintenance manuals will be prepared by District. The manuals will include all usual and customary practices such as step-by-step operational procedures of the facility and each major component, and preventive maintenance schedules for all major components including facility security, access safety, coatings, meter accuracy, pressure sensors, electrical controls, water main flushing, valves, and hydrants. The City will review and respond to submitted manuals within a reasonable period of time. The District shall respond to the City's comments by incorporating within the manuals suitable measures as agreed to by the District and the City.

4.10 Water Use and Billing.

a. Payment Rate. If the interties are used at any time, the District and City will pay the other for water used at the normal wholesale rate charged to the District and City by the City of Seattle and Alderwood Water District, respectively, including applicable demand charges. The District and City will not pay the other a monthly meter charge.

b. Process. Flows through the interties will be recorded in time increments that will enable calculation of the portion of the demand charge attributable to operation of the interties. The District will report water use by the District or City within one month following the end of the billing period in which the water was used. During periods when intertie meters are not recording water use due to lack of power or for any other reason, estimates of water use shall be used for billing. The estimates of water use will be based upon the best available information about the status of the water systems, such as, pressures in the systems, degree of opening of valves, rates of pumping, number of hydrants in use, and predictions from water system computer modeling. Remittances for water use shall be due within sixty (60) days of the date of the mailed invoice. Late remittances shall bear interest at a rate of twelve percent (12%) per annum.

c. Change of Source. If the District or City changes its source of supply from the City of Seattle or Alderwood Water District, respectively, then the payment rate will be renegotiated between the parties.

4.11 Miscellaneous Terms.

a. Effective Date and Termination. This Agreement shall be deemed effective the date on which it is approved by both parties. This Agreement may be reconsidered and renegotiated upon the written request of the legislative body of either party, but shall be deemed a continuing obligation of the parties upon the terms and conditions stated in this document unless and until renegotiated by mutual agreement. Absent any renegotiation, this Agreement shall continue in effect unless

terminated with two years written notice by either party. However, to allow the District to recoup its design and construction costs, this Agreement may not be unilaterally terminated by the City within twenty years from the effective date.

b. Hold Harmless and Indemnification.

(1) The District shall indemnify and hold the City and its agents, employees and/or officers, harmless from and shall process and defend at its own expense any and all claims, demands, suits in law or equity, actions, penalties, loss (including attorneys' fees), damages or costs of whatever kind or nature, brought against the City arising out of or in connection with the design and construction of the interties.

(2) Each party hereby agrees to indemnify, process and defend at its own expense and hold harmless the other party, its officers, agents and employees, from all claims and demands, of whatever kind or nature including claims for damage or injury to persons or property, losses (including attorneys' fees), or suits in law or equity, arising in any manner out of the operation and maintenance of the interties, including, but not limited to, the failure to provide water through the interties. In the case of negligence of more than one party, any damages allowed shall be levied in proportion to the percentage of negligence attributable to each party; and each party shall have the right to seek contribution from each of the other parties in proportion to their percentage of negligence, attributable to each of the other parties.

c. Non-Assignment. Neither party may assign any right or interest it has as a result of this Agreement to any other person or entity without the expressed written agreement of the other party.

d. Dispute Resolution. Any controversy or claim arising out of or relating to this Agreement shall be resolved by arbitration administered by the American Arbitration Association in accordance with the Commercial Arbitration Rules, and judgment on the award rendered by the arbitrator(s) may be entered in any court having jurisdiction. The parties agree first, however, to try in good faith to settle the dispute by mediation. If it is necessary for either of the parties to obtain the services of an attorney to enforce the provisions of this Agreement, the defaulting party shall pay the prevailing party all damages and expenses resulting from the breach of this Agreement, including all reasonable attorney fees, all court costs, and other expenses incurred by the prevailing party. This Agreement is made in accordance with and it shall be interpreted and governed by the laws of the State of Washington.

e. Notices. All notices and other material to be delivered under this Agreement shall be in writing and shall be delivered or mailed to the following addresses:

Shoreline Water District
 Attn: District Manager
 P.O. Box 55367
 16906 15th Avenue NE
 Seattle, WA 98155-0367

City of Mountlake Terrace
 Attn: Public Works Director
 23204 - 58th Avenue West
 Mountlake Terrace, WA 98043-4697

f. Entire Agreement. This Agreement is all of the covenants, promises, agreements and conditions, either oral or written, between the parties.

CITY OF MOUNTLAKE TERRACE:

By: Roger J. Bergh
 Roger J. Bergh, Mayor

Date: 10/16/95

By: Walter R. Fehst
 Walter R. Fehst, City Manager

Date: 10/25/95

ATTEST:

Ron Swanson
 Ron Swanson, City Clerk

APPROVED AS TO FORM:

Greg G. Schrag 10-23-95
 Greg G. Schrag, City Attorney

Attachments: Attachment A - Vicinity Map
 Attachment B - Preliminary Site Plan
 Attachment C - Preliminary Mechanical Plan

SHORELINE WATER DISTRICT:

By: Guillemette A. Regan
 Guillemette A. Regan, President

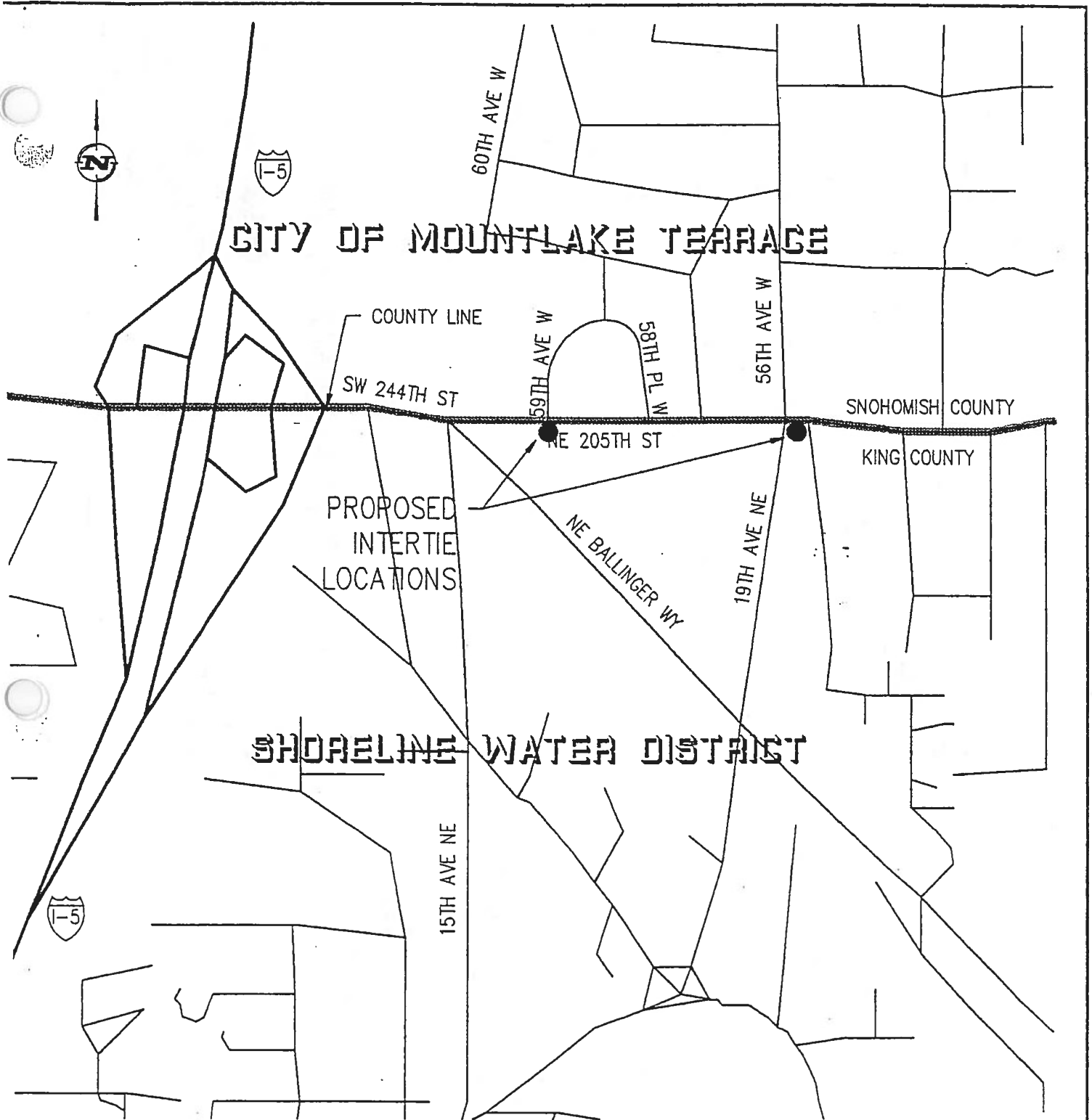
Date: Oct 19, 1995

By: Cynthia L. Driscoll
 Cynthia L. Driscoll,
 District Manager

Date: Oct. 17. 1995

APPROVED AS TO FORM:

Andrew W. Maron
 Andrew W. Maron, District Attorney



ATTACHMENT "A"

SHORELINE WATER DISTRICT AND
CITY OF MOUNTLAKE TERRACE
PROPOSED EMERGENCY INTERTIES

VICINITY MAP

NOT TO SCALE



**NORTH CITY WATER DISTRICT
RESOLUTION 2017.12.31**

**A RESOLUTION APPROVING INTERLOCAL AGREEMENT FOR WATER USE
WITH RONALD WASTEWATER DISTRICT**

Background

1. North City Water District has been providing water use information to Ronald Wastewater District for over 50 years. Recently, there has been a change in the operations of Ronald Wastewater District (RWD). NCWD Board of Commissioners have asked to have the relationship between the Districts be formalize.

2. A draft of the agreement was reviewed by the NCWD Board at the December 5, 2017 Board meeting. Minor modifications were made in the final agreement since the Board reviewed it. The revised agreement is recommended for approval by district staff. RWD Board of Commissioners signed their agreement at their December 12, 2017 Board meeting (see Attachment A).

Action

IT IS RESOLVED THAT:

3. The attached Interlocal Agreement for Water Use is approved.

ADOPTED by the Board of Commissioners of North City Water District at a regular open public meeting this 19th day of December 2017.

ATTEST:



Ron Ricker, President

Larry Schoonmaker, Vice President

Approved as to Form:



Joe Bennett, District Attorney



Charlotte Haines Secretary

**INTERGOVERNMENTAL AGREEMENT FOR
WATER USE DATA BETWEEN
NORTH CITY WATER DISTRICT AND RONALD WASTEWATER DISTRICT**

This agreement is dated December 19, 2017 and is between North City Water District, a special purpose water district organized under RCW Title 57 and Ronald Wastewater District (Ronald), a special purpose sewer district, also organized under RCW Title 57. Collectively, North City Water District (NCWD) and Ronald Wastewater District (RWD) are known as "the parties".

RECITALS

1. Since RWD first had sewers constructed the wastewater treatment charges for commercial accounts as been based on the volume of water used or equivalent residential units (ERUs).
2. NCWD was previously known as "Shoreline Water District" and before that "King County Water District No. 42."
3. Sometime in the last 57 years, RWD worked with NCWD to collect commercial customer's water use data. RWD used the water use data to determine the number of ERUs for the King County wastewater treatment charge for each commercial account.
3. RWD has developed a list of addresses within the NCWD service area for which they regularly request water use information from NCWD. The account address, along with RWD account number and NCWD account number, is provided in the electronic request from RWD. No information regarding the account owner or billing information is included as part of the request. NCWD has historically provided the quantity of water sold to each address requested during the most recent billing cycle. RWD then converts the water use information into ERUs and in turn, develops wastewater bills for commercial accounts.
4. NCWD is not responsible for updating any water information and providing it to RWD should a leak adjustment occur at any address requested by RWD.
5. RWD, or a designee of the District, shall continue to request the information on a monthly basis throughout the term of this contract.
6. NCWD shall continue to provide water use information to RWD, provided the information is used solely for billing purposes.
7. The parties have worked together on a number of projects over time and now desire to formalize the long-standing relationship. NCWD and RWD have authority to entire into such an agreement pursuant to RCW Title 57 and Chapter 39.34 RCW.

AGREEMENT


8. **Term of the Agreement.** The term of this agreement shall remain in effect as long as RWD continues to exist.
9. **Attorneys' Fees and Costs.** In the event of any material breach of this Agreement, the party responsible for the breach shall pay the other party's reasonable costs and attorneys' fees incurred in enforcing the Agreement, and in any litigation involving this Agreement, the prevailing party shall be entitled to receive its reasonable costs and attorneys' fees in such litigation.
10. **Entire Agreement.** This Agreement supersedes all prior agreements and understandings, written or oral, between the parties about the subject matter of this Agreement.
11. **Assignment.** This Agreement shall not be assigned without first obtaining written consent by NCWD.
12. **Indemnification.** Each party shall defend, indemnify and hold the other harmless from and against any and all claims, actions, damages, liability, and expense, including without limitation reasonable attorneys' fees, incurred as a result of such party's actions under this Agreement.
13. **Applicable Law.** This Agreement shall be governed by the laws of the State of Washington.
14. **Dispute Resolution and Venue.** In the event of any dispute arising under this Agreement, the parties will first attempt in good faith to resolve the dispute through direct negotiations and/or mediation. If such good faith attempts to resolve the dispute are not successful, then venue for any legal action shall be Shoreline District Court or King County Superior Court.
15. **Authority to Sign.** The representative of each party signing below affirms that he or she has full authority to sign this Agreement and bind the party represented.

NORTH CITY WATER DISTRICT

By: 
 RON RICKER
 President, Board of Commissioners

DATED: December 19, 2017

RONALD WASTEWATER DISTRICT

By: 
 GRETCHEN ATKINSON
 President, Board of Commissioners

DATED: December 12, 2017

**NORTH CITY WATER DISTRICT
RESOLUTION 2018.04.12**

**A RESOLUTION RATIFYING INTERLOCAL AGREEMENT FOR WATER USE
WITH CITY OF LAKE FOREST PARK**

Background

1. North City Water District has been providing water use information to the City of Lake Forest Park and the Lake City Sewer District for over 50 years. NCWD Board of Commissioners requested that the cooperative arrangement between the District and the City be formalized.

2. In February of 2018, the Lake Forest Park City Council approved an Agreement with the District. At is April 2 regular meeting. The District Board discussed and approved by motion the Agreement with the City and authorized Commissioner Ricker to sign the agreement.

3. The Board requested that District staff prepare this resolution formally ratifying the Agreement with the City of Lake Forest Park and authorizing Commissioner Ricker to sign the Agreement on behalf of the District.

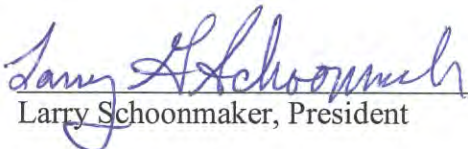
Action


IT IS RESOLVED THAT:

4. The Board of Commissioners of North City Water District hereby ratifies the attached Interlocal Agreement for Water Use with the City of Lake Forest, and signed by Commissioner Ricker on April 2, 2018.

ADOPTED by the Board of Commissioners of North City Water District at a regular open public meeting this 17th day of April 2018.

ATTEST:


Larry Schoonmaker, President


Charlotte Haines, Vice President

Approved as to Form:


Joe Bennett, District Attorney


Ron Ricker, Secretary

**INTERGOVERNMENTAL AGREEMENT FOR
WATER USE DATA BETWEEN
NORTH CITY WATER DISTRICT AND CITY OF LAKE FOREST PARK**

This agreement is dated March 8, 2018 and is between North City Water District ("NCWD"), a special purpose water district organized under RCW Title 57 and the City of Lake Forest Park ("the City"), a municipal corporation organized as a charter code city (RCW Title 35A.11). Collectively, NCWD and the City are known as "the parties".

RECITALS

WHEREAS, NCWD was formerly known as Shoreline Water District and, before that, King County Water District No. 42; and

WHEREAS, the City and Shoreline Water District entered into a non-exclusive franchise to own, construct, maintain, operate, replace and repair a water system within the public rights-of-way in the City formalized in Ordinance 1058, adopted February 28, 2013; and

WHEREAS, the Lake City Sewer District ("LCSD") is now a part of the City; and

WHEREAS, since the City and LCSD began operating sewers, the wastewater treatment charges for commercial accounts have been based on the volume of water used or equivalent residential units ("ERUs"); and

WHEREAS, the City and LCSD have historically worked with NCWD to collect commercial customer's water use data. The City and LCSD use the water use data to determine the number of ERUs for the King County wastewater treatment charge for commercial accounts; and

WHEREAS, the City has developed a list of addresses within the NCWD service area for which they regularly request water use information from NCWD. In the City's request, the City provides the account address, the user's account number, and NCWD account number. No information regarding the account owner or billing information is included as part of the request. NCWD has historically provided the quantity of water sold to each address requested during the most recent billing cycle. The City then converts the water use information into ERUs and in turn, develops wastewater bills for commercial accounts; and

WHEREAS, the parties have worked together on a number of projects over time and now desire to formalize the long-standing relationship; and

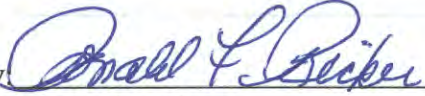
WHEREAS, NCWD and the City have authority to enter into such an agreement pursuant to RCW Title 57, RCW 35.11A and Chapter 39.34 RCW.

10. Authority to Sign. The representative of each party signing below affirms that he or she has full authority to sign this Agreement and bind the party represented.

11. Waiver. Any waiver by the Parties of the breach of any provision of this Agreement by the other party will not operate, or be construed, as a waiver of any subsequent breach by either party or prevent either party from thereafter enforcing any such provisions.

12. Severability. If any part of this Agreement is found to be in conflict with applicable laws, such part shall be inoperative, null and void, insofar as it is in conflict with said laws, the remainder of the Agreement shall remain in full force and effect.

NORTH CITY WATER DISTRICT

By: 
 RON RICKER
 Chairman, Board of Commissioners

DATED: ~~March~~ 2, 2018

APRIL

CITY OF LAKE FOREST PARK

By: 
 JEFF JOHNSON
 Mayor

DATED: March 8, 2018

**NORTH CITY WATER DISTRICT
RESOLUTION 2017.12.25**

**A RESOLUTION TO ACCEPT THE AGREEMENT TO TRANSFER RESPONSIBILITY FOR
CERTAIN PUBLIC RIGHT OF WAY STREET LIGHTS
FROM NORTH CITY WATER DISTRICT TO THE CITY OF LAKE FOREST PARK**

Background

1. North City Water District (District) has been providing street light administrative services for streetlights within what is now the City of Lake Forest Park (City) since 1955.
2. The City of Lake Forest Park (City) will be assuming the administrative responsibility for street light services for the majority of street light within the City limits from Seattle City Light beginning in 2018.
3. The District and the City have negotiated a transfer agreement for the street lights where the District has been providing administrative services for street lights within the City of Lake Forest Park will be transferred to the City effective December 31, 2017 (see Attachment A).
4. Seattle City Light has reviewed the transfer agreement between the District and the City and supports the transfer of administrative services.
5. District staff recommends that the District accept and approve the enclosed Transfer Responsibility Agreement.

Action

IT IS RESOLVED THAT:

6. The attached Agreement to Transfer Responsibility for Certain Public Right of Way Street Lights from North City Water District to the City of Lake Forest Park is approved.
7. The District Manager is authorized to execute the Transfer Agreement.

ADOPTED by the Board of Commissioners of North City Water District at a public meeting this 5th day of December, 2017.

ATTEST:

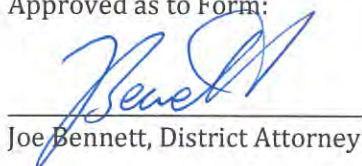


Ron Ricker, President



Larfy Schoonmaker, Vice President

Approved as to Form:



Joe Bennett, District Attorney



Charlotte Haines, Secretary

**AGREEMENT TO TRANSFER RESPONSIBILITY FOR CERTAIN
PUBLIC RIGHT-OF-WAY STREET LIGHTS FROM NORTH CITY
WATER DISTRICT TO THE CITY OF LAKE FOREST PARK**

THIS AGREEMENT to transfer certain public right-of-way street lights ("Agreement" or "Transfer Agreement") is entered into this ____ day of December 2017, by and between North City Water District, a Title 57 RCW special purpose district ("NCWD" or the "District") and the City of Lake Forest Park, a Washington non-charter, municipal code city ("City" or "Lake Forest Park"). The City and District are referred to collectively herein as "the Parties."

I. RECITALS.

1. NCWD was previously known as "Shoreline Water District" and before that as "King County Water District No. 42."

2. Sometime prior to November 1955, the Briarcrest Community Club inquired with the City of Seattle Department of Lighting ("City Light") about providing lighting for their community. The Briarcrest Community Club received a response from City Light dated November 9, 1955. The materials were to be installed by City Light on existing City Light poles at locations indicated on the plat plan. "Maintenance of the luminaire, glassware and bracket were to be charged on a basis of time and material as required."

3. Shortly after receiving the letter, it appears the Briarcrest Community Club approached Water District No. 42 about providing lighting service. On or about January 16, 1956, the District amended its Comprehensive Plan to "have the power to acquire, construct, maintain, operate and develop street lighting systems for the area comprised in Water District No. 42, or portions thereof", and "to have the power to levy and collect special assessments against the real property lighting systems for the purpose of paying the whole or any part of the cost of such construction, installation or improvement, together with the expense of furnishing electric energy, and maintenance and operation and overhead expense."

4. On March 5, 1956, the District's engineer provided a cost estimate for materials and installation of street lights only. On March 20, 1956, the District's engineer reviewed the petition and certified the Sufficiency for the Proposed LID No. 7 - 52.8% of the 264 registered owners had signed the petition to form the LID. The District bid the project to furnish the material in connection with said street lighting system in accordance to the plans and specifications at the District office. The District recognized that City Light "own[ed] or control[ed] the utility poles upon which said street lights are to be installed and have a monopoly for the furnishing of electrical energy to said community and will not permit any other party or corporation to install said street lights."

5. Since 1956, the District has added an additional seven lights on City Light poles, for a total of forty-nine (49) District-operated street lights currently within Lake Forest Park. The benefitted properties are identified on Exhibit A (spreadsheet) attached hereto, and located as depicted in the maps attached hereto as Exhibit B.

6. The City of Lake Forest Park was incorporated in 1961. During the August 10 and September 14, 2017, Lake Forest Park City Council meetings, the Council discussed street lights. In early 2018, the City and City Light will be entering into a street light agreement regarding the ownership and maintenance of streetlights within Lake Forest Park city limits ("Street Light Agreement").

7. During the same City Council meetings, the Council indicated that they wanted to take on the responsibility of streetlights within the District boundaries that are within the City. The District desires that the City take over the responsibility for the forty-nine (49) street lights, identified in paragraph 5, above, and the City is willing to accept transfer of responsibility for the maintenance, operational and capital expenses of these forty-nine (49) street lights, subject to City Light's continued ownership of said street lights.

8. City Light has maintained and provided the electricity to operate the forty-nine (49) street lights identified in paragraph 5. Though not a party to this Agreement, City Light consents to this transfer between the Parties and will continue to provide electricity and maintenance for the streetlights after transfer from the District to the City. See the executed Consent document attached.

II. AGREEMENT.

9. Effect of Recitals. The Recitals, paragraphs 1-8 above, are a material part of this Agreement.

10. Transfer and Acceptance of Lights. North City Water District hereby irrevocably transfers to the City of Lake Forest Park all responsibilities for the forty-nine (49) street lights identified in paragraph 5, above, and Exhibits A and B hereto. The District will discontinue billing customers for these street lights effective January 1, 2018. The City hereby accepts this transfer as well as all responsibilities attendant thereto.

11. Supporting Documentation. Documents supporting the assertions made in the Recitals are attached hereto as Exhibit C.

12. Attorneys' Fees and Costs. In the event of litigation involving this Agreement, the prevailing party shall be entitled to receive its reasonable costs and attorneys' fees in such litigation.

13. Entire Agreement. This Agreement supersedes all prior agreements and understandings, written or oral, between the parties.

14. No Effect on Franchise Agreement. Except as specifically provided herein, nothing in this Agreement shall affect any provision of the Franchise Agreement between the City and the District with an effective date of March 6, 2013.

15. Further Assurances. Each party agrees to diligently and in good faith undertake all actions and procedures reasonably required to consummate the agreed transfer of street lights as set forth in this Agreement.

16. Indemnification. Each party shall defend, indemnify and hold the other harmless from and against any and all claims, actions, damages, liability, and expense, including without limitation reasonable attorneys' fees, incurred as a result of such party's actions under this Agreement.

17. Applicable Law. This Agreement shall be governed by the laws of the State of Washington.

18. Dispute Resolution and Venue. In the event of any dispute arising under this Agreement, the parties will first attempt in good faith to resolve the dispute through direct negotiations and/or mediation. If such good faith attempts to resolve the dispute are not successful, then venue for any legal action shall be King County Superior Court.

19. Authority to Sign. The representative of each party signing below affirms that he or she has full authority to sign this Agreement and bind the party represented.

20. Counterparts. This Agreement may be signed by one or more counterparts, including by facsimile, scanned or electronic signatures, each of which shall be considered an original, and all of which together shall constitute one instrument.

NORTH CITY WATER DISTRICT

CITY OF LAKE FOREST PARK

By: _____
DIANE POTTINGER
District Manager

By: _____
JEFF JOHNSON
Mayor

DATED: December __, 2017

DATED: December __, 2017

APPROVED AS TO FORM:

APPROVED AS TO FORM:

Joseph P. Bennett, Attorney for
North City Water District

Kim Adams Pratt
City Attorney

CONSENT

The undersigned, on behalf of Seattle City Light, affirms that he has read the foregoing Agreement and consents to the transfer of forty-nine (49) street lights, as identified in Exhibits A and B hereto, from North City Water District to the City of Lake Forest Park.

KELLY ENRIGHT, Customer Care Director
Account Executive Office Team

DATED: December __, 2017

Pole Number	Customer Account	Customer Name	Type	Category	Rate Code	ASSET_MOBILE_3	STREET_NUMBER	STREET_NAME	LOCATION_DETAILS	POLE_CITY
1393742	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	3206	NE 163RD ST	NS NE 163RD ST 1W 33RD AVE NE	LAKE FOREST PARK
1391012	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	3202	NE 158TH ST	NS NE 158TH ST 1E 32ND AVE NE	LAKE FOREST PARK
1393717	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	3304	NE 156TH ST	NS NE 156TH ST 2E 33RD AVE NE	LAKE FOREST PARK
1403893	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	3404	NE 166TH PL	NWS 34TH AVE NE 3N NE 158TH ST	LAKE FOREST PARK
1393736	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	15806	34TH AV NE	ES 34TH AVE NE 3N NE 158TH ST	LAKE FOREST PARK
1393821	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	3002	NE 163RD ST	NS NE 163RD ST 1E 30TH AVE NE	LAKE FOREST PARK
1403890	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	16504	34TH AV NE	ES 34TH AVE NE 2N NE 165TH ST	LAKE FOREST PARK
1393712	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	15802	33RD AV NE	NS NE 158TH ST 1E 33RD AVE NE	LAKE FOREST PARK
1393816	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	16006	30TH AV NE	ES 30TH AVE NE 2S NE 163RD ST	LAKE FOREST PARK
1393747	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	16006	34TH AV NE	ES 34TH AVE NE 2S NE 163RD ST	LAKE FOREST PARK
1393734	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	3404	NE 160TH ST	NS NE 160TH ST 2E 34TH AVE NE	LAKE FOREST PARK
1393716	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	15602	33RD AV NE	NEC NE 156TH ST & 33RD AVE NE	LAKE FOREST PARK
1403903	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	16310	34TH AV NE	ES 34TH AVE NE & NE 165TH ST	LAKE FOREST PARK
1393739	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	3404	NE 158TH ST	NS NE 158TH ST 2E 34TH AVE NE	LAKE FOREST PARK
1403892	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	3402	NE 166TH PL	WS 34TH AVE NE 9N NE 163RD ST (4N NE 165TH ST)	LAKE FOREST PARK
1391003	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	15502	33RD AV NE	SS NE 155TH ST IN LINE ES 33RD AVE NE TO N	LAKE FOREST PARK
1393667	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	16304	35TH AV NE	ES 35TH AVE NE 1N NE 162ND ST TO SE	LAKE FOREST PARK
1393672	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	16002	34TH AV NE	NEC 34TH AVE NE & NE 160TH ST	LAKE FOREST PARK
1393729	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	3304	NE 160TH ST	NS NE 160TH ST 2I177E 33RD AVE NE (SERVICE TO 16004 33RD NE)	LAKE FOREST PARK
1393818	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	3402	NE 156TH ST	NEC 34TH AVE NE & NE 156TH ST	LAKE FOREST PARK
1403897	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	16007	32ND AV NE	WS 32ND AVE NE 1S NE 163RD	LAKE FOREST PARK
1403895	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	16002	30TH AV NE	NEC NE 160TH ST & 30TH AVE NE	LAKE FOREST PARK
1393710	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	3406	NE 166TH PL	WS 35TH AVE NE 4N NE 165TH ST	LAKE FOREST PARK
1393670	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	15603	35TH AV NE	WS 35TH AVE NE 11N NE 160TH ST	LAKE FOREST PARK
1393675	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	15806	33RD AV NE	ES 33RD AVE NE 2S NE 160TH ST	LAKE FOREST PARK
1393668	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	16001	32ND AV NE	NEC 33RD AVE NE & NE 160TH ST	LAKE FOREST PARK
1393675	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	16006	33RD AV NE	NWC 32ND AVE NE & NE 160TH ST	LAKE FOREST PARK
1393745	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	16306	34TH AV NE	ES 34TH AVE NE 3N NE 163RD ST	LAKE FOREST PARK
1391010	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	16005	32ND AV NE	WS 32ND AVE NE 2S NE 163RD ST	LAKE FOREST PARK
1393750	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	3404	NE 163RD ST	NS NE 163RD ST 2E 34TH AVE NE	LAKE FOREST PARK
1393738	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	15801	32ND AV NE	NWC NE 158TH ST 32ND AVE NE	LAKE FOREST PARK
1393808	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	3404	NE 156TH ST	NS NE 156TH ST 1W 35TH AVE NE	LAKE FOREST PARK
1393744	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	15802	34TH AV NE	NS NE 158TH ST 1E 34TH AVE NE	LAKE FOREST PARK
1393822	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	3004	NE 160TH ST	NS NE 160TH ST 2E 30TH AVE NE	LAKE FOREST PARK
1393713	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	16302	34TH AV NE	NEC 34TH AVE NE & NE 163RD ST	LAKE FOREST PARK
1403899	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	3202	NE 163RD ST	NS NE 163RD ST IN LINE WITH WS 32ND AVE NE TO S	LAKE FOREST PARK
1393671	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	3304	NE 158TH ST	NS NE 158TH ST 2E 33RD AVE NE	LAKE FOREST PARK
1393825	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	16603	35TH AV NE	WS 35TH AVE NE 6N NE 165TH ST (3N 34TH NE)	LAKE FOREST PARK
1393654	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	3302	NE 163RD ST	NS NE 163RD ST 1W 34TH AVE NE	LAKE FOREST PARK
1393659	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	15805	35TH AV NE	ES 35TH AVE NE 3N NE 158TH ST	LAKE FOREST PARK
1393656	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	16004	35TH AV NE	ES 35TH AVE NE 2N NE 160TH ST	LAKE FOREST PARK
1393835	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	15805	35TH AV NE	WS 35TH AVE NE 1S NE 160TH ST	LAKE FOREST PARK
1393658	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	16002	35TH AV NE	ES 35TH AVE NE 2S NE 162ND ST	LAKE FOREST PARK
1393660	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	15502	35TH AV NE	ES 35TH AVE NE 1S NE 156TH ST	LAKE FOREST PARK
1393833	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	15802	35TH AV NE	ES 35TH AVE NE 1N NE 158TH ST	LAKE FOREST PARK
1393832	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RLI		SCL MAINT (C)	15803	35TH AV NE	WS 35TH AVE NE 2N NE 158TH ST	LAKE FOREST PARK
						SCL MAINT (C)	15601	35TH AV NE	WS 35TH AVE NE 1N NE 156TH ST	LAKE FOREST PARK
						SCL MAINT (C)	15602	35TH AV NE	ES 35TH AVE NE 1N NE 156TH ST	LAKE FOREST PARK

EXHIBIT A

Attachment A

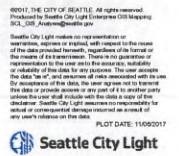
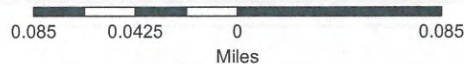


EXHIBIT C**ATTACHMENTS****SOURCE DOCUMENTS FOR RECITAL PARAGRAPHS**

<u>Recital Paragraph</u>	<u>Attachment Number</u>	<u>Description</u>
2	1	11/9/1955 Letter A. Tyler to C. Fox
3	2	11/18/55 Westinghouse Invoice to WD 42
3	3	WD 42 Resolution No. 266 (1/16/56)
4	4	3/5/1956 Sparling Cost Estimate
4	5	3/20/1956 Letter B. Qualheim to WD 42 Board
4	6	Affidavit of J. Porter dated 5/22/1956
4	7	WD 42 Resolution No. 279 (6/4/1956)

**AGREEMENT TO TRANSFER RESPONSIBILITY FOR CERTAIN
PUBLIC RIGHT-OF-WAY STREET LIGHTS FROM NORTH CITY
WATER DISTRICT TO THE CITY OF LAKE FOREST PARK**

THIS AGREEMENT to transfer certain public right-of-way street lights ("Agreement" or "Transfer Agreement") is entered into this 14th day of December 2017, by and between North City Water District, a Title 57 RCW special purpose district ("NCWD" or the "District") and the City of Lake Forest Park, a Washington non-charter, municipal code city ("City" or "Lake Forest Park"). The City and District are referred to collectively herein as "the Parties."

I. RECITALS.

1. NCWD was previously known as "Shoreline Water District" and before that as "King County Water District No. 42."

2. Sometime prior to November 1955, the Briarcrest Community Club inquired with the City of Seattle Department of Lighting ("City Light") about providing lighting for their community. The Briarcrest Community Club received a response from City Light dated November 9, 1955. The materials were to be installed by City Light on existing City Light poles at locations indicated on the plat plan. "Maintenance of the luminaire, glassware and bracket were to be charged on a basis of time and material as required."

3. Shortly after receiving the letter, it appears the Briarcrest Community Club approached Water District No. 42 about providing lighting service. On or about January 16, 1956, the District amended its Comprehensive Plan to "have the power to acquire, construct, maintain, operate and develop street lighting systems for the area comprised in Water District No. 42, or portions thereof", and "to have the power to levy and collect special assessments against the real property lighting systems for the purpose of paying the whole or any part of the cost of such construction, installation or improvement, together with the expense of furnishing electric energy, and maintenance and operation and overhead expense."

4. On March 5, 1956, the District's engineer provided a cost estimate for materials and installation of street lights only. On March 20, 1956, the District's engineer reviewed the petition and certified the Sufficiency for the Proposed LID No. 7 - 52.8% of the 264 registered owners had signed the petition to form the LID. The District bid the project to furnish the material in connection with said street lighting system in accordance to the plans and specifications at the District office. The District recognized that City Light "own[ed] or control[ed] the utility poles upon which said street lights are to be installed and have a monopoly for the furnishing of electrical energy to said community and will not permit any other party or corporation to install said street lights."

5. Since 1956, the District has added an additional seven lights on City Light poles, for a total of forty-nine (49) District-operated street lights currently within Lake Forest Park. The benefitted properties are identified on Exhibit A (spreadsheet) attached hereto, and located as depicted in the maps attached hereto as Exhibit B.

6. The City of Lake Forest Park was incorporated in 1961. During the August 10 and September 14, 2017, Lake Forest Park City Council meetings, the Council discussed street lights. In early 2018, the City and City Light will be entering into a street light agreement regarding the ownership and maintenance of streetlights within Lake Forest Park city limits ("Street Light Agreement").

7. During the same City Council meetings, the Council indicated that they wanted to take on the responsibility of streetlights within the District boundaries that are within the City. The District desires that the City take over the responsibility for the forty-nine (49) street lights, identified in paragraph 5, above, and the City is willing to accept transfer of responsibility for the maintenance, operational and capital expenses of these forty-nine (49) street lights, subject to City Light's continued ownership of said street lights.

8. City Light has maintained and provided the electricity to operate the forty-nine (49) street lights identified in paragraph 5. Though not a party to this Agreement, City Light consents to this transfer between the Parties and will continue to provide electricity and maintenance for the streetlights after transfer from the District to the City. See the executed Consent document attached.

II. AGREEMENT.

9. Effect of Recitals. The Recitals, paragraphs 1-8 above, are a material part of this Agreement.

10. Transfer and Acceptance of Lights. North City Water District hereby irrevocably transfers to the City of Lake Forest Park all responsibilities for the forty-nine (49) street lights identified in paragraph 5, above, and Exhibits A and B hereto. The District will discontinue billing customers for these street lights effective January 1, 2018. The City hereby accepts this transfer as well as all responsibilities attendant thereto.

11. Supporting Documentation. Documents supporting the assertions made in the Recitals are attached hereto as Exhibit C.

12. Attorneys' Fees and Costs. In the event of litigation involving this Agreement, the prevailing party shall be entitled to receive its reasonable costs and attorneys' fees in such litigation.

13. Entire Agreement. This Agreement supersedes all prior agreements and understandings, written or oral, between the parties.

14. No Effect on Franchise Agreement. Except as specifically provided herein, nothing in this Agreement shall affect any provision of the Franchise Agreement between the City and the District with an effective date of March 6, 2013.

15. Further Assurances. Each party agrees to diligently and in good faith undertake all actions and procedures reasonably required to consummate the agreed transfer of street lights as set forth in this Agreement.

16. Indemnification. Each party shall defend, indemnify and hold the other harmless from and against any and all claims, actions, damages, liability, and expense, including without limitation reasonable attorneys' fees, incurred as a result of such party's actions under this Agreement.

17. Applicable Law. This Agreement shall be governed by the laws of the State of Washington.

18. Dispute Resolution and Venue. In the event of any dispute arising under this Agreement, the parties will first attempt in good faith to resolve the dispute through direct negotiations and/or mediation. If such good faith attempts to resolve the dispute are not successful, then venue for any legal action shall be King County Superior Court.

19. Authority to Sign. The representative of each party signing below affirms that he or she has full authority to sign this Agreement and bind the party represented.

20. Counterparts. This Agreement may be signed by one or more counterparts, including by facsimile, scanned or electronic signatures, each of which shall be considered an original, and all of which together shall constitute one instrument.

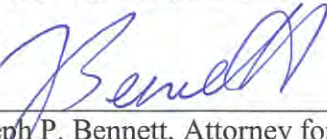
NORTH CITY WATER DISTRICT

By: 

DIANE POTTINGER
District Manager

DATED: December 5, 2017

APPROVED AS TO FORM:



Joseph P. Bennett, Attorney for
North City Water District


CITY OF LAKE FOREST PARK

By: 

JEFF JOHNSON
Mayor

DATED: December 14, 2017

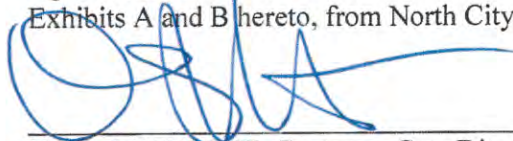
APPROVED AS TO FORM:



Kim Adams Pratt
City Attorney

CONSENT

The undersigned, on behalf of Seattle City Light, affirms that ^{he} has read the foregoing Agreement and consents to the transfer of forty-nine (49) street lights, as identified in Exhibits A and B hereto, from North City Water District to the City of Lake Forest Park.



KELLY ENRIGHT, Customer Care Director
Account Executive Office Team

DATED: December 9, 2017

EXHIBIT A TO TRANSFER AGREEMENT

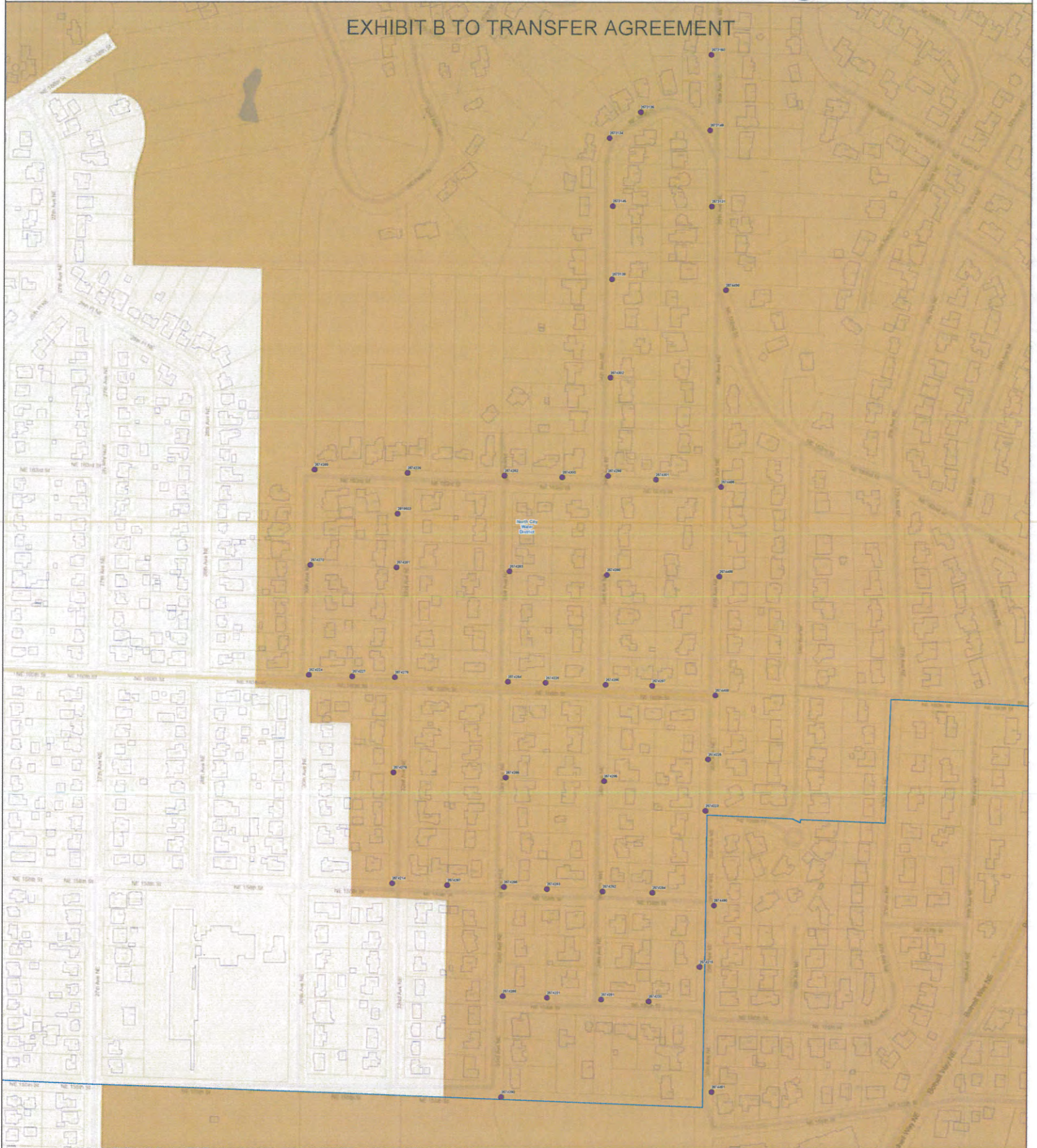
Pole Number	Customer Account	Customer Name	Type	Category	Rate Code	ASSET_MOBILE_3	STREET_NUMBER	STREET_NAME	LOCATION_DETAILS	POLE CITY
1393742	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	3206	NE 163RD ST	N5 NE 163RD ST 1W 33RD AVE NE	POLE CITY
1391012	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	3202	NE 158TH ST	N5 NE 158TH ST 1E 32ND AVE NE	LAKE FOREST PARK
1393717	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	3304	NE 156TH ST	N5 NE 156TH ST 2E 33RD AVE NE	LAKE FOREST PARK
1403893	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	3404	NE 166TH PL	NWS 34TH AVE NE 5N NE 165TH ST	LAKE FOREST PARK
1393736	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	15806	34TH AV NE	ES 34TH AVE NE 3N NE 158TH ST	LAKE FOREST PARK
1393821	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	3002	NE 163RD ST	N5 NE 163RD ST 1E 30TH AVE NE	LAKE FOREST PARK
1403890	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	16504	34TH AV NE	ES 34TH AVE NE 2N NE 165TH ST	LAKE FOREST PARK
1393712	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	15802	33RD AV NE	N5 NE 158TH ST 1E 33RD AVE NE	LAKE FOREST PARK
1393816	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	16006	30TH AV NE	ES 30TH AVE NE 2S NE 163RD ST	LAKE FOREST PARK
1393747	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	16006	34TH AV NE	ES 34TH AVE NE 2S NE 163RD ST	LAKE FOREST PARK
1393734	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	3404	NE 160TH ST	N5 NE 160TH ST 2E 34TH AVE NE	LAKE FOREST PARK
1393716	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	15602	33RD AV NE	NEC NE 156TH ST & 33RD AVE NE	LAKE FOREST PARK
1403903	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	16310	34TH AV NE	ES 34TH AVE NE & NE 165TH ST	LAKE FOREST PARK
1393739	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	3404	NE 158TH ST	W5 NE 158TH ST 2E 34TH AVE NE	LAKE FOREST PARK
1403892	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	3402	NE 166TH PL	W5 34TH AVE NE 9N NE 163RD ST (4N NE 165TH ST)	LAKE FOREST PARK
1391003	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	15502	33RD AV NE	SS NE 155TH ST IN LINE ES 33RD AVE NE TO N	LAKE FOREST PARK
1393667	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	16304	35TH AV NE	ES 35TH AVE NE 1N NE 162ND ST TO SE	LAKE FOREST PARK
1393749	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	16002	34TH AV NE	NEC 34TH AVE NE & NE 160TH ST	LAKE FOREST PARK
1393672	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	3304	NE 160TH ST	N5 NE 160TH ST 2E 33RD AVE NE (SERVICE TO 16004 33RD NE)	LAKE FOREST PARK
1393729	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	3402	NE 156TH ST	NEC 34TH AVE NE & NE 156TH ST	LAKE FOREST PARK
1393824	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	16007	32ND AV NE	W5 32ND AVE NE 1S NE 163RD	LAKE FOREST PARK
1393818	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	16002	30TH AV NE	NEC NE 160TH ST & 30TH AVE NE	LAKE FOREST PARK
1403897	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	3406	NE 166TH PL	W5 35TH AVE NE 4N NE 165TH ST	LAKE FOREST PARK
1403895	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	16503	35TH AV NE	W5 35TH AVE NE 11N NE 160TH ST	LAKE FOREST PARK
1393710	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	15806	33RD AV NE	ES 33RD AVE NE 2S NE 160TH ST	LAKE FOREST PARK
1393670	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	16002	33RD AV NE	NEC 33RD AVE NE & NE 160TH ST	LAKE FOREST PARK
1393813	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	16001	32ND AV NE	NWC 32ND AVE NE & NE 160TH ST	LAKE FOREST PARK
1393668	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	16006	33RD AV NE	ES 33RD AVE NE 3N NE 160TH ST	LAKE FOREST PARK
1393675	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	16306	34TH AV NE	ES 34TH AVE NE 3N NE 163RD ST	LAKE FOREST PARK
1393815	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	16005	32ND AV NE	W5 32ND AVE NE 2S NE 163RD ST	LAKE FOREST PARK
1393745	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	3404	NE 163RD ST	N5 NE 163RD ST 2E 34TH AVE NE	LAKE FOREST PARK
1391010	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	15801	32ND AV NE	N5 NE 156TH ST 1W 35TH AVE NE	LAKE FOREST PARK
1393750	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	3404	NE 156TH ST	N5 NE 156TH ST 1E 34TH AVE NE	LAKE FOREST PARK
1393738	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	15802	34TH AV NE	N5 NE 160TH ST 2E 30TH AVE NE	LAKE FOREST PARK
1393808	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	16302	34TH AV NE	NEC 34TH AVE NE & NE 163RD ST	LAKE FOREST PARK
1393744	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	3202	NE 163RD ST	N5 NE 163RD ST IN LINE WITH W5 32ND AVE NE TO S	LAKE FOREST PARK
1393822	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	3304	NE 158TH ST	N5 NE 158TH ST 2E 33RD AVE NE	LAKE FOREST PARK
1403899	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	16603	35TH AV NE	W5 35TH AVE NE 6N NE 165TH ST (3N 34TH NE)	LAKE FOREST PARK
1393671	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	3302	NE 163RD ST	N5 NE 163RD ST 1W 34TH AVE NE	LAKE FOREST PARK
1393825	8070930000	NORTH CITY WATER DISTRICT	LED	RESIDENTIAL RL		SCL MAINT (C)	15805	32ND AV NE	W5 32ND AVE NE 3N NE 158TH ST	LAKE FOREST PARK
1393654	8070930000	NORTH CITY WATER DISTRICT	NON-LED DECORATIVE DH1	RESIDENTIAL RL		SCL MAINT (C)	16004	35TH AV NE	ES 35TH AVE NE 2N NE 160TH ST	LAKE FOREST PARK
1393659	8070930000	NORTH CITY WATER DISTRICT	NON-LED DECORATIVE DH1	RESIDENTIAL RL		SCL MAINT (C)	15805	35TH AV NE	W5 35TH AVE NE 1S NE 160TH ST	LAKE FOREST PARK
1393656	8070930000	NORTH CITY WATER DISTRICT	NON-LED DECORATIVE DH1	RESIDENTIAL RL		SCL MAINT (C)	16002	35TH AV NE	ES 35TH AVE NE 2S NE 162ND ST	LAKE FOREST PARK
1393835	8070930000	NORTH CITY WATER DISTRICT	NON-LED DECORATIVE DH1	RESIDENTIAL RL		SCL MAINT (C)	15502	35TH AV NE	ES 35TH AVE NE 1S NE 156TH ST	LAKE FOREST PARK
1393658	8070930000	NORTH CITY WATER DISTRICT	NON-LED DECORATIVE DH1	RESIDENTIAL RL		SCL MAINT (C)	15802	35TH AV NE	ES 35TH AVE NE 1N NE 158TH ST	LAKE FOREST PARK
1393660	8070930000	NORTH CITY WATER DISTRICT	NON-LED DECORATIVE DH1	RESIDENTIAL RL		SCL MAINT (C)	15803	35TH AV NE	W5 35TH AVE NE 2N NE 158TH ST	LAKE FOREST PARK
1393833	8070930000	NORTH CITY WATER DISTRICT	NON-LED DECORATIVE DH1	RESIDENTIAL RL		SCL MAINT (C)	15601	35TH AV NE	W5 35TH AVE NE 1N NE 156TH ST	LAKE FOREST PARK
1393832	8070930000	NORTH CITY WATER DISTRICT	NON-LED DECORATIVE DH1	RESIDENTIAL RL		SCL MAINT (C)	15602	35TH AV NE	ES 35TH AVE NE 1N NE 156TH ST	LAKE FOREST PARK

EXHIBIT A

Shoreline Water District Streetlights

Attachment A

EXHIBIT B TO TRANSFER AGREEMENT



Streetlights

Owner Type

- Shoreline Water District
- Lake Forest Park Water Districts
- SCL Service Area
- Burien
- Unincorporated King County
- Lake Forest Park
- Normandy Park
- Renton
- SeaTac
- Shoreline
- Tukwila



0.085 0.0425 0 0.085
Miles

Location Map



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Prepared by Seattle City Light Enterprise GIS Mapping.
SCL_GIS_Enterprise.mxd
Seattle City Light makes no representation or
warranty, express or implied, regarding the
accuracy or completeness of the data provided
herein, regardless of the form or the
medium of its transmission. There is no guarantee or
representation by the user as to the accuracy, validity
or reliability of the data for any purposes. The user accepts
the data "as is" and assumes all risks associated with its use.
No responsibility for the data, its use or any errors or
omissions is assumed by the City of Seattle or the
City of Shoreline. The user shall indemnify and hold the
City of Seattle and the City of Shoreline harmless from
any and all claims, damages, losses, costs or expenses
incurred or to be incurred by the City of Seattle or the
City of Shoreline as a result of the use of the data.
PLOT DATE: 11/06/2017

Seattle City Light

EXHIBIT C**ATTACHMENTS****SOURCE DOCUMENTS FOR RECITAL PARAGRAPHS**

<u>Recital Paragraph</u>	<u>Attachment Number</u>	<u>Description</u>
2	1	11/9/1955 Letter A. Tyler to C. Fox
3	2	11/18/55 Westinghouse Invoice to WD 42
3	3	WD 42 Resolution No. 266 (1/16/56)
4	4	3/5/1956 Sparling Cost Estimate
4	5	3/20/1956 Letter B. Qualheim to WD 42 Board
4	6	Affidavit of J. Porter dated 5/22/1956
4	7	WD 42 Resolution No. 279 (6/4/1956)

EXHIBIT C

Attachment 1

EXHIBIT C

Attachment 2

EXHIBIT C

Attachment 3

further amended to include the additions provided for in this Resolution as follows:

Section 1. The Commissioners of Water District No. 42, King County, Washington, shall have the power to acquire, construct, maintain, operate and develop street lighting systems for the area comprised in Water District No. 42, or portions thereof, pursuant to the provisions of Chapter 68 of the Session Laws of the State of Washington for 1941.

Section 2. That said Commissioners shall have the power to levy and collect special assessments against the real property specially benefitted by the installation of street or road lighting systems for the purpose of paying the whole or any part of the cost of such construction, installation or improvement, together with the expense of furnishing electric energy, and maintenance and operation and overhead expense.

Section 3. That the street lighting and fixtures be installed at street and road intersections, and at such other locations on the streets, highways, avenues, and roads within the area comprised in Water District No. 42 as may be deemed necessary by the Commissioners of the District.

Section 4. That when street lighting has been installed through the creation of a local improvement district, the Commissioners of the Water District shall establish a uniform monthly charge, subject to revision from time to time, to cover the cost of electric energy and maintenance, operation and overhead expense attributable to street lighting, and the amount of such charge shall be added to the water bills of the persons within the local improvement district.

Section 5. That when local improvement districts are organized for the installation of street lighting under this Resolu-

THOMAS E. SPARLING

THOMAS E. SPARLING

THOMAS E. SPARLING

THOMAS E. SPARLING

THOMAS E. SPARLING

EXHIBIT C

Attachment 4

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HOWARD E. HARTMAN & ASSOCIATES
CONSULTING ENGINEERS

10000 W. 10th Ave.
Suite 100
Denver, CO 80231

10000 W. 10th Ave.
Suite 100
Denver, CO 80231

10000 W. 10th Ave.
Suite 100
Denver, CO 80231

EXHIBIT C

Attachment 5

10000 W. 10th Ave.
Suite 100
Denver, CO 80231

10000 W. 10th Ave.
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Suite 100
Denver, CO 80231

AFFIDAVIT OF JAMES W. PORTER
OF MAILING NOTICES OF HEARING
UPON ASSESSMENT ROLL IN
LOCAL IMPROVEMENT DISTRICT NO.
7, WATER DISTRICT NO. 42,
KING COUNTY, WASHINGTON

JAMES W. PORTER, being first duly sworn, upon oath deposes and says:

That during all times herein mentioned he was and now is over the age of 21 years, a citizen of the United States and the State of Washington, and an engineer employed by Howard T. Harstad & Associates, the engineers for Water District No. 42, King County, Washington.

That in compliance with Section 57.16.070 of Revised Code of Washington, notice was given at least fifteen days before the hearing upon the assessment roll of Local Improvement District No. 7, Water District No. 42 by affiant mailing a copy of the attached notice to each of the owners or reputed owners of land in said Local Improvement District No. 7, as they appear on the books of the Treasurer of King County, Washington.

That the date of said hearing will be June 4, 1956.

That affiant on May 16, 1956, personally mailed each of said notices by placing same in a United States mail box at Seattle, Washington, for collection and delivery by the United States postal authorities, each of said notices being sealed in an envelope properly addressed and with first-class postage pre-paid; that 264 separate notices were so mailed.

James W. Porter
JAMES W. PORTER

Subscribed and sworn to before me this 22nd day of May, 1956.

Gatsumi Tanino
Notary Public in and for the State
of Washington, residing at Seattle

RESOLUTION NO. ~~278~~ 279

RESOLUTION OF THE BOARD OF WATER COMMISSIONERS
OF WATER DISTRICT NO. 42, KING COUNTY, WASHINGTON,
AUTHORIZING THE PRESIDENT OF THE BOARD OF WATER
COMMISSIONERS TO SIGN A CONTRACT FOR THE INSTALLA-
TION OF 42 LUMINARS IN LOCAL IMPROVEMENT DISTRICT
NO. 7, GENERALLY KNOWN AS THE BRIERCREST COMMUNITY

1. WHEREAS, by Resolution No. 273 adopted April 16, 1956, the Board of Water Commissioners of Water District No. 42 formed Local Improvement District No. 7 for the installation of a street lighting system in the vicinity of the Briercrest Community, and ordered the installation of 42 street lights therein; and
2. WHEREAS, the City of Seattle, Department of Lighting, own or control the utility poles upon which said street lights are to be installed and have a monopoly for the furnishing of electrical energy to said community and will not permit any other party or corporation to install said street lights; and
3. WHEREAS, the said Department of Lighting has submitted an "Application for Service" on its form 91L showing a charge for such installation in the sum of \$1963.75, the Water District to furnish the luminars and appurtenances,

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF WATER COMMISSIONERS OF WATER DISTRICT NO. 42, KING COUNTY, WASHINGTON, AS FOLLOWS:

Section 1: The "Application for Service" on form 91L of the City of Seattle, Department of Lighting, dated June 1, 1956 providing for the installation of 42 luminars in Local Improvement District No. 7 for the sum of \$1963.75 be and the same is hereby approved, a copy of which is hereto attached.

Section 2: The President of the Board, Ralph C. Olson, be and he is hereby authorized to sign said "Application for Service" on behalf of the Water District.

EXHIBIT C

Attachment 7

**NORTH CITY WATER DISTRICT
RESOLUTION 2017.11.22**

**A RESOLUTION TO ACCEPT THE AGREEMENT TO TRANSFER RESPONSIBILITY FOR
CERTAIN PUBLIC RIGHT OF WAY STREET LIGHTS
FROM NORTH CITY WATER DISTRICT TO THE CITY OF SHORELINE**

Background

1. North City Water District (District) has been providing street light administrative services for street lights within what is now the City of Shoreline (City) since 1977.
2. The City of Shoreline (City) assumed the administrative responsibility for street light services for the majority of street light within the City limits from Seattle City Light in 2008.
3. The District and the City have negotiated a transfer agreement for the street lights where the District has been providing administrative services for street lights within the City of Shoreline will be transferred to the City effective December 31, 2017 (see Attachment A).
4. Seattle City Light has reviewed the transfer agreement between the District and the City and supports the transfer of administrative services.
5. District staff recommends that the District accept and approve the enclosed Transfer Responsibility Agreement.


Action

IT IS RESOLVED THAT:

6. The attached Agreement to Transfer Responsibility for Certain Public Right of Way Street Lights from North City Water District to the City of Shoreline is approved.
7. The District Manager is authorized to execute the Transfer Agreement.

ADOPTED by the Board of Commissioners of North City Water District at a public meeting this 21st day of November, 2017.

ATTEST:


Ron Ricker, President


Larry Schoonmaker, Vice President

Approved as to Form:


Joe Bennett, District Attorney


Charlotte Haines, Secretary

EXHIBIT A

POLE NUMBER	STREET NUMBER	STREET NAME	LOCATION DETAILS	TYPE
1391007	15503	32ND AV NE	WS 32ND AVE NE 2N NE 155TH ST	LED
1393807	2704	NE 160TH ST	NWC 28TH AVE NE & NE 160TH ST	LED
1393885	15502	30TH AV NE	NEC NE 155TH ST & 30TH AVE NE	LED
1393810	2706	NE 158TH ST	NWC NE 158TH ST 28TH AVE NE	LED
1402470	1502	NE 169TH ST	NS NE 169TH ST 2E 15TH AVE NE	LED
1391008	15505	32ND AV NE	WS 32ND AVE NE 2S NE 158TH ST	LED
1393881	15802	30TH AV NE	NEC NE 158TH ST & 30TH AVE NE	LED
1391015	15806	30TH AV NE	ES 30TH AVE NE 2S NE 160TH ST	LED
1393883	15506	30TH AV NE	ES 30TH AVE NE 2S NE 158TH ST	LED
1391005	3002	NE 155TH ST	NWC 32ND AVE NE & NE 155TH ST	LED
1391011	3004	NE 158TH ST	NS NE 158TH ST 2E 30TH AVE NE	LED
1402437	1506	NE 177TH ST	NS NE 177TH ST 3E 15TH AVE NE	NON- LED
1352807	404	NE 153RD ST	NS NE 153RD PL 1W 5TH AVE NE	NON- LED
1352824	402	NE 153RD ST	NS NE 153RD PL 2W 5TH AVE NE	NON- LED

**AGREEMENT TO TRANSFER RESPONSIBILITY FOR
CERTAIN PUBLIC RIGHT OF WAY STREET LIGHTS
FROM NORTH CITY WATER DISTRICT TO THE CITY OF SHORELINE**

This AGREEMENT TO TRANSFER CERTAIN PUBLIC RIGHT OF WAY STREET LIGHTS ("Agreement" or "Transfer Agreement") is entered into this ___ day of November, 2017 by and between North City Water District, a Title 57 RCW special purpose district ("NCWD" or the "District") and the City of Shoreline, a Washington non-charter, municipal code city ("City" or "Shoreline"). The City and District are referred to collectively herein as "the Parties."

RECITALS

1. NCWD was previously known as "Shoreline Water District" and before that "King County Water District No. 42."
2. On or about April 4, 1977, in response to a petition filed by the owners of nineteen (19) lots on NE 153rd Street, the District Board of Commissioners, by Resolution 673, formed and created Street Lighting District No. 2 ("SLD No. 2"), to pay for the energy, lamp replacement and normal maintenance costs serving said water customers within SLD No. 2.
3. The District currently has responsibility for fourteen (14) street lights within SLD No. 2, and bills the benefitted residential properties for the street light service. The benefitted properties are identified on Exhibit A attached hereto, and located as depicted in four maps attached hereto as Exhibit B.
4. The City of Shoreline was incorporated in 1995. In 2008, Shoreline and the Seattle City Light ("SCL") entered into a Streetlight Agreement regarding the ownership and maintenance of street lights within the Shoreline city limits ("Street Light Agreement"). Per the Street Light Agreement, SCL owns all the "standard" streetlights in the City, whereas Shoreline owns the "non-standard" streetlights along Aurora Ave. N., 15th Ave NE and the Shoreline Interurban Trail. Because SLD No. 2 was not being administered by SCL but instead NCWD, the Street Light Agreement did not specifically address the administrative and maintenance responsibilities with respect to the fourteen (14) street lights identified in paragraphs 2 and 3, above, and Exhibits A and B hereto.
5. The fourteen (14) street lights identified in paragraph 3, above, constitute "standard" street lights as defined in the 2008 Street Light Agreement.

6. Section 3 of the 2008 Street Light Agreement provides that "any streetlight that is later found to be in public right-of-way that is not in Exhibit A shall be immediately added to the City's responsibility."
7. The District desires that the City take over the responsibility for the fourteen (14) street lights consistent with the intent of the 2008 Street Light Agreement, and the City desires to treat citizens within the City of Shoreline equally and consistently with the 2008 Street Light Agreement between the City and SCL.
8. The City has the experience, capability and legal authority to accept responsibility of the fourteen (14) street lights now administratively currently managed by the District. SCL will continue to own and maintain any standard street lights, as they have since 1977.
9. SCL has provided electricity to operate as well as maintenance as needed for the fourteen (14) street lights identified in paragraph 3. Though not a party to this Agreement, SCL consents to this transfer and will continue to provide electricity and maintenance for the street lights after transfer from the District to the City.

AGREEMENT

10. **Effect of Recitals.** The Recitals, paragraphs 1-8 above, are a material part of this Agreement.
11. **Transfer by District.** North City Water District hereby irrevocably transfers to the City of Shoreline all responsibilities for the fourteen (14) street lights identified in paragraph 3, above, and Exhibits A and B hereto.
12. **Acceptance by City.** The City of Shoreline hereby accepts the transfer of the fourteen (14) street lights identified in paragraphs 2 and 3, above, and Exhibits A and B hereto, as well as all responsibilities attendant thereto.
13. **Attorneys' Fees and Costs.** In the event of any material breach of this Agreement, the party responsible for the breach shall pay the other party's reasonable costs and attorneys' fees incurred in enforcing the Agreement, and in any litigation involving this Agreement, the prevailing party shall be entitled to receive its reasonable costs and attorneys' fees in such litigation.
14. **Entire Agreement.** This Agreement supersedes all prior agreements and understandings, written or oral, between the parties.
15. **No Effect on Franchise Agreement.** Except as specifically provided herein, nothing in this Agreement shall affect any provision of the Franchise Agreement between the City and the District with an effective date of August 21, 2012.

16. **Further Assurances.** Each party agrees to diligently and in good faith undertake all actions and procedures reasonably required to consummate the agreed transfer of street lights as set forth in this Agreement.
17. **Indemnification.** Each party shall defend, indemnify and hold the other harmless from and against any and all claims, actions, damages, liability, and expense, including without limitation reasonable attorneys' fees, incurred as a result of such party's actions under this Agreement.
18. **Applicable Law.** This Agreement shall be governed by the laws of the State of Washington.
19. **Dispute Resolution and Venue.** In the event of any dispute arising under this Agreement, the parties will first attempt in good faith to resolve the dispute through direct negotiations and/or mediation. If such good faith attempts to resolve the dispute are not successful, then venue for any legal action shall be Shoreline District Court or King County Superior Court.
20. **Authority to Sign.** The representative of each party signing below affirms that he or she has full authority to sign this Agreement and bind the party represented.
21. **Counterparts.** This Agreement may be signed by one or more counterparts, each of which shall be considered an original, and all of which together shall constitute one instrument.

NORTH CITY WATER DISTRICT**CITY OF SHORELINE**

By: _____
 DIANE POTTINGER
 District Manager

By: _____
 DEBBIE TARRY
 City Manager

DATED: November __, 2017

DATED: November __, 2017

APPROVED AS TO FORM:

APPROVED AS TO FORM:

 Joseph P. Bennett, Attorney for
 North City Water District

 Margaret J. King
 City Attorney

DATED: November __, 2017

DATED: November __, 2017

CONSENT

The undersigned, on behalf of Seattle City Light, affirms that she has read the foregoing Agreement and consents to the transfer of fourteen (14) street lights, as identified in Exhibits A and B hereto, from North City Water District to the City of Shoreline.

KELLY ENRIGHT
Customer Care Director

DATED: November __, 2017



**AGREEMENT TO TRANSFER RESPONSIBILITY FOR
CERTAIN PUBLIC RIGHT OF WAY STREET LIGHTS
FROM NORTH CITY WATER DISTRICT TO THE CITY OF SHORELINE**

This AGREEMENT TO TRANSFER CERTAIN PUBLIC RIGHT OF WAY STREET LIGHTS ("Agreement" or "Transfer Agreement") is entered into this 12th day of ~~November~~, December, 2017 by and between North City Water District, a Title 57 RCW special purpose district ("NCWD" or the "District") and the City of Shoreline, a Washington non-charter, municipal code city ("City" or "Shoreline"). The City and District are referred to collectively herein as "the Parties."

RECITALS

1. NCWD was previously known as "Shoreline Water District" and before that "King County Water District No. 42."
2. On or about April 4, 1977, in response to a petition filed by the owners of nineteen (19) lots on NE 153rd Street, the District Board of Commissioners, by Resolution 673, formed and created Street Lighting District No. 2 ("SLD No. 2"), to pay for the energy, lamp replacement and normal maintenance costs serving said water customers within SLD No. 2.
3. The District currently has responsibility for fourteen (14) street lights within SLD No. 2, and bills the benefitted residential properties for the street light service. The benefitted properties are identified on Exhibit A attached hereto, and located as depicted in four maps attached hereto as Exhibit B.
4. The City of Shoreline was incorporated in 1995. In 2008, Shoreline and the Seattle City Light ("SCL") entered into a Streetlight Agreement regarding the ownership and maintenance of street lights within the Shoreline city limits ("Street Light Agreement"). Per the Street Light Agreement, SCL owns all the "standard" streetlights in the City, whereas Shoreline owns the "non-standard" streetlights along Aurora Ave. N., 15th Ave NE and the Shoreline Interurban Trail. Because SLD No. 2 was not being administered by SCL but instead NCWD, the Street Light Agreement did not specifically address the administrative and maintenance responsibilities with respect to the fourteen (14) street lights identified in paragraphs 2 and 3, above, and Exhibits A and B hereto.
5. The fourteen (14) street lights identified in paragraph 3, above, constitute "standard" street lights as defined in the 2008 Street Light Agreement.

6. Section 3 of the 2008 Street Light Agreement provides that "any streetlight that is later found to be in public right-of-way that is not in Exhibit A shall be immediately added to the City's responsibility."
7. The District desires that the City take over the responsibility for the fourteen (14) street lights consistent with the intent of the 2008 Street Light Agreement, and the City desires to treat citizens within the City of Shoreline equally and consistently with the 2008 Street Light Agreement between the City and SCL .
8. The City has the experience, capability and legal authority to accept responsibility of the fourteen (14) street lights now administratively currently managed by the District. SCL will continue to own and maintain any standard street lights, as they have since 1977.
9. SCL has provided electricity to operate as well as maintenance as needed for the fourteen (14) street lights identified in paragraph 3. Though not a party to this Agreement, SCL consents to this transfer and will continue to provide electricity and maintenance for the street lights after transfer from the District to the City.

AGREEMENT

10. **Effect of Recitals.** The Recitals, paragraphs 1-8 above, are a material part of this Agreement.
11. **Transfer by District.** North City Water District hereby irrevocably transfers to the City of Shoreline all responsibilities for the fourteen (14) street lights identified in paragraph 3, above, and Exhibits A and B hereto.
12. **Acceptance by City.** The City of Shoreline hereby accepts the transfer of the fourteen (14) street lights identified in paragraphs 2 and 3, above, and Exhibits A and B hereto, as well as all responsibilities attendant thereto.
13. **Attorneys' Fees and Costs.** In the event of any material breach of this Agreement, the party responsible for the breach shall pay the other party's reasonable costs and attorneys' fees incurred in enforcing the Agreement, and in any litigation involving this Agreement, the prevailing party shall be entitled to receive its reasonable costs and attorneys' fees in such litigation.
14. **Entire Agreement.** This Agreement supersedes all prior agreements and understandings, written or oral, between the parties.
15. **No Effect on Franchise Agreement.** Except as specifically provided herein, nothing in this Agreement shall affect any provision of the Franchise Agreement between the City and the District with an effective date of August 21, 2012.


16. **Further Assurances.** Each party agrees to diligently and in good faith undertake all actions and procedures reasonably required to consummate the agreed transfer of street lights as set forth in this Agreement.
17. **Indemnification.** Each party shall defend, indemnify and hold the other harmless from and against any and all claims, actions, damages, liability, and expense, including without limitation reasonable attorneys' fees, incurred as a result of such party's actions under this Agreement.
18. **Applicable Law.** This Agreement shall be governed by the laws of the State of Washington.
19. **Dispute Resolution and Venue.** In the event of any dispute arising under this Agreement, the parties will first attempt in good faith to resolve the dispute through direct negotiations and/or mediation. If such good faith attempts to resolve the dispute are not successful, then venue for any legal action shall be Shoreline District Court or King County Superior Court.
20. **Authority to Sign.** The representative of each party signing below affirms that he or she has full authority to sign this Agreement and bind the party represented.
21. **Counterparts.** This Agreement may be signed by one or more counterparts, each of which shall be considered an original, and all of which together shall constitute one instrument.

NORTH CITY WATER DISTRICT

By: 
 DIANE POTTINGER
 District Manager


DATED: November 22, 2017

APPROVED AS TO FORM:


 Joseph P. Bennett, Attorney for
 North City Water District

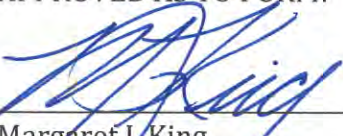
DATED: November 29, 2017

CITY OF SHORELINE

By: 
 DEBBIE TARRY
 City Manager

DATED: ~~November~~ December 12, 2017

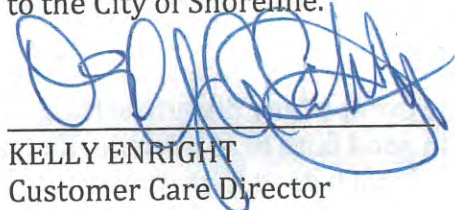
APPROVED AS TO FORM:


 Margaret J. King
 City Attorney

DATED: November ~~29~~, 2017
December 8

CONSENT

The undersigned, on behalf of Seattle City Light, affirms that she has read the foregoing Agreement and consents to the transfer of fourteen (14) street lights, as identified in Exhibits A and B hereto, from North City Water District to the City of Shoreline.



KELLY ENRIGHT
Customer Care Director

DATED: November 3, 2017

EXHIBIT A

POLE NUMBER	STREET NUMBER	STREET NAME	LOCATION DETAILS	TYPE
1391007	15503	32ND AV NE	WS 32ND AVE NE 2N NE 155TH ST	LED
1393807	2704	NE 160TH ST	NWC 28TH AVE NE & NE 160TH ST	LED
1393885	15502	30TH AV NE	NEC NE 155TH ST & 30TH AVE NE	LED
1393810	2706	NE 158TH ST	NWC NE 158TH ST 28TH AVE NE	LED
1402470	1502	NE 169TH ST	NS NE 169TH ST 2E 15TH AVE NE	LED
1391008	15505	32ND AV NE	WS 32ND AVE NE 2S NE 158TH ST	LED
1393881	15802	30TH AV NE	NEC NE 158TH ST & 30TH AVE NE	LED
1391015	15806	30TH AV NE	ES 30TH AVE NE 2S NE 160TH ST	LED
1393883	15506	30TH AV NE	ES 30TH AVE NE 2S NE 158TH ST	LED
1391005	3002	NE 155TH ST	NWC 32ND AVE NE & NE 155TH ST	LED
1391011	3004	NE 158TH ST	NS NE 158TH ST 2E 30TH AVE NE	LED
1402437	1506	NE 177TH ST	NS NE 177TH ST 3E 15TH AVE NE	NON- LED
1352807	404	NE 153RD ST	NS NE 153RD PL 1W 5TH AVE NE	NON- LED
1352824	402	NE 153RD ST	NS NE 153RD PL 2W 5TH AVE NE	NON- LED

Attachment A

 Lake Forest Park
 Shoreline
 Lake Forest Park Water Districts
 SCL Service Area

 Streetlights



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Produced by Seattle City Light Enterprise GIS Mapping
SCL_GIS_Analysis@seattle.gov

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 Seattle City Light

M:\CCLG\REGIS\Projects_SCL\2017\2017-160 North City Water District Main\NCWD Drawings.mxd

NORTH CITY WATER DISTRICT

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APPENDIX E – WATER FACILITIES INVENTORY / CONSUMER CONFIDENCE REPORT

NORTH CITY WATER DISTRICT

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WATER FACILITIES INVENTORY (WFI) FORM

Quarter: 1
Attachment A
Updated: 03/16/2020

ONE FORM PER SYSTEM

Printed: 3/16/2020
WFI Printed For: On-Demand
Submission Reason: Pop/Connect
Update

RETURN TO: Central Services - WFI, PO Box 47822, Olympia, WA, 98504-7822

1. SYSTEM ID NO. 39600 E	2. SYSTEM NAME NORTH CITY WATER DISTRICT	3. COUNTY KING	4. GROUP A	5. TYPE Comm																	
6. PRIMARY CONTACT NAME & MAILING ADDRESS DENNIS L. CLOUSE [OPERATIONS MANAGER] PO BOX 55367 SHORELINE, WA 98155		7. OWNER NAME & MAILING ADDRESS NORTH CITY WATER DISTRICT DISTRICT MANAGER N. DIANE POTTINGER PO BOX 55367 SHORELINE, WA 98155																			
STREET ADDRESS IF DIFFERENT FROM ABOVE ATTN DENNIS CLOUSE ADDRESS 1519 NE 177TH ST CITY SHORELINE STATE WA ZIP 98155		STREET ADDRESS IF DIFFERENT FROM ABOVE ATTN DIANE POTTINGER ADDRESS 1519 NE 177TH ST CITY SHORELINE STATE WA ZIP 98155																			
9. 24 HOUR PRIMARY CONTACT INFORMATION		10. OWNER CONTACT INFORMATION																			
Primary Contact Daytime Phone: (206) 362-8100		Owner Daytime Phone: (206) 362-8100																			
Primary Contact Mobile/Cell Phone: (206) 618-9616		Owner Mobile/Cell Phone: (206) 618-9606																			
Primary Contact Evening Phone:		Owner Evening Phone: (206) 618-9606																			
Fax: (206) 361-0629 E-mail: dennyc@northcitywater.org		Fax: (206) 361-0629 E-mail: dianep@northcitywater.org																			
11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)																					
<input checked="" type="checkbox"/> Not applicable (Skip to #12) <input type="checkbox"/> Owned and Managed SMA NAME: _____ SMA Number: _____ <input type="checkbox"/> Managed Only <input type="checkbox"/> Owned Only																					
12. WATER SYSTEM CHARACTERISTICS (mark all that apply)																					
<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <input type="checkbox"/> Agricultural <input checked="" type="checkbox"/> Commercial / Business <input checked="" type="checkbox"/> Day Care <input checked="" type="checkbox"/> Food Service/Food Permit <input type="checkbox"/> 1,000 or more person event for 2 or more days per year </div> <div style="width: 30%;"> <input type="checkbox"/> Hospital/Clinic <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Licensed Residential Facility <input type="checkbox"/> Lodging <input type="checkbox"/> Recreational / RV Park </div> <div style="width: 30%;"> <input checked="" type="checkbox"/> Residential <input checked="" type="checkbox"/> School <input type="checkbox"/> Temporary Farm Worker <input checked="" type="checkbox"/> Other (church, fire station, etc.): _____ </div> </div>																					
13. WATER SYSTEM OWNERSHIP (mark only one)				14. STORAGE CAPACITY (gallons)																	
<input type="checkbox"/> Association <input type="checkbox"/> County <input type="checkbox"/> Investor <input checked="" type="checkbox"/> Special District <input type="checkbox"/> City / Town <input type="checkbox"/> Federal <input type="checkbox"/> Private <input type="checkbox"/> State				5,700,000																	
15	16 SOURCE NAME	17	18 SOURCE CATEGORY	19	20	21 TREATMENT	22	23	24 SOURCE LOCATION												
	LIST UTILITY'S NAME FOR SOURCE AND WELL TAG ID NUMBER. Example: WELL #1 XYZ456 IF SOURCE IS PURCHASED OR INTERTIED, LIST SELLER'S NAME Example: SEATTLE	INTERTIE SYSTEM ID NUMBER WELL WELL IN A WELL FIELD SPRING SPRING IN SPRINGFIELD SEA WATER SURFACE WATER RANNEY / INF. GALLERY OTHER PERMANENT SEASONAL EMERGENCY SOURCE METERED NONE	WELL WELL IN A WELL FIELD SPRING SPRING IN SPRINGFIELD SEA WATER SURFACE WATER RANNEY / INF. GALLERY OTHER PERMANENT SEASONAL EMERGENCY SOURCE METERED NONE	USE NONE CHLORINATION FILTRATION FLUORIDATION (UV) IRRADIATION (UV) OTHER		DEPTH TO FIRST OPEN TERTIAL IN FEET CAPACITY (GALLONS PER MINUTE) 1/4, 1/4 SECTION SECTION NUMBER TOWNSHIP RANGE															
S01	77050Y/SEATTLE (5)	77050 Y																			
S02	77050\Seattle Cedar	77050 Y																			
S03	77050\Seattle Cedar	77050 Y																			
S04	572505\Mountlake Terrace (2)	57250 5																			

WATER FACILITIES INVENTORY (WFI) FORM - Continued

Attachment A

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
39600 E	NORTH CITY WATER DISTRICT	KING	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?)		10887	Unspecified
A. Full Time Single Family Residences (Occupied 180 days or more per year)	7602		
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	325		
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	3285		
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.	253	253	
28. TOTAL SERVICE CONNECTIONS		11140	

29. FULL-TIME RESIDENTIAL POPULATION													
A. How many residents are served by this system 180 or more days per year? <u>25476</u>													

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

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

32. REGULAR NON-RESIDENTIAL USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. If you have schools, daycares, or businesses connected to your water system, how many students daycare children and/or employees are present each month?	4753	4753	4753	4753	4753	4753			4753	4753	4753	4753
B. How many days per month are they present?	18	18	18	18	18	18			18	18	18	18

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
* Requirement is exception from WAC 246-290	30	30	30	30	30	30	30	30	30	30	30	30

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: _____

Total WFI Printed: 1



Water Facilities Inventory (WFI)

Report Create Date: 3/16/2020
Water System Id(s): 39600
Print Data on Distribution Page: Yes
Print Copies For: DOH Copy
Water System Name: ALL
County: -- Any --
Region: ALL
Group: ALL
Type: ALL
Permit Renewal Quarter: ALL
Water System Is New: ALL
Water System Status: Act
Water Status Date From: ALL To ALL
Water System Update Date ALL To ALL
Owner Number: ALL
SMA Number: ALL
SMA Name: ALL
Active Connection Count From: ALL To: ALL
Approved Connection Count ALL To: ALL
Full-Time Population From: ALL To: ALL
Water System Expanding ALL
Source Type: ALL
Source Use: ALL
WFI Printed For: On-Demand



Conserving Water with Local and Regional Programs

During 2018, North City Water District purchased 571 million gallons of water, with a distribution leakage rate of 2.5% throughout our system. The District is extremely proud of this rate and will continue to keep it as low as possible through proactive monitoring and maintenance.

The Saving Water Partnership (SWP)—which is made up of North City Water District and 17 other water utility partners—is still on target with its six-year conservation goal to reduce per capita use to less than 105 mgd average annually from 2013 through 2018, once again meeting the goal with 96.6 mgd in 2017, slightly higher than last year, attributed primarily to the hot summer, according to SPU Economist Bruce Flory. Our District's customers helped achieve this through the following events and programs:

- Over 3,475 people visited our Water Education Booths at the Lake Forest Park Green Fair, Lake Forest Park Picnic in the Park, Shoreline Science (STEM) Festival, Ridgecrest's Ice Cream Social, Celebrate Shoreline Festival, and YMCA's Healthy Kids Day;
- 159 people learned about water-wise gardening tips at our free Savvy Gardener classes;
- 28 classroom presentations were made about water;
- 6 households within our District boundaries took advantage of the single family toilet rebate program; and
- 3 single family households received a rebate for installing an irrigation timer.

Upcoming Community Events:

We LOVE to connect with our customers! Come visit us at:

- June 1 STEM Fair at Shoreline Community College
- June 29-30 Shoreline Arts Festival at Shoreline Comm. College
- August 13 North City Jazz Walk (the District is a Venue)
- August 17 Celebrate Shoreline at Cromwell Park
- September 7 LFP Picnic In the Park at Animal Acres Park

More About Water Quality

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, and can pick up substances resulting from the presence of animals or from human activity. In Seattle's surface water supplies, the potential sources of contamination include:

- Microbial contaminants, such as viruses, bacteria, and protozoa from wildlife;
- Inorganic contaminants, such as salts and metals, which are naturally occurring; and
- Organic contaminants, which result from chlorine combining with the naturally occurring organic matter.

In order to ensure that tap water is safe to drink, the Environmental Protection Agency and/or the Washington state board of health prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration and/or the Washington state department of agriculture regulations establish limits for contaminants in bottled water that must provide the same protection for public 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 a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline at 800.426.4791.

We at North City Water District encourage public interest and participation in the decisions that affect our drinking water. If you would like to learn more about our water, have questions about its quality, or would like to know what you can do to help keep our water supply clean, safe and abundant, please don't hesitate to contact us at 206.362.8100, or visit one of our Board of Commissioners meetings (every first and third Tuesday of each month at 3:00 pm) at our District office, or you can contact any one of the following organizations:

Seattle Public Utilities

Phone: 206.684.3000

Website: http://www.seattle.gov/util/MyServices/Water/Water_Quality

United States Environmental Protection Agency (EPA) and the Safe Drinking Water Hotline

Phone: 800.426.4791

Website: <http://www.epa.gov/safewater>

Washington State Department of Health (DOH):

Phone: 800.521.0323

Website: <http://www.doh.wa.gov/ehp/dw/>

Ongoing Water System Planning



1 Overview

Purpose, Policies, Rules and Regulations, Conservation, Customer Service, and long term water supply contract with SPU



2 Basic Planning Data

Supply, Emergency, Facilities, Equipment, System, and Water Treatment



3 Existing Water System

Supply, Emergency, Facilities, Equipment, System, and Water Treatment



4 Minimum Design Criteria

For All System Components



5 System Analysis

Source, Storage, Pumping, Distribution, and Monitoring



6 Capital Improvement Planning



7 Operations & Maintenance

Personnel, Processes, Records, Water Quality, Safety, Emergency, Public Notification, and Preventive Maintenance



8 Financials

Water Supply, Cost of Service, Connection Charges, Funding, Capital Improvement Financing, Developer Policies, Standard Details and Specs, and Multi-Year Rate Study

Highlighting Three Appendices to Our Plan

This Water System Planning effort will also update our Water Use Efficiency/Conservation Plan and our Coliform Monitoring Plan. We are also introducing a new program, "ShakeAlert."

Water Use Efficiency/Conservation Plan

Because North City Water District is part of a regional water system, we take an active role in managing water use to minimize the amount of water that is purchased but goes unused. Thanks to heightened conservation efforts, our region has achieved some dramatic results: in the early 1990s, the average gallons used per person per day was over 160. Today, the actual use is 85 gallons per person per day in our region, enabling us to delay the need for an additional water source. Conservation efforts have included everything from public outreach, rebate programs, and tiered pricing, to changes in federal and state plumbing codes—all shared annually by our regional program, the Saving Water Partnership: www.savingwater.org.

This year, North City Water District is adding in a routine review of the water use efficiency/conservation program, in order to adopt a specific goal for North City along with the regional goal. We expect to have a public hearing on this new program at our Board meeting on July 16 at 3:00 pm. Our proposed conservation program is currently being developed and can be viewed at www.northcitywater.org/about/conservation.

Coliform Monitoring Plan

As a regional partner with Seattle Public Utilities, your District participates in the Regional Coliform monitoring program. Water samples are taken throughout the regional system to ensure our water quality remains outstanding. In 2015 and 2016, the District added several additional water quality monitoring stations to better monitor water movement and quality. We are updating this plan to include the new stations, and meet new regulations.



ShakeAlert

With all the talk about a "big one earth quake," North City Water District is working with a local consultant to plan for any necessary measures to ensure ongoing water supply, should an earthquake cause our region to be without water for more than a couple days.

The Pacific Northwest Seismic Network (PNSN) at the University of Washington and the US Geological Survey (USGS) have developed a system to provide early warning of earthquakes referred to as "ShakeAlert." Consisting of a network of sensors spread throughout the west coast, ShakeAlert has been approved for pilot testing in selected water and sewer utilities in Washington and Oregon.

The pilot system is designed to provide early warning alerts, which can be used to establish safety measures that protect people, equipment and facilities. The amount of time for early detection depends on the epicenter of an earthquake, which is expected to be between 0.5 and 4 minutes.

North City Water District will work with a local consultant to plan for and complete a predesign report, and a Pilot Application to participate in the regional program, along with the purchase of any necessary equipment. We look forward to keeping you updated as we have more information. Learn more about ShakeAlert on their website at: www.shakealert.org/

If you have any questions about these three new sections, or about our Water System Planning process in general, please don't hesitate to give us a call at 206.362.8100.

The North City Waves Newsletter is brought to you by North City Water District, and its Board of Commissioners:

Ron Ricker (President), Charlotte Haines (Vice President), and Patty Hale (Secretary).

Feel free to contact us at PO Box 55367, or 1519 NE 177th Street, Shoreline, WA 98155.

206.362.8100 • www.northcitywater.org • [f](https://www.facebook.com/NorthCityWaterDistrict) / NorthCityWaterDistrict

Printed on 30%
post consumer paper.
Please recycle.



2018 ANNUAL REPORT of DRINKING WATER QUALITY

Issue 2: April • May • June 2019

A newsletter for water-related issues and info
Serving the communities of Shoreline and Lake Forest Park since 1931

From Our Board...

by Ron Ricker, President

Spring has officially arrived... as evidenced by the number of construction projects underway in our community. Yet this year, for the first time since 1954, we expect our service connections to decrease by nearly 100 accounts. Looking back to 1965, our Engineering Report stated that the majority of the District's growth in the 1950 and 1960s, with an expected saturation point of approximately 6500 connections by the year 1980. By 1982, our Water System Plan reported 7300 connections; in 2018 we had a total of 8200 connections. So why are we projecting less connections, rather than our historic slow but steady increase? Two words: Sound Transit. As light rail arrives in Shoreline, single family residences will be demolished to make room for new parking garages, light rail stations, and approximately 500 multi-family housing units built by others (with more water-efficient plumbing and fixtures that mitigate their residential density). In some areas, roadways and utilities will be relocated, but the vast majority will be removed from our system. The District has been and will continue to work closely with Sound Transit to ensure the design is as cost effective as possible, both for our ratepayers and the regional transportation system.



North City Waves Newsletter ~ a publication by North City Water District

- 1) Join www.nextdoor.com for neighborhood news and notices
- 2) Follow us on www.facebook.com/NorthCityWaterDistrict
- 3) Sign up for news, alerts, free classes and more on our website at www.northcitywater.org

Three Ways to Stay in Touch

- Annual Water Quality Report for 2018
- Water Test Results Tables and Definitions
- All Sorts of Rebates Available
- Learning About Your Water at the Source
- Project Update: New Maintenance Building
- Conserving Water Locally and Regionally
- Upcoming Community Events
- More About Water Quality
- Ongoing Water System Planning

Increased rate
reduction available
for 150 eligible low
income customers.
Call us or visit
www.northcitywater.org

Inside This Issue

PO Box 55367
1519 NE 177th Street
Shoreline, Washington 98155
206.362.8100





Annual Water Quality Report for 2018

North City Water District continues to maintain state and federal water quality guidelines that are significantly below EPA maximum levels.

All About Your Water

Where Is Your Water From? Tolt and Cedar River Watersheds.

Who Tests Your Water? Your drinking water is regulated by the Environmental Protection Agency (EPA), who sets drinking water quality standards, establishes testing methods and monitoring requirements for water utilities, sets maximum levels for water contaminants, and requires utilities to give public notice whenever a violation occurs. Your drinking water is tested frequently both by North City Water District and Seattle Public Utilities, our supplier, to ensure that high quality water is delivered to your home.

What is Your Water Being Tested For? 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 a health risk. More information about contaminants and potential health effects is available by calling the Environmental Protection Agency's (EPA) Safe Drinking Water Hotline 800.426.4791.

When is Your Water Tested? Continuously—365 days a year.

How is Your Water Tested? Your drinking water has been tested for over 200 compounds and additional contaminates. Tests are done before and after treatment and while your water is in the distribution system. The Tables presented on the following page list all of the contaminants detected in the most recent required water testing and compare them to the limits and goals set by the EPA and the State of Washington to ensure your tap water is safe. Not shown are more than 200 additional contaminants that were tested for, but not detected, in your drinking water. If you would like to see a list of these other compounds or if you have other water quality questions, do not hesitate to contact us. Please note: asbestos monitoring is not required for our District because all the asbestos pipe in our distribution system was replaced prior to 1991.

How Safe is Your Water? Your water falls safely within state and federal guidelines for each and every contaminant, significantly below the EPA's levels.

Lead and Copper Monitoring Results

Our regional water supply does not contain lead or copper. However it is possible that lead levels at your home may be higher than at other homes in the community as a result of materials used in your home's plumbing.

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. North City Water District is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components.

When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline at 1.800.426.4791 or at <http://www.epa.gov/safewater/lead>.

People With Special Concerns

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised 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 from infections. These people should seek advice about drinking water from their health care providers. EPA/Centers for Disease Control (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 at 1.800.426.4791.

If you would like to learn more about your water, or if you have questions about its quality, please don't hesitate to contact North City Water District at 206.362.8100.

Table 1: Water Quality Testing Results for 2018

Compounds that were not detected in 2018 are not included in these charts.

Types of Detected Compounds	Units	Primary Source	Ideal Goal (MCLG)	Max. Allowed (MCL)	Levels in the Cedar River Watershed Average	Levels in the Cedar River Watershed Range	Levels in the Tolt Watershed Average	Levels in the Tolt Watershed Range	Meets EPA Stds.?
RAW WATER									
Total Organic Carbon	ppm	Naturally present in the environment	NA	TT	0.9	0.4 to 2.1	1.3	1.1 to 1.5	Yes
FINISHED WATER SOURCE									
Turbidity	NTU	Soil runoff	NA	TT	0.3	0.2 to 2.3	0.04	0.01 to 0.35	Yes
Arsenic	ppb	Erosion of natural deposits	0	10	0.4	0.4 to 0.6	0.4	0.4 to 0.44	Yes
Barium	ppb	Erosion of natural deposits	2000	2000	1.5	1.3 to 1.6	1.1	1.0 to 1.2	Yes
Chromium	ppb	Erosion of natural deposits	100	100	0.27	0.25 to 0.33	0.2	ND to 0.24	Yes
Fluoride	ppm	Water additive to promote strong teeth	4	4	0.7	0.4 to 0.8	0.7	0.6 to 0.8	Yes
Nitrate	ppm	Byproduct of drinking water disinfection	10	10	ND	One sample	0.07	One sample	Yes
SPECIFIC SAMPLES FROM NORTH CITY WATER DISTRICT'S DISTRIBUTION SYSTEM									
Total Trihalomethanes	ppb	Byproduct of drinking water disinfection	NA	80	Average: 36 Range: 22 to 46				Yes
Haloacetic Acids (5)	ppb	Byproduct of drinking water disinfection	NA	60	Average: 38 Range: 18 to 41				Yes
Chlorine	ppm	Water additive to control microbes	MRDLG =4	MRDL =4	Highest Monthly Average: 0.72 Range: 0.08 to 1.21				Yes

Table 2: Lead and Copper Monitoring Results for the Tolt Watershed in 2017

Samples are taken every three years. Five of the 51 samples in the Tolt Watershed were taken in NCWD's service area. None of the samples for the Cedar River Watershed were from NCWD's service area.

Lead and Copper Sampling Program and Units	Ideal Goal MCLG	Action Level ²	Results of 2017 Samplings ³	# Homes Exceeding Action Level	Typical Sources in Drinking Water
Lead, ppb	0	15	4.0	0 of 51	Corrosion of household plumbing systems. Samples collected in homes within the Tolt water service area.
Copper, ppm	1.3	1.3	0.15	0 of 51	

² The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

³ 90th percentile: 90 percent of the samples were less than the values shown.

Additional Water Monitoring

North City Water District monitors the water in our distribution system for various compounds according to UCMR4 standards, as well as other parameters that can be impacted by algae. Our primary source water is from the Tolt River but we do also get water from the Cedar River, both of which can experience naturally occurring, seasonal algae blooms. Typically these blooms occur in the late spring, but due to a number of environmental factors including sunlight and temperature, blooms can occur at other times of the year. Although the algae we see in our water supplies is not associated with health concerns, it can create tastes and odors. Thankfully these are well controlled at both treatment facilities. Please contact us at our office if you would like to receive a copy of these results.

Rebates Available

Planning to replace or install a new toilet, or upgrade your sprinkler system? How about commercial kitchen equipment, medical equipment, industrial refrigeration units, or commercial laundry machines? Saving Water Partnership has an abundance of rebates for homeowners, apartment and condo owners, as well as institutions, and commercial/industrial businesses. Learn more at:

www.savingwater.org/rebates

Table Definitions

MCLG: Maximum Contaminant Level Goal

The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

MCL: Maximum Contaminant Level

The highest level of a contaminant allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

MRDL: Maximum Residual Disinfectant Level

The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG: Maximum Residual Disinfectant Level Goal

The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

TT: Treatment Technique

A required process intended to reduce the level of a contaminant in drinking water.

NTU: Nephelometric Turbidity Unit

Turbidity is a measure of how clear the water looks. The turbidity MCL that applied to the Cedar supply in 2018 is 5 NTU, and for the Tolt supply it was 0.3 NTU for at least 95% of the samples in a month. For November 2018, 99.4% of the samples from the Tolt were below 0.3 NTU. All of the other months in 2018 had 100% of samples below 0.3 NTU for the Tolt.

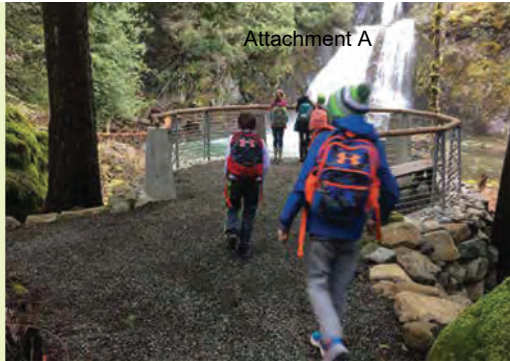
NA: Not applicable.

ND: Not detected.

ppm: 1 part per million = 1 mg/L = 1 milligram per liter.

ppb: 1 part per billion = 1 ug/L = 1 microgram per liter

1 ppm: = 1000 ppb.



Learning About Your Water at the Source

Did You Know? You and your family can enjoy an affordable, guided adventure to experience your watershed first-hand!

Located 35 miles east of Seattle along the shores of Rattlesnake Lake, the Cedar River Watershed Education Center offers you and your family a unique way to experience the water cycle.

Affordable tours and classes—such as the Family Watershed Tour, the Railroad History Treasure Tour, or the Junior Naturalist Class—can be reserved on SPU's website with this \$5.00 off coupon!

www.seattle.gov/util/crwec/

Center and Exhibit Hours:

April – October:
Tuesday – Sunday | 10AM to 5PM
November – March:
Tuesday – Sunday | 10AM to 4PM
Closed Mondays and on City Holidays

Rattlesnake Lake Recreation Area Hours:

6am to dusk all year, day-use only.

More Information:

206.733.9421 | 425.831.6780
crwprograms@seattle.gov



WATERSHED TOURS

The Cedar River Watershed Education Center is only 35 miles east of Seattle, at beautiful Rattlesnake Lake. The Center is open year-round, Tuesday-Sunday from 10am to 5pm. Visiting the Center is free.

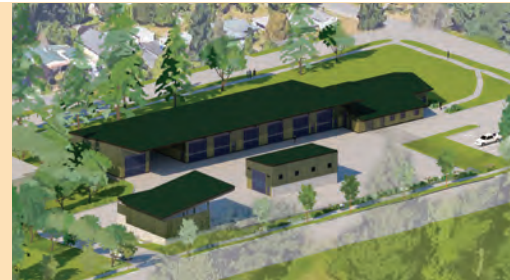
Guided tours of the Watershed are available July-September. (\$10 adults; \$5 youth & seniors ages 55 and older.)

\$5 OFF
EACH TICKET

CEDAR RIVER WATERSHED EDUCATION TOUR
Register and redeem at: seattle.gov/util/crwec Click on "Programs and Tours"
PROMO CODE: WATER Valid July-September 2019.

Project Update: New Maintenance Building

Our decades-long dream of a new maintenance facility is finally in sight... but it hasn't been easy: staggering construction costs in the northwest prompted us to separate the project into phases. Phase I site work has been completed (prior to the City of Shoreline's overlay program later this year); Phase II construction was awarded to Faber Construction in April. Although we couldn't afford to do everything (a wash facility at this site was too costly) , we'll get most of what we need by modifying other portions of our site. Construction will begin in mid June and should be complete in early 2020.



APPENDIX F – CROSS-CONNECTION CONTROL

NORTH CITY WATER DISTRICT

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**SHORELINE WATER DISTRICT
RESOLUTION 2012.12.93**

A RESOLUTION ADOPTING THE CROSS CONNECTION CONTROL PROGRAM

Background

1. The District approved a contract with Murray, Smith and Associates on February 21st, 2012 to develop a Cross Connection Control Program (CCCP);
2. The District receive the updated CCCP in July, 2012;
3. As part of the District's Code update, the District had decided it would like to adopt the CCCP by resolution.
4. Minor changes to the July 2012 plan were made to reference the changes made to the new District Code.
5. A copy of the updated CCCP was presented to the Board of Commissioners at the December 18, 2012 Board Meeting.
6. District staff is recommending the Cross Connection Control Program, prepared by MSA, be adopted.

Action

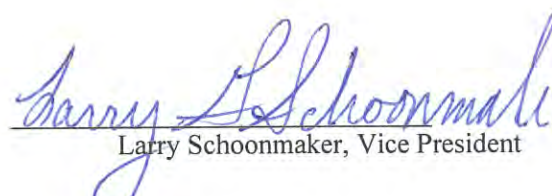
IT IS RESOLVED THAT:

7. The Board adopts the 2012 Cross Connection Control Program prepared by MSA Consultants.

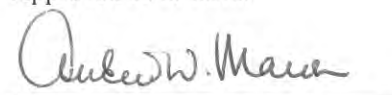
ADOPTED by the Board of Commissioners of Shoreline Water District at a regular open public meeting on this 18th day of December, 2012.


ATTEST:


Ron Ricker, President


Larry Schoonmaker, Vice President

Approved as to form:


Andrew Maron, District Attorney

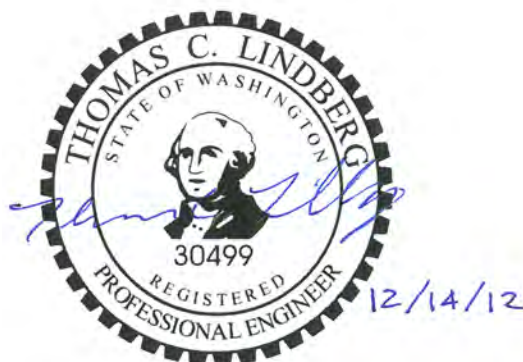

Charlotte Haines, Secretary



Cross-Connection Control Program

*Safeguarding
Shoreline's Water*

SHORELINE WATER DISTRICT
CROSS-CONNECTION CONTROL PROGRAM
DECEMBER 2012



Prepared by:

MURRAY, SMITH & ASSOCIATES, INC.

Engineers/Planners
2707 Colby Avenue, Suite 1110
Everett, Washington 98201-3566

12-1307.403

**Shoreline Water District
Cross-Connection Control Program
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- B. List of Non-residential Service Connections
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SHORELINE WATER DISTRICT

Cross-Connection Control Program

INTRODUCTION

The Shoreline Water District (District) cross-connection control (CCC) program is a proactive and ongoing effort of the District to protect the health of its customers by preventing contamination through cross-connection of the drinking water supplied throughout the distribution system. A cross-connection is any physical connection, actual or potential, between the water system and any source of non-potable substance that could contaminate or pollute the potable water supply by backflow. All public water systems in Washington State are required to implement a cross-connection control program and include the program document in the system's water system plan. The State mandate for a CCC program and the required elements of a CCC program are contained in *WAC 246-290-490 Cross-Connection Control*. The following are the current minimum required elements of a CCC program.

1. Adopt a local ordinance, resolution or code that establishes the purveyor's legal authority, describes operating policies and the corrective actions of a CCC program.
2. Develop and implement procedures and schedules for evaluating new and existing service connections to assess the degree of hazard posed by the consumer's premises to the purveyor's distribution system.
3. Develop and implement procedures and schedules that eliminate cross-connections whenever possible or control cross-connections by installation of approved backflow preventers and ensure approved backflow preventers are properly installed.
4. Ensure that personnel, including one certified Cross-Connection Control Specialist (CCS), are provided to develop and implement the CCC program.
5. Develop and implement procedures to ensure approved backflow preventers relied upon to protect the public water system are properly inspected and tested.
6. Develop and implement a backflow prevention assembly testing quality control assurance program.
7. Develop and implement procedures for responding to backflow incidents.
8. Include information on the cross-connection control program in customer education materials.
9. Develop and maintain CCC program records.
10. Meet any additional CCC requirements imposed by the Department of Health if reclaimed water is distributed or received in the water service area.

Shoreline Water District

CCC Program Purpose and Scope

This document establishes minimum standards for the District to protect the public water supply from possible contamination from backflow. This document also describes minimum CCC program operating policies, provides guidelines for installation, testing and maintenance of approved backflow prevention assemblies. In addition, permitting and inspection requirements for existing and new backflow prevention assemblies are described. The document concludes with program improvements that the District is planning to implement.

District Authority

The Federal Safe Drinking Water Act and the statutes of the State of Washington Title 43 RCW require purveyors to protect the public water systems from contamination. In addition, Washington Administrative Code establishes CCC program requirements for the State under *WAC 246-290-490*. In Washington State, the Department of Health (DOH) is the lead agency for the development and administration of the State's CCC program. The District has adopted cross-connection control code under the *Shoreline Water District Code (SWDC) Title 6: Facilities, Cross Connection Control Program*. This code establishes the District's authority in implementing a cross-connection program and taking corrective actions, as necessary, to prevent cross-connections.

District Responsibility

The District is responsible for protecting its drinking water from contamination, due to backflow of pollutants through water service connections. If the District determines that a backflow prevention assembly is necessary at a customer's premise, the District will notify the customer to install an approved backflow assembly. The list of approved backflow prevention assemblies for the state of Washington is available through the DOH; the list is updated annually. Installation of said backflow assembly shall be a condition of continued water service from the District. Upon installation, the customer shall arrange for inspection and testing of said assembly. The customer will be responsible for all applicable testing and inspection fees.

District Enforcement Actions

Any person, firm, or corporation who violates any of the provisions of this document or *SWDC Title 6: Facilities, Cross Connection Control Program* may be punished in accordance with the code. Any person, firm or corporation who violates any provisions and requirements of this document shall be subject to discontinuance of water service to the premise. Discontinuance of water service to the premise shall remain in effect until corrective action, as required by the District, is completed, including applicable testing and approvals.

Cross-Connection Control Program

CROSS-CONNECTION CONTROL PROGRAM

The District has implemented much of the required elements of the CCC program as listed above. This section describes the District's current CCC program and identifies areas to be addressed in order to comply with the current CCC program requirements. The District is committed to protecting the public water supply from contamination by eliminating potential cross-connections. The District's CCC program that follows includes a statement of its goals and objectives, the evaluation of CCC elements, program implementation, and planned program improvements.

CCC Program Goals and Objectives

The goals and objectives of the District's CCC program consist of:

- Preventing contamination of the public water supply by eliminating or properly protecting actual or potential cross-connections;
- Taking inventory of all existing and potential cross-connections; and
- Maintaining the inspection and testing program for all backflow prevention assemblies. Inspections shall occur during backflow prevention assembly installations, repairs or relocations, after a backflow incident involving the assembly, and at a minimum annually. The District will notify customers when testing is due.

The District will achieve these goals and objectives through the implementation of the CCC program that follows.

Identification of Existing Cross-Connections

The District currently does not have a formal process for identifying existing cross-connections; however, a process is identified in this document in Element 2: Evaluation of Service Connections. The District maintains a database that documents the existing backflow prevention assemblies within the system and applicable annual testing data.

Table 1 lists standard abbreviations for backflow prevention assemblies and the corresponding level of protection that each provides, with "1" being the highest protection and "5" being the lowest protection. The abbreviations will be used in the tables that follow.

Shoreline Water District

Table 1
Backflow Prevention Assembly Abbreviations

Abbreviation	Description	Level of Protection
AG	Air Gap	1
RPBA	Reduced Pressure Backflow Assembly	2
RPDA	Reduced Pressure Detector Assembly	2
DCVA	Double Check Valve Assembly	3
DCDA	Double Check Detector Assembly	3
PVBA	Pressure Vacuum Breaker Assembly	4
SVBA	Spill-Resistant Pressure Vacuum Breaker	4
AVB	Atmospheric Vacuum Breaker	5

Table 2 summarizes the total number of each type of backflow prevention assembly protecting the District's distribution system as of June 2012.

Table 2
Summary of Existing Backflow Prevention Assemblies

Type of Assembly	Total Quantity
AG	4
RPBA	97
RPDA	1
DCVA	218
DCDA	36
PVBA	0
SVBA	0
AVB	0
Total	356

Evaluation of CCC Program Elements

The District is required to develop and implement a cross-connection control program in accordance with *WAC 246-290-490*. All required elements of a local CCC program must be documented and included in the District's Comprehensive Water System Plan. The evaluation of these CCC program elements, current level of implementation and future planned implementation are presented below.

Element 1: Cross-Connection Control Code

The purveyor is required to "adopt a local ordinance, resolution, code, bylaw, or other written legal instrument" outlining the purveyor's CCC program. In addition, this document must establish the purveyor's legal authority to implement a CCC program. Operating policies, technical provisions and corrective actions of the CCC program must also be addressed in the legal document.

Cross-Connection Control Program

The District has formally adopted code for CCC under SWDC Title 6: Facilities, Cross Connection Control Program. The code establishes the District's authority for implementing the CCC program, addresses the regulations in the WAC 246-290 and references the current CCC program contained in this document.

Element 2: Evaluation of Service Connections

Purveyors must develop and implement procedures for evaluating existing and new service connections to assess the risk of connecting the consumer's premises to the District's public water system. Purveyors are required to notify the consumer within a reasonable time frame of the evaluation results. New connections are required to be evaluated prior to providing water service. Existing connections shall have an initial inspection as well as a re-assessment based on a schedule acceptable to DOH.

Currently, the District is made aware of new service connections and changes in use through the Request for Fire Flow Analysis/Certificate of Water Availability application process in coordination with the Cities of Shoreline and Lake Forest Park. The premise risk assessment is performed during the application review and, if necessary, a backflow prevention assembly is required. The District then informs the customer of the type of assembly to be installed. To improve the evaluation process for service connections, the District will implement the following methodical approach:

- 1. When a future or existing customer applies for a Certificate of Water Availability/Request for Fire Flow Analysis they must include a completed water usage questionnaire, unless the customer is applying for a plat which is undeveloped and has no specific planned development, as determined by the District. The application and questionnaire will be reviewed by the District, during which the level of risk associated with the premise will be determined. The District will classify the premise as a high, medium, or low health hazard then specify the required backflow prevention assembly, if necessary. The District may request additional information, such as detailed plans and specifications, if necessary to appropriately classify the premise.*
- 2. The following is evaluated during the District's review:*
 - a. The actual or potential health hazard or contamination risk to the District's water system.*
 - b. The intricacy of any existing and/or proposed plumbing arrangement.*
 - c. The likelihood of cross-connections within the premise.*
 - d. Cross-connections which may be acceptable risks.*
 - e. Whether complete premise isolation or within premise protection is required.*
 - f. The actual or potential use and/or availability of any unapproved auxiliary water supply system within the premise.*
 - g. Any storage or handling of dangerous material or toxic substance which could be a health hazard if it entered into the system.*

Shoreline Water District

After the review, the District will inform the property owner/authorized agent in writing if a cross-connection exists and will offer technical guidance for eliminating or controlling the cross-connection. If the District determines that the premise is a potential high-health risk, such as the premises listed in Table 3, then the appropriate approved backflow prevention assembly shall be installed for premise isolation, regardless of any in-premise protection.

3. *A District Cross-Connection Control Specialist (CCS) will inspect any new building, structure, or ground installation for potential premise isolation during the construction phase. Once the inspection is completed, but prior to establishing the water service connection, the District CCS will inform the property owner/authorized agent that the inspection has been performed and recommend any additional backflow protection that is required. The District CCS will advise the property owner/authorized agent that it's their responsibility to have a current Washington State Backflow Assembly Tester (BAT) test the backflow prevention assembly prior to utilizing the water service, and that annual testing will be required. The District CCS will attend and witness the initial test of all backflow prevention assemblies installed within the jurisdiction. It will be the property owner/authorized agent's responsibility to coordinate with the District CCS to schedule an appointment to attend and witness the initial backflow prevention assembly test (24 hour advance notice required).*

The District has not performed a complete system-wide risk assessment of all existing service connections; but they will implement a program that evaluates all high health hazard premises, all commercial and/or industrial premises, all premises with fire systems, all premises with water systems utilizing booster pumps, and all premises with buildings 30 feet or more in height to insure premise isolation protection has been provided at the water service connection. Potential high-risk cross-connection premises will be evaluated first, followed by medium-risk then low-risk premises. Premises brought to the District's attention, which upon review are determined deficient in the required premise isolation backflow prevention, will be brought into current compliance without regard to any established priority list. The District will implement the following methodical approach to complete the initial evaluation:

1. *Develop a priority list utilizing existing water service records, telephone directory yellow pages, and any other beneficial resources.*
2. *Begin evaluating service connections, starting with highest health hazard risk on the previously developed priority list. The District CCS will determine the actual or potential health hazard or contamination risk to the District's water system.*
3. *After the risk evaluation, the District CCS will determine if premise isolation backflow prevention is necessary and what level of protection is required for the degree of hazard.*
4. *The District CCS will prepare a written report to file in the record keeping system at the District that will include, at a minimum:*
 - a. *A list of all cross-connections, the location, and any methods of elimination or control.*
 - b. *Any applicable drawings, sketches, blueprints, or photos.*

Cross-Connection Control Program

- c. *Summary of findings, recommendations and requirements for corrective actions, and a time in which corrective action must be completed.*
5. *The District CCS will notify the customer via letter of the premise isolation backflow prevention requirements, including the necessary corrective actions and due date for completion. The District will keep a copy of all correspondence on file.*
6. *The District CCS will follow-up with the customer on the completion due date to determine if the corrections have been performed. If the corrections are completed, the District CCS will inspect all backflow prevention assemblies which connect the premise property to the District's water service. If the corrections are in progress, but require more time for completion, a new due date may be set by the District CCS. If the corrections have been neglected, the District will exercise the appropriate authority, per WAC 246-290-490(2)(h-j), SWDC Title 6: Facilities, Cross Connection Control Program, and the District Cross-Connection Control Program, which may include, but is not limited to, denying or discontinuing water service to a customer's premise until the cross-connection hazard is eliminated or controlled to the satisfaction of the District.*
7. *Once all corrections have been completed, the passed Backflow Prevention Assembly Test Report will be filed with all the previous premise related documents.*
8. *The District will re-inspect the high health hazard premise isolation annually, if possible, or more often if justifiable. The re-inspection will focus on the premises that are not isolated from the system by an AG or RPBA, as long as the assemblies are approved and continue to pass annual testing and inspection.*

For a more detailed implementation schedule refer to Appendix C.

Table 3 lists typical premises posing a high health hazard that require an air gap and/or a reduced pressure backflow assembly to prevent contamination to the public water system. The list below can also be found under WAC 246-290-490(4)(b)(iii)(Table 9). The District may grant exceptions on a case-by-case basis if the CCS determines there is no health hazard on the premise.

Shoreline Water District

Table 3
Premises Requiring Mandatory Service Isolation by AG and/or RPBA
(High Health Risk)

Premise	Premise
Agricultural (farms and dairies)	Laboratories
Beverage Bottling Plants	Ice Manufacturing & Cold Storage Plants
Car Washes	Mortuaries and Autopsy Facilities
Chemical Plants and Metal Plating Industries	Petroleum Processing or Storage Plants
Commercial Laundries and Dry Cleaners	Piers, Docks and Boat Marinas
Premises with Potable and Reclaimed Water	Paper and Paper Products Plants
Film Processing Facilities	Survey Access Denied or Restricted
Food Processing Plants, Canneries, Packing (Slaughter) Houses	Wastewater Treatment Plants & Wastewater Lift and Pumping Stations
Hospitals, Medical Centers, Nursing Homes, Veterinary, Medical & Dental Clinics, Blood Plasma Centers and Medical Research	Radioactive Material Processing Plants or Nuclear Reactors
Irrigation Systems Utilizing District Water Supply with Chemical Addition	Unapproved Auxiliary Water Supply Interconnected with the Potable Water Supply
Fire Protection Systems Using Chemical Addition	Battery Manufacturing or Repair Facilities

Table 4 shows various facilities that require or recommend backflow prevention assemblies to be installed. **Table 5** lists fixtures, equipment, and areas that have the potential to contaminate the public drinking water system. The table also shows the minimum protection required by the District to prevent such contamination caused by the listed fixtures, equipment and areas. Per District standards, the Spill-Resistant Pressure Vacuum Breaker Assembly will be the minimum form of backflow prevention assembly and no new Atmosphere Vacuum Breakers will be installed. The District reserves the right to require a backflow prevention assembly which provides a higher level of protection upon premise review. In addition, the American Water Works Association (AWWA) published a manual entitled, “Recommended Practice for Backflow Prevention and Cross-Connection Control (AWWA Manual M14)” that outlines cross-connection control procedures as a tool for developing a CCC program. The AWWA Manual M14 as well as the “Cross-Connection Control Manual, Accepted Procedure and Practice” published by the Pacific Northwest Section (PNWS) of the American Water Works Association (AWWA) (PNWS-AWWA Yellow Manual) also recommend backflow prevention assemblies for typical hazards.

Cross-Connection Control Program

Table 4
Backflow Protection Requirements and Recommendations

Required Service Isolation
Premises with Approved Auxiliary Supply
Premises with Dedicated Fire Sprinkler Systems or Private Hydrants
Tall Buildings (Over 30 feet)
Recommended Service Isolation
Mobile Home Parks
Shopping Centers and Strip Malls
Non-Residential Services
Heat Exchangers or Solar Hot Water Systems
Irrigation Services Without Chemical Injection
Recreational Vehicle Parks

Table 5
Backflow Prevention Assemblies for Minimum Protection

Fixtures, Equipment and Areas	Minimum Protection	Fixtures, Equipment and Areas	Minimum Protection
Air Compressors	DCVA	Irrigation Systems w/o Chemicals	PVBA/SVBA/DCVA
Air Conditioning Systems	RPBA	Irrigation Systems w/ Chemicals	RPBA
Air Washers (controls air pollution)	RPBA	Janitor Sinks	SVBA/AVB*
Aquarium Make-Up Water	AG/RPBA	Kitchen Equipment	SVBA/AVB*
Aspirators, Medical/Lab	RPBA	Laboratory Equipment	RPBA
Aspirators, Vault Drain	RPBA	Laundry Machines, Commercial	RPBA
Aspirators, Weedicide/Herbicide/Pesticide	RPBA	Lavatories	SVBA/AVB*
Autoclaves	RPBA	Livestock Drinking Tanks	AG/DCVA
Autopsy Tables, Embalming Equipment	RPBA	Make-Up Tanks	AG/RPBA
Baptismal Fountains	RPBA/AG/AVB*	Mobile Carpet Cleaners	RPBA
Bathtub, Below Rim Filler	RPBA	Mobile Home Park	DCVA/RPBA
Bedpan Washers	RPBA	Mop Sinks	SVBA/AVB*
Beverage Dispensers using CO2	RPBA	Outboard Motor Test Tanks	AG/RPBA
Bidets	AG-Internal/SVBA/AVB*	Perchlorethylene Reclaim	AG/RPBA
Boat Lifts	RPBA	Pesticide Applicator Trucks	AG/RPBA
Boiler Feed Lines	AG/RPBA	Photo Developing Tanks and Sinks	RPBA
Bottle Washing Equipment	RPBA/PVBA/SVBA	Photostat Equipment	RPBA
Box Hydrants	PVBA/SVBA/DCVA	Pipette Washers	SVBA/AVB*
Brine Tanks	AG/DCVA	Potato Peelers	SVBA/AVB*
Can Washing Equipment	RPBA/PVBA/SVBA	Poultry Feeders	RPBA
Chemical Feeder Tanks	AG/RPBA	Pressure Washers w/o Chemicals	DCVA
Chilled Water Systems	RPBA	Private Fire Hydrants	DCVA
Chlorinators	RPBA	Processing Tanks	AG/RPBA
Commercial Coffee Urns	AG/SVBA/AVB*	Pump Seal Water	AG/RPBA
Computer Cooling Lines	AG/RPBA	Pumps, Pneumatic Ejector	RPBA
Condensate Tanks	AG/RPBA	Pump Prime Lines	RPBA
Commercial Cooking Kettles	AG/SVBA/AVB*	Pumps, Water Operated Ejector	RPBA
Cooling Towers	AG/RPBA	Radiant Floor Heat, Hydronic Heat	AG/RPBA
Decorative Ponds	AG/RPBA	Radiator Flushing Equipment	AG/RPBA
Degreasing Equipment	RPBA	Recreational Vehicle Dump Stations	AG

Shoreline Water District

Table 5 (continued)
Backflow Prevention Assemblies for Minimum Protection

Fixtures, Equipment and Areas	Minimum Protection	Fixtures, Equipment and Areas	Minimum Protection
Demineralized Water Systems	RPBA	Serrated Faucets	SVBA/AVB*
Dental Equipment, Cuspidors	RPBA	Service Sinks	SVBA/AVB*
Detergent Dispensers (Dishwasher)	SVBA/AVB*	Sewer Connected Equipment	AG
Dialysis Equipment	RPBA	Sewer Flushing	AG
Dishwashers, Commercial	AG/RPBA/SVBA/AVB*	Shampoo Basins/Hose Rinse	SVBA/AVB*
Dishwashers, High-Temp	AG/SVBA/AVB*	Showers, Telephone	SVBA/AVB*
Drinking Fountains	AG	Sitz Baths	SVBA/AVB*
Dye Vats and Tanks	AG/RPBA	Soap Mixing Tanks	AG/RPBA
Dynamotors	DCVA	Solar Heating Systems	RPVA
Emergency Generators	RPBA	Solution Tanks	AG/RPBA
Espresso Machines	AG/RPBA	Spas	AG/RPBA
Etching Tanks	AG/RPBA	Specimen Tanks	AG/RPBA
Fermenting Tanks	AG/RPBA	Starch Tanks	AG/RPBA
Fertilizer Injection Equipment	RPBA	Steam-Air Sprays	RPBA
Film Processing Equipment	RPBA	Steam Cleaners	RPBA
Fire Depart. Connections w/o Chemicals	DCVA/DCDA	Steam Ejectors	RPBA
Fire Depart. Connections w/ Chemicals	RPBA/RPDA	Steam Generating Facilities	RPBA
Fire Sprinkler Systems w/o Chemicals	DCVA/DCDA	Sterilizers	RPBA
Fire Sprinkler Systems w/ Chemicals	RPBA/RPDA	Stillts	RPBA
Floor Drains	AG	Sumps	AG
Fluoride Tanks (Water Treatment Plants)	RPBA	Swimming Pools	AG/RPBA
Flushing Floor Drains	SVBA/AVB*	Toilets (Internal)	AG
Foamite Systems	RPBA/RPDA	Trap Primers	AG
Fountains, Ornamental	AG/RPBA	Ultrasonic Baths	AG
Frost-Free Yard Hydrant (Stop-and-Drain)	DCVA/RPBA	Urinals (Internal)	AG
Fume Hoods	RPBA	Used Water Systems	RPBA
Garbage Can Washers	RPBA	Vats	AG/RPBA
Garbage Disposals	RPBA	Washing Pools	AG/RPBA
Heat Exchangers Other Than Double Wall Types with Leak Path	RPBA	Wall Hydrants	SVBA/AVB*
Heat Pumps	RPBA	Wash Tanks	AG/SVBA/AVB*
High Pressure Washers w/o Chemicals	DCVA	Wastewater Lines	AG
High Pressure Washers w/ Chemicals	RPBA	Water-Air Sprays	DCVA
Hose Bibs	SVBA/AVB*	Water Closets (Internal)	AG
Hoses, Kitchen Rinse	SVBA/AVB*	Water Cooled Equipment	RPBA
Hot Tubs	AG/RPBA	Water Ejectors	RPBA
Hot Water Heating Systems	RPBA	Water Recirculating Systems	DCVA
Hot Water Boilers	RPBA	Water Settling	RPBA
Humidifier Tanks and Boxes	AG	Water Treatment/Water Softner	AG/RPBA
Hydraulically Operated Equipment	RPBA	Water Trucks	AG/DCVA
Hydrotherapy Baths	RPBA	Wet Vacuum Systems	RPBA
Ice Makers	AG/RPBA	Whirlpool Baths	DCVA/SVBA/AVB*
Industrial Fluid Systems	RPBA	Windshield Washer Fluid Aspirators	RPBA
Inter-Connected (Looped) Water Systems	DCVA	X-Ray Processors	RPBA

* SWD does not allow new AVBs to be installed in the system; existing AVBs are allowed if they meet the conditions of the WAC 246-290-490(5)(b).

Cross-Connection Control Program

Element 3: Cross-Connection Control and Elimination

This CCC program element requires that the purveyor eliminate existing cross-connections wherever possible. If elimination is not possible, then suitable approved backflow prevention assemblies should be installed properly by a certified CCS to reduce the risk of contamination in each of the following circumstances.

- If the nature and extent of any activity on the premises, the material used in connection with any activity on the premises, or the materials stored on the premises, could contaminate or pollute the drinking water supply in any way.
- Any premises having one or more cross-connections.
- Internal cross-connections that are not correctable or intricate plumbing arrangement that make it impractical to ascertain whether or not cross-connections exist.
- A repeated history of cross-connections being established or re-established.
- 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.
- Materials of a toxic or hazardous nature being used such that, if back siphoning should occur, a health hazard could result.
- Any mobile apparatus which uses water from the system or water from any premises within the system service boundaries.
- Any irrigation system.
- Any fire service and/or fire sprinkler.
- All new construction, remodels, commercial, business, industrial and private homes shall be evaluated to determine the necessity of an approved assembly.
- On any premise where installation of an approved assembly is deemed to be necessary to accomplish the purpose of these regulations in the District's judgment.

To ensure proper operation and accessibility of all approved assemblies, the following requirements shall apply to the installation of backflow prevention assemblies.

- No part of the approved assembly shall be submerged under water or installed on a location subject to flooding. If installed in a vault or a basement, adequate drainage shall be provided.
- Approved assemblies must be installed at the point of use. Alternate locations must be approved in writing by the District prior to installation.
- The approved assembly must be protected from freezing and other severe weather conditions.
- All approved assemblies installed shall be of a type and model pre-approved by the DOH and the District.

Shoreline Water District

- The approved assembly shall be readily accessible with adequate room for maintenance and testing. Approved assemblies 2 inches and smaller shall have a minimum clearance of 6 inches on all sides of the assembly. Approved assemblies larger than 2 inches shall have a minimum clearance of 12 inches on the back side, 24 inches on the test cock side, 12 inches plus the nominal size of the assembly below the assembly and 36 inches above the assembly.
- If the approved assembly is installed inside a building, the assembly shall be readily accessible at all times and an emergency after hours contact phone number and person shall be provided to the District.
- If the approved assembly is installed inside a building and it is installed 5 feet above the floor, it must be equipped with rigidly and permanently installed scaffolding acceptable to the District. This installation must also meet the requirements set forth by the U.S. Occupational Safety and Health Administration and the State of Washington Occupational Safety and Health Codes.
- Reduced pressure principle assemblies may be installed in a vault only if the relief valve discharge can be drained to daylight through an unobstructed drain pipe. The drain shall be of adequate capacity to carry the full rated flow of the assembly and shall be screened at both ends. An approved air gap shall be located at the relief valve orifice. This air gap shall be at least twice the inside diameter of the incoming supply line as measured vertically above the top rim of the drain and in no case less than 1 inch.
- Where an approved assembly is deemed necessary, the model of the assembly and installation plans shall be submitted to the District for approval prior to installation.
- Upon completion of the installation, the District shall be notified and an inspection will occur for approval of the installation. All approved assemblies must be registered with the District. Registration shall consist of installation location on premises, make, model and serial number of the assembly, and an initial test report.
- If any user refuses access to a premise, or to the interior of a structure, at reasonable times and with reasonable notice for inspection by the District, an RPBA will be required to be installed at the service connection to that premise.

Any variance from these installation requirements shall be requested in writing by the customer and must be approved by the District prior to installation.

Customers shall be responsible for following the provisions of the District's CCC program. In addition, customers shall be responsible for the elimination or protection of all cross-connections on their premises. The District will continue to maintain an inventory of the existing backflow prevention assemblies that it currently operates, maintains, and inspects. A separate inventory will include all assemblies on customers' premises that are responsibility of the customer to maintain. The District will keep this inventory on file at its facility, and shall update the inventory as necessary.

Cross-Connection Control Program

The District shall begin eliminating potential cross-connections and requiring installation of backflow prevention assemblies at all premises deemed to be “high-risk”, such as those listed in Table 3. Once potential “high-risk” cross-connections are eliminated, the District will concentrate its efforts on reducing potential “medium-” and “low-risk” cross-connections. The medium-risk cross-connections shall be those customers requiring premise isolation, as determined by the District. The low-risk cross-connections shall be the District’s remaining customers. The District will continue to enforce the proper backflow prevention assembly installation and testing, as previously stated and also described within Elements 5 and 6 of this program.

Element 4: Personnel Certification

WAC 246-290-490 requires that personnel, including one certified Cross-Connection Control Specialist (CCS), are provided by the purveyor to develop and implement a CCC program. **Table 6** shows the certifications of the District’s operation and maintenance personnel. Mr. Bob Heivilin and Mr. Mike Oberstadt are both certified as CCS.

The District has sufficient certified staff to implement and maintain the CCC program as outlined by the State. Mr. Bob Heivilin will serve as the District’s primary personnel for maintaining and implementing the CCC program; Mr. Mike Oberstadt will serve as the backup personnel. The District will continue to provide properly certified personnel to implement the CCC program.

Table 6
District Personnel Certifications

Name	Current Title	Certifications	Certificate Number
Mike Oberstadt	Operations Lead	WDM-4, WDS-1, CCS	5430
Bob Heivilin	Utility Person IV/WQ	WDM-4, WDS-1, CCS, BAT	5407, B3620
Austin Hugill	Utility Person III	WDM-2	10950
Harold Berge	Utility Person III	WDM-2	11949
Jesse Foss	Utility Person III	WDM-1	11979
Toby Bigger	Utility Person I	WDM-1	12920

Certification Definitions:

WDM – Water Distribution Manager

WDS – Water Distribution Specialist

CCS – Cross-Connection Control Specialist

BAT – Backflow Assembly Tester

Element 5: Backflow Prevention Assembly Inspection and Testing

DOH requires that all backflow prevention assemblies are routinely inspected and tested by certified personnel. Inspections are required at the time of installation, annually thereafter, after a backflow incident, and/or after the assembly is repaired, reinstalled, or relocated. All assemblies found functioning improperly shall be promptly repaired or replaced by the customer. If any such assembly is not promptly repaired or replaced, the District may deny or discontinue service to the premise.

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The District is responsible for administering backflow assemblies that are installed on the public water distribution system, not including those assemblies installed after a meter on private premises. For assemblies installed on a customer's premise, the customer shall arrange for testing of said assemblies to be performed by a certified Washington State BAT. The customer will be subject to all applicable testing, maintenance and repair fees. On new installations, the District will (1) provide on-site evaluation and/or inspection of plans in order to determine the type of backflow prevention assembly, if any, that will be required; and (2) will attend and witness the initial test of all backflow prevention assemblies and require certification of proper installation by a BAT prior to providing water service. For existing premises, the District will perform evaluations and inspections of plans and/or premises and inform customers by letter of any corrective action deemed necessary, the method of achieving the correction, and the time allowed for the correction to be made. Ordinarily, corrections must be made within sixty days; however, the District may adjust this time period depending on the degree of hazard involved and the history of the assembly in question. Service may be discontinued immediately if necessary. The District will then inspect the premises on or after the expiration date of the required action to correct a cross-connection. If the premise is found to be in non-compliance with the District's request, the customer shall receive written notice that water service to the premise will be discontinued. If the customer informs the District of extenuating circumstances as to why the correction has not been completed within five working days of receipt of the notice of termination, the District may grant a time extension.

Inspection and testing of backflow prevention assemblies shall be done (1) during the initial installation, (2) during on-site reviews of existing installations, (3) after any repairs or maintenance, (4) after any relocation, and (5) on an annual basis or more frequently for certain high health hazard premises. When an initial installation or annual test indicates that a backflow prevention assembly is not functioning properly, the customer shall correct the malfunction within five working days as directed by the District. After correcting the problem, the customer shall submit a completed passing test report form to the District.

The customer shall be responsible for the payment of all fees for (1) permits, (2) annual (and additional, if deemed necessary by the District) backflow prevention assembly inspection/testing, (3) re-testing if the backflow prevention assembly fails to operate correctly, and (4) any re-inspections for non-compliance with District requirements. The District will continue to maintain records of backflow prevention assembly inspections.

Element 6: Testing Quality Control Assurance Program

This program element requires development and implementation of a quality control assurance program for the testing of backflow prevention assemblies. Successful implementation of this program element assures that all backflow prevention assemblies are properly tested and in working condition.

The District has developed procedures to ensure proper testing of all backflow prevention assemblies. Only certified Washington State BATs shall be utilized to test all backflow prevention assemblies. The District maintains a list of approved BATs which is available to customers upon request. Testing shall be recorded on the proper forms and maintained at the District's facility. The District Backflow Prevention Assembly Test Report form will be included with the annual testing notification and can be found in the Appendix F.

Cross-Connection Control Program

Testing personnel shall adhere to the following steps: (1) use only properly operating and calibrated gauge equipment; (2) follow proper field test procedures; (3) consult the manufacturer's repair and maintenance manual when disassembly is required; (4) use only original manufacturer spare parts; and (5) retest the backflow prevention assembly immediately after repair or maintenance.

In addition to the above steps, testing procedures performed by a certified BAT shall be in compliance with current test procedures approved by the DOH, the PNWS-AWWA yellow manual or the USC manual, which may include the following: (1) advise customer of an impending test/inspection so that the customer's staff may prepare for and be aware of potential service interruptions; (2) notify the fire department when shut down of a fire service is necessary; (3) flush residual dirt through test cocks before attaching test gauges; (4) ensure that the high and low pressure bypass hoses of the test kit are connected to the proper test cocks and open test cocks slowly when bleeding air through the bypass hoses; (5) test gauges shall be properly calibrated by a certified testing agency; (6) and assemblies should be tested before the warranty expiration date.

Element 7: Backflow Incident Response

Purveyors are required to develop a backflow incident response plan. The following paragraph outlines the District's response to a backflow incident. Other emergency response procedures are included in the *Shoreline Water District Disaster Plan* and the *Shoreline Water District Emergency Response Plan*, both of which are confidential documents kept on file at the District.

Emergency Condition: **Water System Contamination and Pollution Due to a Backflow Incident**

Impact on System: Potentially major impact; water not suitable for potable use - loss of supply and/or potential irreversible damage to water mains and pipes.

Emergency Response:

1. Notify the District's on-call personnel of the incident.
2. Shut down the affected mains, if possible, to contain the affected contaminants.
3. Notify the District's Operations Manager
4. Notify DOH of the backflow incident.
5. Notify all customers of the problem and instruct them to boil all water to be used for consumption and cooking, or issue a no-drinking warning.
6. Flush affected water mains to remove contaminants.
7. Disinfect storage tanks and water mains, as necessary, to remove contaminated residuals.
8. Analyze water quality in other parts of the distribution system to ensure that all contaminants were contained.

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This document (and the Shoreline Water District's Disaster Plan and Emergency Response Plan) outlines procedures to be followed if an emergency arises. When a CCC emergency is called into the City of Shoreline Police Department, or other emergency responder during non-business hours, the responder will notify the District's on-call person. This person will assess the emergency and notify any water division personnel, as deemed necessary, depending on the severity of the emergency. All emergencies will be reported to Mr. Denny Clouse, Operations Manager. Mr. Clouse will be responsible for coordinating with District personnel, as well as other emergency responders, if necessary.

Element 8: Public Education

Information on the CCC program must be included in educational materials distributed to water system customers. Educational materials include pamphlets, brochures, bill inserts, public service announcements, and consumer confidence reports.

The District will develop CCC program education materials and will include them in bill inserts, District-wide newsletters and provide copies at the customer counter of the District office.

Element 9: Record Keeping

Purveyors must develop and maintain records of their CCC program. At a minimum, purveyors must maintain the following records:

- Master list of service connections and/or premises where backflow prevention assemblies are protecting the public water system or fixtures.
- Assessed hazard level of each backflow prevention assembly.
- Inventory information on approved air gaps, including location, degree of hazard, installation date, inspection history, inspection results and personnel conducting inspections.
- Backflow prevention assembly inventory information, including location, description (type, manufacturer, model, size, and serial number), degree of hazard, installation date, inspection history, test and repair history, test results and inspecting personnel.
- Atmospheric Vacuum Breaker (AVB) inventory including location, description (manufacturer, model, and size), installation date, inspection history and inspecting personnel.
- Program summary and backflow incident reports.

The District currently maintains program records including a backflow prevention assembly inventory, completed DOH Summary Reports, and completed test and inspection reports. The backflow prevention assembly inventory information includes location, description, assessed degree of hazard, customer's name, and other pertinent information. The inventoried information is first recorded on a paper form then entered/scanned into a database maintained by the District. The paper and/or electronic records are filed according to the facility and stored at the District. The District will enhance its record keeping by adding, at a minimum, information in regards to the backflow prevention assembly installation date, history of inspections, tests and repairs, test results, and licensed person performing tests. All records will continue to remain at the District's facility to allow access by the District personnel.

Cross-Connection Control Program

Element 10: Reclaimed Water Requirements

Purveyors that distribute or receive reclaimed water within their water service area have additional cross-connection control requirements imposed by DOH through permits issued in accordance with Chapter 90.46 RCW.

The District currently does not distribute or receive reclaimed water within its service area; therefore, these requirements are not applicable. However, if reclaimed water is used in the future, then the District will follow all requirements of the permits issued under Chapter 90.46 RCW.

PROGRAM IMPLEMENTATION AND PLANNED IMPROVEMENTS

The District's ongoing CCC program is a dynamic program that requires staffing and resources to ensure its effectiveness in protecting the quality of drinking water in the distribution system. Refer to Appendix C for the overall CCC program implementation schedule. The District will implement the following items and planned improvements to ensure a successful CCC program.

- Adopt this updated CCC program document and reference it in the District's code.
- Throughout the life of the CCC program, the District plans to reference and incorporate elements from the latest edition of the "Cross-Connection Control Manual, Accepted Procedure and Practice" published by the Pacific Northwest Section (PNWS) of the American Water Works Association (AWWA) (PNWS-AWWA Yellow Manual), the AWWA manual entitled, "Recommended Practice for Backflow Prevention and Cross-Connection Control (AWWA M14)", and the "Manual of Cross-Connection Control" published by the Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California (USC Manual).
- The District plans to improve the service connection evaluation process by following the methodical approach described within the section titled "Element 2: Evaluation of Service Connections". A hazard evaluation will be included within the evaluation program to determine the risk to the public drinking water supply. This evaluation will rank existing and potential cross-connections as high-, medium- and low-risk. Also, the District will perform a system-wide risk assessment of all existing service connections beginning with the high-risk connections then following with the medium- and low-risk connections. The District will then re-inspect annually the high-risk connections, which are not isolated from the system by an AG or RPBA.
- Based on the results of the service connection evaluation, the District will begin an elimination program, eliminating the potential high-risk cross-connections first by requiring installation of backflow prevention assemblies. Once the potential high-risk connections are eliminated, the District will concentrate on reducing the potential medium- and low-risk connections.

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- The District will continue its inspection practices of installed backflow prevention assemblies, as described within the section titled “Element 5: Backflow Prevention Assembly Inspection and Testing”. The District will ensure that all inspection and testing procedures are completed in a consistent manner. The District will continue documenting inspection and test results and maintain the records in order to comply with the regulatory requirements.
- The District plans to enhance record keeping practices by adding information in regards to backflow prevention assembly installation date, history of inspections, tests and repairs, test results, and licensed person performing tests.
- The District will continue developing and distributing CCC program public education materials. The District plans to include CCC program information with water bills and add program information to other handout materials. The District will also provide program information on its website. The District will use and distribute CCC brochures developed by the PNWS-AWWA, which are included in Appendix J.

APPENDIX A

Installed Backflow Prevention Assemblies

Attachment A

Service Address (Full)	Equipment Serial Number	Equipment Mfr Code	Equipment Model Number	Equipment Type Code	Equipment Display Size	Hazard Type
17202 15 Ave NE	Meat Department	Air Gap		AG		Dishwasher with Chemicals
17202 15 Ave NE	Bakery	Air Gap		AG		Dishwasher with Chemicals
17202 15 Ave NE	Back Room	Air Gap		AG		Cleaning Chemicals
17202 15 Ave NE	Dishwasher	Air Gap	Duo-Feed	AG		Chemical Feeder
20315 19th AV NE	N09300	Wilkins	350DA	DCDA	2 1/2"	Fire Sprinkler w/o Chemical Addition
17763 15th Ave NE	2527811	Wilkins	950XL	DCDA	3/4"	Fire Sprinkler w/o Chemical Addition
19021 14 CRT NE	W24251	Wilkins	950XLD	DCDA	3/4"	Fire Sprinkler w/o Chemical Addition
1750 NE 145 ST	2764242	Wilkins	950XL	DCDA	3/4"	Fire Sprinkler w/o Chemical Addition
20224 Ballinger Way NE	9708131201	Febco	856	DCDA	4"	Fire Sprinkler w/o Chemical Addition
20224 Ballinger Way NE	9802131403	Febco	856	DCDA	4"	Fire Sprinkler w/o Chemical Addition
1549 NE 177th St	B0841	Febco	806YD	DCDA	4"	Fire Sprinkler w/o Chemical Addition
14555 25 Ave NE	3JN0426	Ames	3000SS	DCDA	4"	Fire Sprinkler w/o Chemical Addition
19935 19TH AVE NE	B1012	Febco	806	DCDA	4"	Fire Sprinkler w/o Chemical Addition
1515 NE 150th Street	B7673	Febco	806YD	DCDA	4"	Fire Sprinkler w/o Chemical Addition
1521 NE 150 Street	B7672	Febco	806YD	DCDA	4"	Fire Sprinkler w/o Chemical Addition
1410 NE 180th Street	W99498	Wilkins	DCDA	DCDA	4"	Fire Sprinkler w/o Chemical Addition
145 NE 155th Street	103516	Ames	3000SS	DCDA	4"	Fire Sprinkler w/o Chemical Addition
20011 Ballinger Way NE	3BN0720	AMES	3000SS	DCDA	4"	Fire Sprinkler w/o Chemical Addition
17518 15th Ave NE	9808191450	Febco	856	DCDA	4"	Fire Sprinkler w/o Chemical Addition
17440 BROOKSIDE BLVD NE	960516121	Febco	856	DCDA	4"	Fire Sprinkler w/o Chemical Addition
20202 Ballinger WAY NE	3BJ0216	Ames	3000SS	DCDA	4"	Fire Sprinkler w/o Chemical Addition
1514 NE 179th St	123608	Ames	3000SS	DCDA	4"	Fire Sprinkler w/o Chemical Addition
16528 5th Ave NE	131587	AMES	3000SS	DCDA	4"	Fire Sprinkler w/o Chemical Addition
14803 15 Ave NE	V11421	WILKINS	350ADA	DCDA	4"	Fire Sprinkler w/o Chemical Addition
17763 15th Ave NE	V109102	Wilkins	350DA	DCDA	4"	Fire Sprinkler w/o Chemical Addition
19931 15 AVE NE	V09669	Wilkins	350ADA	DCDA	4"	Fire Sprinkler w/o Chemical Addition
19021 14 CRT NE	V04389	Wilkins	350ADA	DCDA	4"	Fire Sprinkler w/o Chemical Addition
1750 NE 145 ST	V14656	Wilkins	350ADA	DCDA	4"	Fire Sprinkler w/o Chemical Addition
17020 Brookside BLVD NE	9405110552	Febco	806	DCDA	4"	Fire Sprinkler w/o Chemical Addition
14810 15 AVE NE	V19754	WILKINS	350ADA	DCDA	4"	Fire Sprinkler w/o Chemical Addition
2400 NE 147TH AVE	B3359	Febco	806YD	DCDA	4"	Fire Sprinkler w/o Chemical Addition
20004 24th ave ne	022798-000	Watts	757	DCDA	4"	Fire Sprinkler w/o Chemical Addition
19930 Ballinger WAY NE	1215400802	Ames	3000SS	DCDA	4"	Fire Sprinkler w/o Chemical Addition
14500 15th Ave NE	31L1053	Ames	3000SS	DCDA	6"	Fire Sprinkler w/o Chemical Addition
1250 NE 145th Street	9806241438	Febco	856	DCDA	6"	Fire Sprinkler w/o Chemical Addition
20065 15 Ave NE	B2170	Febco	806YD	DCDA	6"	Fire Sprinkler w/o Chemical Addition

Installed Backflow Prevention Assemblies

Attachment A

Service Address (Full)	Equipment Serial Number	Equipment Mfr Code	Equipment Model Number	Equipment Type Code	Equipment Display Size	Hazard Type
20330 Ballinger Way NE	131728	Watts	709 DCDA	DCDA	6"	Fire Sprinkler w/o Chemical Addition
345 NE 175th Street	B64-5	HERSEY	DDC-II	DCDA	6"	Fire Sprinkler w/o Chemical Addition
2003 NE 160th ST	3021125	Febco	856	DCDA	6"	Fire Sprinkler w/o Chemical Addition
20041 Ballinger WAY NE	N1D522	Wilkins	350DA	DCDA	6"	Fire Sprinkler w/o Chemical Addition
19916 19 Ave NE	1205	Ames	2000B	DCVA	1 1/2"	Fire Sprinkler w/o Chemical Addition
19230 Forest Park Dr NE	D2057	CONB	40-107-02	DCVA	1 1/2"	Irrigation w/o Chemicals
20330 Ballinger Way NE	40281	Watts	007M2QT	DCVA	1 1/2"	Premise Isolation
18033 15th Pl NE	683123	Wilkins	950XL	DCVA	1 1/2"	Irrigation w/o Chemicals
515 NE 172 Ct	EK381	Conbraco	40-107-A2	DCVA	1 1/2"	Fire Sprinkler w/o Chemical Addition
3338 NE 178th St	64716	Watts	007M2QT	DCVA	1 1/2"	Fire Sprinkler w/o Chemical Addition
518 NE 172nd Ct.	EK330	APOLLO/CONBR	40-107-A2	DCVA	1 1/2"	Fire Sprinkler w/o Chemical Addition
16719 8th Ave NE	8295	Ames	2000B	DCVA	1 1/2"	Fire Sprinkler w/o Chemical Addition
16717 8th Ave NE	8395	Ames	2000B	DCVA	1 1/2"	Fire Sprinkler w/o Chemical Addition
16768 Shore Dr NE	16794	Ames	2000B	DCVA	1 1/2"	Fire Sprinkler w/o Chemical Addition
18520 26 Ave NE	66736	Watts	007M2QT	DCVA	1 1/2"	Fire Sprinkler w/o Chemical Addition
17207 10 Ave NE	118246	Ames	2000B	DCVA	1 1/2"	Fire Sprinkler w/o Chemical Addition
15800 8 Ave NE	025928-000	Watts	007M2QT	DCVA	1 1/2"	Fire Sprinkler w/o Chemical Addition
17900 15 AVE NE	1125	Febco	850	DCVA	1 1/4"	Irrigation w/o Chemicals
20068 15 AVE NE	491	Ames	2000 B	DCVA	1 1/4"	Fire Sprinkler w/o Chemical Addition
20066 15 AVE NE	1020	Ames	2000 B	DCVA	1 1/4"	Fire Sprinkler w/o Chemical Addition
20078 15 AVE NE	1554	Ames	2000 B	DCVA	1 1/4"	Fire Sprinkler w/o Chemical Addition
20076 15 AVE NE	1500	Ames	2000 B	DCVA	1 1/4"	Fire Sprinkler w/o Chemical Addition
20072 15 AVE NE	894	Ames	2000 B	DCVA	1 1/4"	Fire Sprinkler w/o Chemical Addition
20074 15 AVE NE	764	Ames	2000 B	DCVA	1 1/4"	Fire Sprinkler w/o Chemical Addition
17763 15th Ave NE	HA84057	FEBCO	850	DCVA	1"	Irrigation w/o Chemicals
17124 32nd Ave NE	A028394	Febco	805Y	DCVA	1"	Irrigation w/o Chemicals
17435 Brookside BLVD NE	1046882	Wilkins	950XLT	DCVA	1"	Irrigation w/o Chemicals
16501 34th Ave NE	81664	Wilkins	950	DCVA	1"	Irrigation w/o Chemicals
19661 15th Ave NE	W104617	Wilkins	550	DCVA	1"	Irrigation w/o Chemicals
19653 15th Ave NE	AD0240	Febco	805Y	DCVA	1"	Irrigation w/o Chemicals
16520 Shore Drive NE	7513	CONB	40-105-A2	DCVA	1"	Irrigation w/o Chemicals
14604 9th Ave. NE	875065	Wilkins	950XL	DCVA	1"	Irrigation w/o Chemicals
16227 38th Street NE	429745	Wilkins	950XL	DCVA	1"	Irrigation w/o Chemicals
14555 25 Ave NE	130201	Febco	805Y	DCVA	1"	Irrigation w/o Chemicals
1720 NE 179th Street	61196	Watts	007M1QT	DCVA	1"	Irrigation w/o Chemicals
19004 Lago Pl NE	A154197	Febco	805Y	DCVA	1"	Irrigation w/o Chemicals

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17628 25TH AVE NE	803228	Wilkins	950XLT	DCVA	1"	Irrigation w/o Chemicals
3010 NE 195TH CT	Ak0780	Febco	805Y	DCVA	1"	Irrigation w/o Chemicals
15823 11th Avenue NE	B0777	CONB	40-105-02	DCVA	1"	Irrigation w/o Chemicals
20227 BALLINGER WAY NE	B7315	Febco	805Y	DCVA	1"	Irrigation w/o Chemicals
100 NE 161st Street	AK0164	Febco	805Y	DCVA	1"	Irrigation w/o Chemicals
20065 15 Ave NE	V7552	Febco	805Y	DCVA	1"	Fire Sprinkler w/o Chemical Addition
2215 NE 147TH ST	J8948	Febco	805Y	DCVA	1"	Irrigation w/o Chemicals
14708 15th Avenue NE	1306847	Wilkins	950XL	DCVA	1"	Fire Sprinkler w/o Chemical Addition
1825 NE SERPENTINE PL	856926	Wilkins	950XLT	DCVA	1"	Irrigation w/o Chemicals
2400 NE 147TH AVE	A026521	Febco	805Y	DCVA	1"	Irrigation w/o Chemicals
1400 NE 165th St	A006086	Febco	805Y	DCVA	1"	Irrigation w/o Chemicals
15343 25 Ave NE	9510271259	Febco	805Y	DCVA	1"	Irrigation w/o Chemicals
16516 10th AV NE	951101446	Febco	805Y	DCVA	1"	Irrigation w/o Chemicals
15557 8 Ave NE	1131529	Wilkins	950XL	DCVA	1"	Irrigation w/o Chemicals
18033 15th Pl NE	A028770	Febco	805Y	DCVA	1"	Irrigation w/o Chemicals
17726 12TH AVE NE	A15582	Febco	850	DCVA	1"	Irrigation w/o Chemicals
17518 15th Ave NE	7413022	Wilkins	950XLT	DCVA	1"	Irrigation w/o Chemicals
16850 NE 170th St	104547	Wilkins	950	DCVA	1"	Irrigation w/o Chemicals
2543 NE 178th Street	48835	Watts	007M1QT	DCVA	1"	Fire Sprinkler w/o Chemical Addition
1824 Serpentine Pl NE	V9404	CONB	40-105-A2	DCVA	1"	Irrigation w/o Chemicals
1822 NE Serpentine Pl NE	AY702	CONB	40-105-02	DCVA	1"	Irrigation w/o Chemicals
2500 Ballinger WAY NE	1223078	Wilkins	950XLT	DCVA	1"	Irrigation w/o Chemicals
16328 27th Ave NE	A01827H	Febco	850	DCVA	1"	Irrigation w/o Chemicals
19201 Ballinger WAY NE	A59149	Febco	850	DCVA	1"	Irrigation w/o Chemicals
1445 NE 166th Ct.	1404038	Wilkins	950XLT	DCVA	1"	Irrigation w/o Chemicals
1424 NE 155th St	1612966	Wilkins	950XL	DCVA	1"	Irrigation w/o Chemicals
20224 Ballinger Way NE	331390	Watts	007M1QT	DCVA	1"	Irrigation w/o Chemicals
17413 32nd Ave NE	1818490	Wilkins	950XLT	DCVA	1"	Irrigation w/o Chemicals
19500 Ballinger WAY NE	308009	Watts	007M1QT	DCVA	1"	Premise Isolation
19500 Ballinger WAY NE	1819465	Wilkins	950XLT	DCVA	1"	Irrigation w/o Chemicals
16521 41st Ave NE	H40362	Febco	850	DCVA	1"	Irrigation w/o Chemicals
16018 32nd Ave NE	1117544	Wilkins	950XLT	DCVA	1"	Irrigation w/o Chemicals
20019 30th Ave NE	8489	Ames	2000B	DCVA	1"	Fire Sprinkler w/o Chemical Addition
1824 Serpentine Pl NE	H01886	Febco	850U	DCVA	1"	Fire Sprinkler w/o Chemical Addition
18008 25th Ave NE	HA08189	Febco	850	DCVA	1"	Irrigation w/o Chemicals
18904 26th Ave NE	897892	Wilkins	950XL	DCVA	1"	Irrigation w/o Chemicals

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335 NE 158th St	1387827	Watts	007M1QT	DCVA	1"	Irrigation w/o Chemicals
19931 15 AVE NE	HA50235	Febco	850	DCVA	1"	Irrigation w/o Chemicals
228 NE 174th St	2276364	Wilkins	950XLT	DCVA	1"	Irrigation w/o Chemicals
239 NE 178th St	14659	Ames	2000B	DCVA	1"	Fire Sprinkler w/o Chemical Addition
19021 14 CRT NE	43384	Watts	007M1QT	DCVA	1"	Irrigation w/o Chemicals
603 NE 165 ST	A06159	Ames	2000B	DCVA	1"	Fire Sprinkler w/o Chemical Addition
601 NE 165 ST	A06191	Ames	2000B	DCVA	1"	Fire Sprinkler w/o Chemical Addition
609 NE 165 ST	A06358	Ames	2000B	DCVA	1"	Fire Sprinkler w/o Chemical Addition
611 NE 165 ST	A06197	Ames	2000B	DCVA	1"	Fire Sprinkler w/o Chemical Addition
19036 21 AVE NE	2781341	Wilkins	950XLT	DCVA	1"	Irrigation w/o Chemicals
16252 38th Ave NE	30326	Febco	850	DCVA	1"	Irrigation w/o Chemicals
19217 12 Ave NE	2829620	WILKINS	950XLT	DCVA	1"	Irrigation w/o Chemicals
15521 35 AVE NE	HB35553	Febco	850	DCVA	1"	Irrigation w/o Chemicals
1834 Perkins WAY NE	2916301	Wilkins	950XLT	DCVA	1"	Irrigation w/o Chemicals
3006 NE 194 ST	2833829	Wilkins	950XLT	DCVA	1"	Irrigation w/o Chemicals
2121 NE 195 Pl	A07811	Watts	007M1QT	DCVA	1"	Irrigation w/o Chemicals
17305 32 AVE NE	2278424	Wilkins	950XLT	DCVA	1"	Irrigation w/o Chemicals
20011 Ballinger Way NE	2808001	Wilkins	950XLT	DCVA	1"	Irrigation w/o Chemicals
919 ne 185 st	H10791	Febco	850U	DCVA	1"	Irrigation w/o Chemicals
18082 25 AVE NE	HA94859	Febco	850	DCVA	1"	Fire Sprinkler w/o Chemical Addition
18082 25 AVE NE	2550328	Wilkins	950XL	DCVA	1"	Irrigation w/o Chemicals
3003 NE 160 ST	HC06968	Febco	850	DCVA	1"	Irrigation w/o Chemicals
19909 Ballinger WAY NE	561916	Wilkins	950XLT	DCVA	1"	Irrigation w/o Chemicals
719 NE 189 St	FT624	CONB	40-105-A2	DCVA	1"	Fire Sprinkler w/o Chemical Addition
19930 Ballinger WAY NE	1311032	Wilkins	950XLT	DCVA	1"	Irrigation w/o Chemicals
19584 23 AVE NE	5838	Ames	2000 B	DCVA	1"	Fire Sprinkler w/o Chemical Addition
15519 8 ave ne	A044593	Wilkins	350	DCVA	1"	Irrigation w/o Chemicals
3411 NE 158 ST	3380977	Wilkins	950XLT	DCVA	1"	Irrigation w/o Chemicals
20330 Ballinger Way NE	15143	Watts	007QT	DCVA	1/2"	Fire Sprinkler w/o Chemical Addition
2002 NE 160th Street	9506290800	Febco	805YD	DCVA	2 1/2"	Irrigation w/o Chemicals
1445 NE 166th Ct.	CJ-0369	Ames	Colt 200a	DCVA	2 1/2"	Fire Sprinkler w/o Chemical Addition
20034 15th Ave NE	U6198	Febco	805Y	DCVA	2"	Fire Sprinkler w/o Chemical Addition
19643 15th Ave NE	AD9501	Febco	805Y	DCVA	2"	Fire Sprinkler w/o Chemical Addition
19667 15th Ave NE	W65908	Wilkins	550	DCVA	2"	Fire Sprinkler w/o Chemical Addition
19631 15th Ave NE	W105608	Wilkins	550	DCVA	2"	Fire Sprinkler w/o Chemical Addition
19645 15th Ave NE	W90192	Wilkins	550	DCVA	2"	Fire Sprinkler w/o Chemical Addition

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19230 Forest Park Dr NE	W105175	Wilkins	550	DCVA	2"	Fire Sprinkler w/o Chemical Addition
19230 Forest Park Dr NE	W105172	Wilkins	550	DCVA	2"	Fire Sprinkler w/o Chemical Addition
19230 Forest Park Dr NE	W105177	Wilkins	550	DCVA	2"	Fire Sprinkler w/o Chemical Addition
19230 Forest Park Dr NE	W105180	Wilkins	550	DCVA	2"	Fire Sprinkler w/o Chemical Addition
19230 Forest Park Dr NE	W105173	Wilkins	550	DCVA	2"	Fire Sprinkler w/o Chemical Addition
19230 Forest Park Dr NE	W105179	Wilkins	550	DCVA	2"	Fire Sprinkler w/o Chemical Addition
19230 Forest Park Dr NE	W105178	Wilkins	550	DCVA	2"	Fire Sprinkler w/o Chemical Addition
19230 Forest Park Dr NE	W105176	Wilkins	550	DCVA	2"	Fire Sprinkler w/o Chemical Addition
19230 Forest Park Dr NE	W90265	Wilkins	550	DCVA	2"	Irrigation w/o Chemicals
19230 Forest Park Dr NE	W105174	Wilkins	550	DCVA	2"	Fire Sprinkler w/o Chemical Addition
19230 Forest Park Dr NE	W105171	Wilkins	550	DCVA	2"	Fire Sprinkler w/o Chemical Addition
2002 NE 160th Street	AE2337	Febco	805Y	DCVA	2"	Irrigation w/o Chemicals
145 NE 155th Street	A04799	Febco	850	DCVA	2"	Irrigation w/o Chemicals
345 NE 175th Street	173164	HERSEY	FDC	DCVA	2"	Irrigation w/o Chemicals
2715 NE 158th ST	3043579	Wilkins	950XLT	DCVA	2"	Irrigation w/o Chemicals
835 NE 155th Street	A08437	Febco	850	DCVA	2"	Irrigation w/o Chemicals
19524 Ballinger WAY NE	AC775	CONB	40-108-A2T	DCVA	2"	Fire Sprinkler w/o Chemical Addition
816 NE 190th St	106061057	Febco	850	DCVA	3"	Irrigation w/o Chemicals
16045 25th AV NE	7181259	Febco	805YD	DCVA	3"	Irrigation w/o Chemicals
17447 37th AV NE	670	Watts	7	DCVA	3"	Irrigation w/o Chemicals
1530 NE 177th ST	J09671	Wilkins	350	DCVA	3"	Fire Sprinkler w/o Chemical Addition
1530 NE 177th ST	J10355	Wilkins	350	DCVA	3"	Fire Sprinkler w/o Chemical Addition
19500 Ballinger WAY NE	8120	Watts	7	DCVA	3"	Premise Isolation
14500 15th Ave NE	90406	Watts	007M2QT	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
20224 Ballinger Way NE	A005348	Febco	805Y	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
20224 Ballinger Way NE	A006455	Febco	805YB	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
1549 NE 177th St	T6099	Febco	805Y	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
2525 NE 195th Street	14766	Watts	007M1QT	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
16325 5th Ave NE	A028747	Febco	805Y	DCVA	3/4"	Irrigation w/o Chemicals
14555 25 Ave NE	1281	Ames	2000B	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
16900 25TH AVE NE	377419	Febco	805Y	DCVA	3/4"	Irrigation w/o Chemicals
19935 19TH AVE NE	R7736	Febco	805Y	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
1515 NE 150th Street	Z1615	Febco	805Y	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
1521 NE 150 Street	Z1616	Febco	805Y	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
1250 NE 145th Street	A806846	Febco	805Y	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
1410 NE 180th Street	W10066	Wilkins	950XL	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition

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145 NE 155th Street	10225	Ames	2000B	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
345 NE 175th Street	160425	HERSEY	FDC	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
2003 NE 160th ST	A013556	Febco	805Y	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
2003 NE 160th ST	12577	Watts	009M3QT	DCVA	3/4"	Boiler Feed Lines
16714 5th Ave NE	978341	Wilkins	950XLT	DCVA	3/4"	Irrigation w/o Chemicals
20011 Ballinger Way NE	4624	Ames	2000B	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
1243 NE 169th St	AJ7764	Febco	805Y	DCVA	3/4"	Irrigation w/o Chemicals
1243 NE 169th St	AJ9028	Febco	805Y	DCVA	3/4"	Irrigation w/o Chemicals
17518 15th Ave NE	A008250	Febco	805YB	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
20309 Ballinger Way NE	109902	Watts	709 QT	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
17440 BROOKSIDE BLVD NE	90879	Watts	007M2QT	DCVA	3/4"	Dishwasher w/o Chemicals
17440 BROOKSIDE BLVD NE	A000705	Febco	805YB	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
20202 Ballinger WAY NE	14237	Watts	007M2QT	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
16337 34th Ave NE	A153505	Febco	805Y	DCVA	3/4"	Irrigation w/o Chemicals
20315 19th AV NE	1564695XLD	Wilkins	950XL	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
1514 NE 179th St	26533	Ames	2000B	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
16528 5th Ave NE	35285	AMES	2000B	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
16026 38th Ave NE	132240	Watts	709 QT	DCVA	3/4"	Irrigation w/o Chemicals
14803 15 Ave NE	2547572	WILKINS	950XL	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
19931 15 AVE NE	2409940	Wilkins	950XLD	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
20041 Ballinger WAY NE	W106246	Wilkins	950XL	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
19025 14th Ct NE	A23582	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19027 14 CRT NE	201503	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19031 14 CRT NE	A23561	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19033 14 CRT NE	A50401	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19034 14 CRT NE	A23587	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19035 14 CRT NE	A201531	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19036 14 CRT NE	A201458	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19037 14 CRT NE	A23654	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19040 14 CRT NE	A22810	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19041 14 CRT NE	A50404	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19042 14 CRT NE	A54648	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19043 14 CRT NE	A54660	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19044 14 CRT NE	A201498	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19045 14 CRT NE	A50482	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19046 14 CRT NE	A50483	Watts	007M3QT	DCVA	3/4"	Premise Isolation

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19047 14 CRT NE	A23545	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19050 14 CRT NE	A23584	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19051 14 CRT NE	A23594	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19053 14 CRT NE	A54652	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19054 14 Ct NE	A201423	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19055 14 CRT NE	A22796	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19056 14 CRT NE	A50415	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19057 14 CRT NE	A23508	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19060 14 CRT NE	A22794	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19061 14 CRT NE	A05555	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19062 14 CRT NE	A23506	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19063 14 CRT NE	A23610	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19064 14 CRT NE	A23576	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19065 14 CRT NE	201529	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19066 14 CRT NE	201470	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19067 14 CRT NE	201530	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19052 14 CRT NE	A201460	Watts	007M3QT	DCVA	3/4"	Premise Isolation
19528 7th Ave NE	2790935	Wilkins	950XLT	DCVA	3/4"	Irrigation w/o Chemicals
14803 15 Ave NE Suite 200	HB20472	Febco	850	DCVA	3/4"	Irrigation w/o Chemicals
17202 15 Ave NE	2827942	Wilkins	950XLT	DCVA	3/4"	Irrigation w/o Chemicals
17020 Brookside BLVD NE	A16549	Febco	805Y	DCVA	3/4"	Irrigation w/o Chemicals
17020 Brookside BLVD NE	AJ5237	Febco	805Y	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
17447 37th AV NE	2854152	Wilkins	950XLT	DCVA	3/4"	Irrigation w/o Chemicals
14810 15 AVE NE	3018592 XL	Wilkins	950XL	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
18342 15 PL NE	3166992	Wilkins	950XLT	DCVA	3/4"	Irrigation w/o Chemicals
2400 NE 147TH AVE	T3073	Febco	805Y	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
1227 NE 165 ST	3343674	Wilkins	950XLT	DCVA	3/4"	Irrigation w/o Chemicals
16572 35 AVE NE	3333128	Wilkins	950XLT	DCVA	3/4"	Irrigation w/o Chemicals
20004 24th ave ne	202431	Watts	007M3QT	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
19930 Ballinger WAY NE	27249	Ames	2000 B	DCVA	3/4"	Fire Sprinkler w/o Chemical Addition
17763 15th Ave NE	U05610	WILKINS	350A	DCVA	4"	Premise Isolation
19921 19th Ave NE	L2102	FEBCO	805Y	DCVA	4"	Fire Sprinkler w/o Chemical Addition
2525 NE 195th Street	10930	Watts	709	DCVA	4"	Fire Sprinkler w/o Chemical Addition
1255 NE 152nd ST	J01116	Wilkins	350	DCVA	4"	Fire Sprinkler w/o Chemical Addition
15343 25 Ave NE	9510021314	Febco	805YD	DCVA	4"	Irrigation w/o Chemicals
16045 25th AV NE	9710231248	Febco	850	DCVA	4"	Fire Sprinkler w/o Chemical Addition

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19500 Ballinger WAY NE	312103	Wilkins	350	DCVA	4"	Fire Sprinkler w/o Chemical Addition
1517 NE 147 ST	2CJ1218	Ames	2000 SS	DCVA	4"	Fire Sprinkler w/o Chemical Addition
17712 15th Ave NE	2L112007	Ames	2000 SS	DCVA	6"	Fire Sprinkler w/o Chemical Addition
20309 Ballinger Way NE	0822D1	Ames	2000 SS	DCVA	6"	Fire Sprinkler w/o Chemical Addition
16040 38 AVE NE	2382092	Wilkins	950XLT	DCVA		Irrigation w/o Chemicals
15343 25 Ave NE	96878	Watts	709 QT	DCVA		Irrigation w/o Chemicals
20224 Ballinger Way NE	A03410	Febco	860	RPBA	1 1/2"	Fire Systems with Chem Addition
20010 Ballinger Way NE	287533	Watts	909M1QT	RPBA	1 1/2"	Car Wash
17500 12TH AVE NE	242928	Wilkins	975XL	RPBA	1 1/2"	Premise Isolation
16827 BOTHELL WAY NE	850045	Wilkins	975XL	RPBA	1 1/2"	Car Wash
1400 NE 165th St	276653	Watts	909M1QT	RPBA	1 1/2"	Car Wash
20059 Ballinger WAY NE	99237	Watts	009M2QT	RPBA	1 1/2"	Premise Isolation
14803 15 Ave NE	A36237	Watts	009M2QT	RPBA	1 1/2"	Premise Isolation
15343 25 Ave NE	18031	Conbraco	40-206-02	RPBA	1 1/4"	Degreasing Equipment
16045 25th AV NE	302910	Watts	909M1QT	RPBA	1 1/4"	Premise Isolation
19930 Ballinger WAY NE	384010	Watts	909M1QT	RPBA	1 1/4"	Sterilizer
16045 25th AV NE	298922	Watts	909M1QT	RPBA	1 1/4"	Lab Sinks
16045 25th AV NE	240128	Watts	909QT	RPBA	1"	Boiler Feed Lines
16045 25th AV NE	104531	Watts	909QT	RPBA	1"	Lab Sinks
343 NE 178th St	A73528	Watts	009M2QT	RPBA	1"	Wastewater Lift/Pump stations
20315 19th AV NE	179352	Watts	009M2QT	RPBA	1"	Premise Isolation
20059 Ballinger WAY NE	224974	Watts	009M2QT	RPBA	1"	Irrigation w/o Chemicals
2003 NE 160th ST	339221	Watts	009M2QT	RPBA	1"	Dishwasher with Chemicals
2003 NE 160th ST	335849	Watts	009M2QT	RPBA	1"	Boiler Feed Lines
16329 35th Ave NE	74594	Watts	009QT	RPBA	1/2"	Boiler Feed Lines
20036 Ballinger Way NE	BU960	CONB		RPBA	1/2"	Hot Water Tank
17500 12TH AVE NE	A71159	Watts	009QT	RPBA	1/2"	Film Processors
17500 12TH AVE NE	243168	Wilkins	975XL	RPBA	1/2"	Film Processors
1432 NE 151st Street	97844	Watts	009QT	RPBA	1/2"	X Ray Processor
1610 NE 179th Street	23781	Watts	009QT	RPBA	1/2"	Dental Equipment/Cuspidors
17732 15th Ave NE	3225	CONB	40-203-02	RPBA	1/2"	Beverage Dispenser w/o CO2
20227 BALLINGER WAY NE	1048310	Wilkins	975XL	RPBA	1/2"	Beverage Dispenser w/o CO2
17228 4th Ave NE	102389	Watts	009QT	RPBA	1/2"	Boiler Feed Lines
17202 15 Ave NE	34159	Watts	009QT	RPBA	1/2"	Beverage Dispenser with CO2
16522 18TH AVE NE	DM469	CONB	40-203-A2	RPBA	1/2"	Boiler Feed Lines
18002 15th Ave NE	74597	Watts	009QT	RPBA	1/2"	Cleaning Chemicals

Installed Backflow Prevention Assemblies

Attachment A

Service Address (Full)	Equipment Serial Number	Equipment Mfr Code	Equipment Model Number	Equipment Type Code	Equipment Display Size	Hazard Type
18002 15th Ave NE	74591	Watts	009QT	RPBA	1/2"	Beverage Dispenser with CO2
17751 15th Ave NE	135477	Watts	009QT	RPBA	1/2"	Beverage Dispenser with CO2
20330 15th Ave NE	158560	Watts	009QT	RPBA	1/2"	Beverage Dispenser with CO2
17440 BROOKSIDE BLVD NE	57879	Watts	009QT	RPBA	1/2"	Boiler Feed Lines
17440 BROOKSIDE BLVD NE	BA908	Conbraco	40-203-02	RPBA	1/2"	Boiler Feed Lines
19930 Ballinger WAY NE	202740	Watts	009QT	RPBA	1/2"	Ice Machine
18044 25th Ave NE	188889	Watts	009QT	RPBA	1/2"	Boiler Feed Lines
17046 2 Ave NE	187252	Watts	009QT	RPBA	1/2"	Boiler Feed Lines
14705 22nd Ave NE	241276	Watts	009QT	RPBA	1/2"	Boiler Feed Lines
17235 Bookside Blvd NE	158477	Watts	009QT	RPBA	1/2"	Boiler Feed Lines
15812 35th Ave NE	262430	Watts	009QT	RPBA	1/2"	Boiler Feed Lines
2116 NE 175th ST	290895	Watts	009QT	RPBA	1/2"	Boiler Feed Lines
20059 Ballinger WAY NE	234386	Watts	009QT	RPBA	1/2"	Beverage Dispenser with CO2
17207 10 Ave NE	A12845	Watts	009QT	RPBA	1/2"	Boiler Feed Lines
18033 15th Pl NE	W209303	Wilkins	975XL	RPBA	1/2"	Boiler Feed Lines
17202 15 Ave NE	A02501	Watts	9	RPBA	1/2"	Premise Isolation
18033 15th Pl NE	W320750	Wilkins	975XL	RPBA	1/2"	Boiler Feed Lines
17202 15 Ave NE	A42869	Watts	009QT	RPBA	1/2"	Beverage Dispenser with CO2
17202 15 Ave NE	A13878	Watts	009QT	RPBA	1/2"	Beverage Dispenser with CO2
17202 15 Ave NE	A37791	Watts	009M2QT	RPBA	1/2"	Premise Isolation
17518 15th Ave NE	63771	Watts	009QT	RPBA	1/2"	Film Processors
17729 25th Ave NE	K2465	APOLLO / CON	4020302	RPBA	1/2"	Boiler Feed Lines
15571 9th AVE NE	A81196RP	Watts	009QT	RPBA	1/2"	Boiler Feed Lines
14759 23 AVE NE	W361610	Wilkins	975XL	RPBA	1/2"	Boiler Feed Lines
16541 21 AVE NE	139634	Watts	009QT	RPBA	1/2"	Boiler Feed Lines
4007 NE 161 ST	204452	Watts	009QT	RPBA	1/2"	Boiler Feed Lines
19009 16th Ave NE	164493	WATTS	009QT	RPBA	1/2"	Boiler Feed Lines
17126 10 AVE NE	323482	Watts	009QT	RPBA	1/2"	Boiler Feed Lines
14500 15th Ave NE	508784	Wilkins	975XL	RPBA	2"	Premise Isolation
20036 Ballinger Way NE	87449	Watts	009M2QT	RPBA	2"	Premise Isolation
19547 25TH AVE NE	W183068	Wilkins	975XL	RPBA	2"	Premise Isolation
816 NE 190th St	A43459	Watts	009M2QT	RPBA	2"	Irrigation w/o Chemicals
19930 Ballinger WAY NE	1342269	Wilkins	975XL	RPBA	2"	Premise Isolation
16528 5th Ave NE	W106833	Wilkins	975XL	RPBA	2"	Premise Isolation
14810 15 AVE NE	3044391XL	Wilkins	975XL	RPBA	2"	Premise Isolation
2003 NE 160th ST	A52120	Watts	009M2QT	RPBA	2"	Premise Isolation

Installed Backflow Prevention Assemblies

Attachment A

Service Address (Full)	Equipment Serial Number	Equipment Mfr Code	Equipment Model Number	Equipment Type Code	Equipment Display Size	Hazard Type
145 NE 155th Street	131880	Watts	009M2QT	RPBA	2"	Hot Water Tank
1530 NE 177th ST	168842	Watts	909	RPBA	3"	Premise Isolation
1530 NE 177th ST	169190	Watts	909	RPBA	3"	Premise Isolation
20036 Ballinger Way NE	A020958	Febco	825Y	RPBA	3/4"	Fire Sprinkler w/o Chemical Addition
2215 NE 147TH ST	A008023	Febco	825Y	RPBA	3/4"	Boiler Feed Lines
1720 NE 179th Street	90343	Watts	009M2QT	RPBA	3/4"	Boiler Feed Lines
17721 15TH AVE NE	1241909	Wilkins	975XL	RPBA	3/4"	Dry Cleaning Equipment
1250 NE 145th Street	BW367	CONB	40-204-A2	RPBA	3/4"	Boiler Feed Lines
1208 NE 201ST ST	163692	Watts	009M2QT	RPBA	3/4"	Wastewater Lift/Pump stations
14708 15th Avenue NE	258514	Watts	009M3QT	RPBA	3/4"	Dry Cleaning Equipment
1825 NE SERPENTINE PL	117763	Watts	009QT	RPBA	3/4"	Boiler Feed Lines
816 NE 190th St	123611	Watts	909QT	RPBA	3/4"	Boiler Feed Lines
16045 25th AV NE	102968	Watts	909QT	RPBA	3/4"	Hot Water Tank
2000 Perkins Way NE	T6640	Febco	825Y	RPBA	3/4"	Boiler Feed Lines
16508 8TH AVE NE	G7025	CONB	40-204-02	RPBA	3/4"	Boiler Feed Lines
17518 15th Ave NE	737244	Wilkins	975XL	RPBA	3/4"	Film Processors
18349 10th AV NE	AD6635	Febco	825Y	RPBA	3/4"	Wastewater Lift/Pump stations
19930 Ballinger WAY NE	547560	Watts	909QT	RPBA	3/4"	Sterilizer
18033 15th Pl NE	E0233	Conbraco	40-204-A2	RPBA	3/4"	Boiler Feed Lines
20010 Ballinger Way NE	W090531	Wilkins	975XL	RPBA	3/4"	Beverage Dispenser with CO2
20059 Ballinger WAY NE	130783	Watts	909HWQT	RPBA	3/4"	Dishwasher with Chemicals
17202 15 Ave NE	A62479	Watts	009M3QT	RPBA	3/4"	Air Compressor
1636 ne 169 st	W320057	Wilkins	975XL	RPBA	3/4"	Boiler Feed Lines
2003 NE 160th ST	308784	Watts	009M3QT	RPBA	3/4"	Commercial Kitchen Equipment
2003 NE 160th ST	308771	Watts	009M3QT	RPBA	3/4"	Commercial Kitchen Equipment
16505 5th AV NE	A10208	Watts	009QT	RPBA	3/8"	Beverage Dispenser with CO2
16045 25th AV NE	189254	WATTS	909	RPBA	4"	Premise Isolation
15230 15TH AVE NE	WC-133	CLAVAL	RP4	RPBA	8"	Premise Isolation
15230 15TH AVE NE	WC-132	CLAVAL	RP8LW	RPBA	8"	Premise Isolation
17000 Shore Dr NE	H23797	Febco	860	RPBA		Irrigation with Chemicals
15525 10th AV NE	W297276	Wilkins	975XL	RPBA		Boiler Feed Lines
20036 Ballinger Way NE	9703271450	Febco	826YD	RPDA	6"	Fire Sprinkler w/o Chemical Addition

APPENDIX B

Municipal Accounts

Account Number	Site Address	Name	Meter Size (in)
022340-000	16516 10 AVE NE	Shoreline Schools - Ridgecrest	4
022358-000	16045 25 AVE NE	Shoreline Schools - Kellogg Middle	4
022370-000	15343 25 AVE NE	Shoreline Schools - Shorecrest	4
022384-000	2800 NE 200 ST	Shoreline Schools - Aldercrest	4
022332-000	816 NE 190 ST	Shoreline Schools-N. City Elementary	3
022374-000	2715 NE 158 ST	Shoreline Schools - Briarcrest	3
022380-000	2000 Perkins Way	Shoreline Schools - Cedarbrook	3
022336-000	1216 NE 165 ST	Shoreline Schools - Bus Barn	2
022376-000	17447 37 AVE NE	Shoreline Schools - Brookside	2
21006	19547 25 Ave NE	King Co. Road Services	2
18376	345 NE 175th St	King Co. Library	2
7250	145 NE 155 St	Shoreline Fire Department	1.5
16044	1242 NE 180 St	Shoreline Fire	1.5
21076	2201 NE 201 Pl	King Co. Housing	1.5
022354-000	2003 NE 160 ST	Shoreline Schools - Warehouse	1.5
022356-000	16006 15 AVE NE	City of Shoreline Parks	1.5
21078	20115 20 Pl NE	King Co. Housing	1
022364-000	NE 160 ST & 25 AVE NE	City of Shoreline Upper Hamlin Restroom	1
022350-000	16006 15 AVE NE	City of Shoreline-Parks Mtc Building	1
022334-000	835 NE 155 ST	City of Shoreline-Park Restrooms	1
20342	19201 Ballinger Way	City of Lake Forest Park	5/8
21004	19547 25 Ave NE	King Co. Road Services	5/8
23858	20031 Ballinger Way	King Co. WTD	5/8
022382-000	2545 NE 200 ST	Shoreline Schools - Aldercrest Annex	Meter Removed

Irrigation and Lift Station Accounts

Account Number	Site Address	Name	Meter Size (in)
022362-000	16045 25 AVE NE	Shoreline Schools - Irrigation	4
022368-000	15343 25 AVE NE	Shoreline Schools - Irrigation	4
022372-000	2715 NE 158 ST	Shoreline Schools - Irrigation	4
022378-000	17447 37 AVE NE	Shoreline Schools - Irrigation	4
022366-000	NE 160 & 25 AVE NE	City of Shoreline-Hamlin Baseball Fields - Irrigation	3
022330-000	816 NE 190 ST	City of Shoreline - Irrigation	3
022338-000	835 NE 155 ST	City of Shoreline - Irrigation	3
022352-000	16006 15 AVE NE	City of Shoreline - Irrigation	3
023226-000	1502 NE 179 ST	City of Shoreline - Irrigation	3
007584-000	100 NE 161 ST	City of Shoreline - Irrigation	2
13216	345 NE 175th St	KC Library - Irrigation	2
018356-000	201 NE 175th St	City of Shoreline - Irrigation	5/8
16440	18349 10 Ave NE	Ronald Wastewater - Lift Station	NA
18278	NE 178 St & 5 Ave NE	Ronald Wastewater - Lift Station	NA
18806	1208 NE 201 St	Ronald Wastewater - Lift Station	NA

Commercial Accounts

Account Number	Site Address	Name	Meter Size (in)
20228	19925 Forest Park Dr	Myong Sung Presbyterian Church	NA
14222	17201 15 Ave NE	Anderson Plaza	4
20756	20315 19 Ave NE	T3S LLC	4
16036	18045 15 Pl NE	St Marks Catholic Church	3
6290	1250 NE 145 St	Parkridge Care Center	2
12820	16505 5 Ave NE	Landmark Theater	2
14000	17127 15 Ave NE	Anderson House	2
15822	17518 15 Ave NE	Walgreens	2
15908	17505 15 Ave NE	Peking House	2
15920	1220 NE 175 St	YMCA	2
15982	18060 15 Pl NE	St Marks Catholic Church	2
17728	19010 5 Ave NE	Evergreen Baptist	2
18376	345 NE 175 St	King Co Library	2
20262	20051 Ballinger Way	Washington Tree Service	2
20574	19935 19 Ave NE	Lake Montessori	2
23866	16325 5 Ave NE	Development Services of America	2
25341	14500 15 Ave NE	Seattle Goodwill	2
5976	14622 15 Ave NE	Quadri Akbars (restaurant)	1.5
6052	14708 15 Ave NE	Ngyen Kim	1.5
9242	15555 15 Ave NE	Northwest Church	1.5
11686	16827 Bothell Way N	Butte Enterprises	1.5
13478	17418 8 Ave NE	Bethel Lutheran Church	1.5
14220	17127 15 Ave NE	Anderson House	1.5
14234	17233 15 Ave NE	US Postal Service	1.5
14236	17229 15 Ave NE	Parfitt Family LLC	1.5
14542	17018 15 Ave NE	Center for Human Services	1.5
14810	17202 15 Ave NE	Safeway	1.5
15712	1510 NE 177 St	Pohl Properties	1.5
15904	17521 15 Ave NE	Tokuno Steven	1.5
15914	1240 NE 175 St	Molnar Alex	1.5
16906	510 NE 175 St	Free Methodist Shoreline	1.5
17914	205 NE 205 St	Holyrod Cemetery	1.5
20256	20227 Ballinger Way	McDonalds	1.5
20258	20057 Ballinger Way	Washington Tree Service	1.5
20700	20330 Ballinger Village	Rite Aid (Ballinger Village)	1.5
20722	20202 Ballinger Way	24 Hour Fitness	1.5
20724	20036 Ballinger Way	Penhollow Markets	1.5
20788	1901 NE 205 St	Askar Ahmed	1.5
21018	19930 Ballinger Way	Ballinger Way LLC	1.5
24145	20011 Ballinger Way	Rose Crossing	1.5
24674	14810 15 Ave NE	ASCS Properties LLC	1.5
25339	14500 15 Ave NE	Seattle Goodwill	1.5

Commercial Accounts

Account Number	Site Address	Name	Meter Size (in)
5690	2400 NE 147 St	Shoreline Christian School	1
5734	14511 25 Ave NE	Shoreline United Methodist	1
5738	2215 NE 147 St	Carmelite Monastery	1
5846	14514 20 AVE NE	Prince of Peace Luthern Church	1
5858	1554 NE 145 St	Kaushik Libbie	1
5888	1551 NE 146 St	Painting	1
6280	14711 15 Ave NE	Shoreline Automotive	1
10946	16815 Bothell Way N	Combs Greg	1
11814	17440 Brookside Blvd	LFP Presbyterian Church	1
13302	616 NE 165th St	Korean Church	1
13480	17404 8 Ave NE	Bethel Lutheran Church	1
14002	17051 14 Ave NE	Anderson Larry (part of Anderson House)	1
14232	1221 NE 175 St	North City Lumber	1
14402	16910 15 Ave NE	Wilson Robert	1
14404	16920 15 Ave NE	7-11 Store	1
15710	1514-20 NE 177 St	Pohl Properties	1
15824	17518 15 Ave NE	Walgreens	1
15834	17730 15 Ave NE	(Leenas & Eagles)	1
15852	17750 15 Ave NE	Custom Pure	1
15878	17735 15 Ave NE	Hayes Shane	1
16038	18033 15 Pl NE	St Marks Catholic Church	1
18520	811 NE 201 St	North Ridge Swim Club	1
20244	20306 15 Ave NE	Sundquist	1
20248	20330 15 Ave NE	Roe Steve	1
20260	20059 Ballinger Way	Pagliacci Pizza	1
20264	20041 Ballinger Way	Public Storage Co	1
20270	20021 Ballinger Way	Klokstad Construction	1
20274	19909 Ballinger Way	Dodson, William	1
20276	19929 Ballinger Way	Dodson, William	1
20570	19939 Ballinger Way	Huoth Darrell	1
20572	19953 Ballinger Way	Todo Mexico	1
20764	20010 Ballinger Way	Andy's Chevron	1
20766	19960 Ballinger Way	Kim Peter	1
21020	19936 Ballinger Way	Triune Development	1
21022	19940 Ballinger Way	Triune Development	1
22955	14803 15 Ave NE	Hartley Steven-Blue Star (Hillis Clark Martin)	1
22977	20030 Ballinger Way	Lands Pacific Inc	1
23948	17529 15 Ave NE	17529 15 Ave LLC	1
24208	14701 15 Ave NE	Cressy Door Co	1
24654	15211 15 Ave NE	City Calvary Chapel	1

Commercial Accounts

Account Number	Site Address	Name	Meter Size (in)
24890	19500 Ballinger Way	Sunbreak Condo	1
25557	17001 Bothell Way N	CMSI-BP Gas Station	1
5605	20320-B Ballinger Way	Teriyaki Town (Ballinger Village)	5/8
5890	14521 17 Ave NE	American Legion Post 227	5/8
5966	14602 15 Ave NE	Pearl Black	5/8
5968	14610 15 Ave NE	Englund Gordan	5/8
5970	14612 15 Ave NE	Personal Touch	5/8
5974	14616 15 Ave NE	J & J Auto	5/8
6130	14820 15 Ave NE	Finch Jon-Cindy	5/8
6192	15419 15 Ave NE	Strathy Mike	5/8
6228	1432 NE 151 St	Hamada Ken	5/8
6284	14625 15 Ave NE	Community First Credit Union	5/8
6286	14615 15 Ave NE	Clark Allen	5/8
6288	14625 15 Ave NE	Community First Credit Union	5/8
6292	14501 15 Ave NE	Harveys Auto Service	5/8
6294	1234 NE 145 St	Churck of Scientology	5/8
6306	14527 15 Ave NE	Earl's Garage	5/8
6310	14515 15 Ave NE	Earl's Garage	5/8
7308	15415 5 Ave NE	Shoreline Fellowship	5/8
7368	226 NE 152 St	True Jesus Church	5/8
8028	523 NE 165 St	Talley Kathleen	5/8
8032	525 NE 165 St	PSE	5/8
8034	521 NE 165 St	Shoreline Police	5/8
8036	517 NE 165 St	Hair House	5/8
8182	16268 5 Ave NE	McFarl David	5/8
9256	1424 NE 155 St	Huebner Building	5/8
9636	15518 27 Ave NE	Seattle Congregational Church	5/8
9648	15550 27 Ave NE	Stephenson Gordon	5/8
11296	16840 Bothell Way N	Depape Associates	5/8
12818	16535 5 Ave NE	Lee Eric J	5/8
13072	17060 3 Ave NE	Hua Liu	5/8
13306	522 NE 165 St	Century Development-Aquarium	5/8
13308	520 NE 165 St	Darigold Federal Credit Union	5/8
13310	518 NE 165 St	Century Development-Cameral Clinic	5/8
13312	516 NE 165 St	Century Development Geology	5/8
13314	16506 5 Ave NE	7-Eleven Inc.(Century Dev.)	5/8
13414	17424 5 Ave NE	Seventh Day Adventist	5/8
13616	16508 8 Ave NE	Tabernacle Church Baptist	5/8
14238	17211 15 Ave NE	Dr. H. Kumnen	5/8
14240	17203 15 Ave NE	Son Kun Soo	5/8
15008	1825 NE Serpentine Pl	Srf Seattle - center	5/8

Commercial Accounts

Account Number	Site Address	Name	Meter Size (in)
15714	17704 15 Ave NE	Nguyen Son	5/8
15718	1535 NE 177 St	Sims John	5/8
15826	17534 15 Ave NE	Northsound Carpet	5/8
15830	17554 15 Ave NE	North City Tavern	5/8
15836	1610 NE 179 St	Melton Pat	5/8
15850	1620 NE 179 St	Melton Pat	5/8
15854	17754 15 Ave NE	Les Schwab	5/8
15856	18002 #A 15 Ave NE	Five Starts LLC	5/8
15874	17751 15 Ave NE	Suni's Pizza	5/8
15876	17739 15 Ave NE	Torgesson Daryl	5/8
15880	17727 15 Ave NE	Frank Lumber	5/8
15884	17717 15 Ave NE	Granger Linda	5/8
15886	17711 15 Ave NE	Real Property Associates	5/8
15888	17713 15 Ave NE	Real Property Associates	5/8
15894	17563 15 Ave NE	Stoneccate Development	5/8
15896	17549 15 Ave NE	East Gary W. Coffee Shop	5/8
15898	17547 15 Ave NE	East Gary W. Coffee Shop	5/8
15900	17537 15 Ave NE	Communications Wholesale	5/8
15906	17517 15 Ave NE	RMS Sound	5/8
15912	1244 NE 175 St	Auto Cornerstone	5/8
15922	17500 12 AVE NE	Family Dental	5/8
16042	18005 15 Ave NE	Ahn Mi Young	5/8
16046	18026 14 Ave NE	Gibbons Sam-N Seattle Upholstery	5/8
16438	919 NE 185 St	B & S LLC	5/8
18690	20337 15 Ave NE	Atwork Custom Industries	5/8
18694	20065 15 Ave NE	Advantage IQ	5/8
19630	19024 15 Ave NE	Lemme Busso (Evergreen Landscaping)	5/8
19632	19028 15 Av NE	Lemme Busso (Evergreen Landscaping)	5/8
19634	19042 15 Ave NE	Leland Donald K	5/8
19646	19204 15 Ave NE	Montiel Floriberto	5/8
19660	19258 15 Ave NE	Guitarville (Columbia State Bank)	5/8
20230	19931 Forest Park Dr	Myong Sung Presbyterian Church	5/8
20250	20309 Ballinger Way	Wallace Properties	5/8
20252	20319 Ballinger Way	Schucks	5/8
20268	20021 Ballinger Way	Klokstad Gary E	5/8
20656	19946 Forest Park Drive	Olsen Ken	5/8
20702	20320-A Ballinger Way	Cleaners (Ballinger Village)	5/8
20704	20120 Ballinger Way	Ballinger Village	5/8
20708	20308 Ballinger Way	Teriyaki Town (Ballinger Village)	5/8
20710	20302 Ballinger Way	Ballinger Nails	5/8

Commercial Accounts

Account Number	Site Address	Name	Meter Size (in)
20712	20226-38 Ballinger Way	Ballinger Village	5/8
20714	20224 Ballinger Way	Suntana Tanning	5/8
20718	20222 Ballinger Way	Angler's Choice	5/8
20728	20132 Ballinger Way	Starbucks Coffee #3316	5/8
20730	20136 Ballinger Way	Party Central	5/8
20732	20128-20130 Ballinger Way	Ballinger Village	5/8
20734	20028 Ballinger Way	UPS	5/8
20736	20124 Ballinger Way	Splendid Pleasures	5/8
20738	20120 Ballinger Way	Blockbuster	5/8
20740	20214 Ballinger Way	Ballinger Village	5/8
20768	19944 Ballinger Way	Triune Development	5/8
20774	20036 19 Ave NE	Khorsandi Dr. Shohreh	5/8
20778	20056 19 Ave NE	Burkhart William-Ballinger Professional Offices	5/8
20780	20300 19 Ave NE	Robinson Engineering	5/8
20782	20310 19 Ave NE	White Greg and Rosemary	5/8
20786	20324 19 Ave NE	Ballinger Realty	5/8
21298	2960 NE 200 St	Lake Forest Park Congregational	5/8
21482	19062 Ballinger Way	Hughes W-North Park Heating	5/8
22708	1234 NE 175 St	Nguyen Tan-Europa Car Care	5/8
22965	14712 15 Ave NE	Wallace Pat	5/8
23035	18021 15 Ave NE	LLC Cheton	5/8
23242	17550 15 Ave NE	Sims John	5/8
23395	1211 NE 175 St	Barrie Jeremy	5/8
23428	17503 10 Ave NE	Lancaster Brad (Law Office)	5/8
23558	1216 Ne 145 St	Nail Spa Sense	5/8
23821	1222 NE 145 St	Tracey Michael	5/8
24053	17406 15 Ave NE	Safeway-Gas Station	5/8
24159	14724 15 Ave NE	Romeos Pizza (BURNED)	5/8
24538	17712 15 Ave NE	Real Property Associates	5/8
24951	509 NE 165 St	Scott Lyanne	5/8
25340	14500 15 Ave NE	Seattle Goodwill	5/8
25908	1505 NE 205 St	Pacwest Energy-Gas Station	5/8
26067	20206 Ballinger Way	Happy Bean Smoothie	5/8
26102	20333 Ballinger Way	FDIC - City Bank	5/8
26180	14614 15 Ave NE	Elegant Nails	5/8
26197	519 NE 165 St	Frenandez Audreana	5/8

Wholesale Accounts

Account Number	Name	Meter Size (in)
22342	Fircrest	8
22348	Fircrest	6
22344*	Fircrest	2
22346*	Fircrest	2
*This is a bypass and should only be charged for consumption.		

APPENDIX C

Cross Connection Control Program Implementation Schedule

Task	Planned Implementation (Starting from Policy Adoption Date)
Assess purveyor's water system facility hazards	Within 30 days
Install backflow preventers on purveyor's system facility hazards	Within 6 months
Conduct hazard assessment for new customers	Upon application for service
Ensure backflow preventers are installed for new customers	Before service is provided
Conduct hazard assessments for existing high hazard customers	Within 12 months
Notify existing high hazard customers of hazard assessment results and backflow preventer installation requirements	Within 18 months
Ensure backflow preventers are installed for existing high hazard customers	Within 12 months*
Conduct hazard assessments for existing, non-high hazard, commercial customers	Within 24 months
Notify existing non-high hazard commercial customers of hazard assessment results and backflow preventer installation	Within 36 months
Ensure backflow preventers are installed on connections to existing, non-high hazard, commercial customers	Within 48-60 months*
Re-assess non-high hazard commercial customers	Every 5 years
Conduct hazard assessment for existing residential customers	Within 24 months
Notify residential customers of hazard assessment results and backflow preventer installation requirements	Within 36 months
Ensure that backflow preventers are installed on residential connections that require protection	Within 36-48 months*
Re-assess residential customers	Every 5 years
* Earlier backflow prevention assembly installation is required when a customer's water use changes (e.g., tenant changes), and/or building modifications require a plumbing permit.	

APPENDIX D



Office of Drinking Water

Public Water System Cross-Connection Control Activities Annual Summary Report for Year 2010

Part 1: Public Water System (PWS) and Cross-Connection Control Specialist (CCS) Information

PWS ID: 39600	PWS Name: SHORELINE WATER DISTRICT	County: KING
Provide name and Cert No. of CCS who develops and implements your CCC program		
CCS Name (last, first & mi): Heivilin, Robert R.		CCS Phone: (206) 362-8100
CCS Cert No.: 5407	BAT Cert. No. (if applicable): B3620	
CCS is (check one): PWS owner or employee <input checked="" type="checkbox"/> On contract to PWS <input type="checkbox"/> Volunteer or other <input type="checkbox"/>		

Part 2: Status of Cross-Connection Control (CCC) Program at end of 2010

PWS has (check one box in each column below):	
A written CCC program plan Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	CCC implementation activities Y <input checked="" type="checkbox"/> N <input type="checkbox"/>

(Written program may be a separate document, or part of water system plan or small water system management program).

Provide information regarding PWS's specific CCC Program Elements

Program Element Number	Description of Element [See WAC 246-290-490(3)]	This Program Element is Currently:	
		Included in Written Program	Being Implemented or Is Completed
1	Legal Authority Established	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>
2	Hazard Evaluation Procedures and Schedules	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>
3	CCC Procedures and Schedules	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>
4	Certified CCS Provided	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>
5	Backflow Preventer Inspection and Testing	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>
6	Testing Quality Control Assurance Program	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>
7	Backflow Incident Response Procedures	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>
8	Public Education Program	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>
9	CCC Records	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>
10	Reclaimed Water Permit	Y <input type="checkbox"/> N <input type="checkbox"/> N/A <input checked="" type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/> N/A <input checked="" type="checkbox"/>

Part 3A: System Characteristics at End of 2010

Indicate the number of connections of each type that the PWS serves (whether or not they are protected by backflow preventers). Estimate if necessary.

Type of Service Connection	Number
Residential (As defined by PWS)	7900
All Other (Include dedicated fire sprinkler and irrigation lines and PWS-owned facilities such as water and wastewater treatment plants)	300

and pumping stations, parks, piers and docks.)	Attachment A
Total Number of Connections	8200

Part 3B: Cross-Connection Control for High-Hazard Premises or Systems Served by the PWS Attachment A

If PWS does not serve any high-hazard premises or systems, check here ☐ and go to Part 4A.

- Complete all cells. Enter zero (0) in cells if PWS does not serve such premises.
- Estimate number of connections served if necessary (OK to use phone book).
- Hazard evaluations do not need to be done to complete this table.

Type of High-Hazard Premises or Systems [WAC 246-290-490(4)(b)]	Number of Connections at end of 12/31/2010			
	A. Being Served Water by PWS ¹	B. With Premises Isolation by AG/RP	C. With Column B AG Inspected or RP Tested ²	D. Granted Exception from Mandatory Premises Isolation
Agricultural (farms and dairies)	0	0	0	0
Beverage bottling plants (including breweries)	0	0	0	0
Car washes	2	2	1	0
Chemical plants	0	0	0	0
Commercial laundries and dry cleaners	2	2	2	0
Both reclaimed water and potable water provided	0	0	0	0
Film processing facilities	0	0	0	0
Dedicated fire protection systems with chemical addition or using unapproved auxiliary supplies	1	1	1	0
Food processing plants (including canneries, slaughter houses, rendering plants)	0	0	0	0
Hospitals, medical centers, nursing homes, veterinary, medical and dental clinics, and blood plasma centers	11	3	1	0
Separate irrigation systems using purveyor's water supply and chemical addition ⁴	0	0	0	0
Laboratories	0	0	0	0
Metal plating industries	0	0	0	0
Petroleum processing or storage plants	0	0	0	0
Piers and docks	0	0	0	0
Radioactive material processing plants or nuclear reactors	0	0	0	0
Survey access denied or restricted	0	0	0	0
Wastewater lift/pump stations (non-residential only)	3	3	3	0
Wastewater treatment plants	0	0	0	0
Unapproved auxiliary water supply interconnected with potable water supply	0	0	0	0
Wholesale Customer	2	2	2	0
Totals	21	13	10	0

¹Count multiple connections or parallel installations as separate connections.

²Count only those connections with AG or RPBA installed for premises isolation. Don't include connections with in-premises protection only, or connections with DCVA/DCDAs installed for premises isolation.

³Count only those connections whose premises isolation preventers were inspected (AG) or tested (RPBA) during 2010.

⁴For example, dedicated lines to irrigation systems in parks, playgrounds, golf courses, cemeteries, estates, etc.

⁵Premises with hazardous materials or processes (requiring isolation by AG or RPBA) such as: aircraft and automotive manufacturers, pulp and paper mills, metal manufacturers, military bases, and wholesale customers that pose a high hazard to the PWS. May be grouped together in categories, e.g.: other manufacturing or other commercial. If needed, attach additional sheet giving same information as requested in table.

Page 2

Part 3C: Cross-Connection Control for Medical Category High-Hazard Premises Served by the PWS

If PWS does not serve any medical type premises, check here ☐ and go to Part 4A.

- Complete all cells. Enter zero (0) in cells if PWS does not serve such premises.
- Estimate number of connections served if necessary (OK to use phone book).
- Hazard evaluations do not need to be done to complete this table.

Type of High-Hazard Premises or Systems [WAC 246-290-490(4)(b)]	Number of Connections at end of 12/31/2010			
	A. Being Served Water by PWS ¹	B. With Premises Isolation by AG/RP	C. With Column B AG Inspected or RP Tested ²	D. Granted Exception from Mandatory Premises Isolation
Hospitals				
Hospitals (include psychiatric hospitals and alcohol and drug treatment centers)	0	0	0	0
Facilities for Treatment and Care of Patients Not Located in Hospitals Counted Above				
Same day surgery centers	0	0	0	0
Out-patient clinics and offices	1	1	0	0
Alternative health out-patient clinics and offices	0	0	0	0
Psychiatric out-patient clinics and offices	0	0	0	0
Chiropractors	0	0	0	0
Hospice care centers	0	0	0	0
Childbirth centers	0	0	0	0
Kidney dialysis centers	0	0	0	0
Blood centers	0	0	0	0
Dental clinics and offices	6	1	1	0
Facilities for Housing Patients				
Nursing homes	2	0	0	0
Boarding homes	0	0	0	0
Residential treatment centers	0	0	0	0
Other Medical-Related Facilities				
Mortuaries	0	0	0	0
Morgues and autopsy facilities (not in hospitals)	0	0	0	0
Veterinarian offices, clinics and hospitals	2	1	0	0
All other (describe in Part 6: Comments on page 6)	0	0	0	0
Totals	11	3	1	0

¹Count multiple connections or parallel installations as *separate* connections.

²Count only those connections with AG or RPBA installed for premises isolation. Don't include connections with in-premises protection only, or connections with DCVA/DCDAs installed for premises isolation.

³Count only those connections whose premises isolation preventers were inspected (AG) or tested (RPBA) during 2010.

Part 4A: Backflow Preventer Inventory and Testing Data During Year 2010

- Complete all cells. Enter zero (0) if there are no backflow preventers in that category.
- Count only the backflow preventers that the PWS relies upon for protection of the distribution system. If your records do not distinguish between premises isolation and in-premises protection preventers, enter all data in Premises Isolation section and check the box.
- Count AVBs on irrigation systems only. **If you do not track AVBs, enter "UNK"**.
- Count multiple tests or failures for any particular backflow preventer as one test or failure for that backflow preventer.
- Multiple Service or Parallel Connections: Count each assembly separately.
- Assemblies on Dedicated Fire or Irrigation Lines: Count as Premises Isolation Assemblies.

If PWS does not track AVBs Check here: ☒

Backflow Preventer Category and Testing/Inspection Information		Air Gap	RPBA	RPDA	DCVA	DCDA	PVBA	SVBA	AVB
Premises Isolation, including preventers isolating PWS-owned facilities. If In-Premises Protection preventers are also included, check here. <input type="checkbox"/>									
Rows 1-3 pertain ONLY to Premises Isolation preventers in service at beginning of 2010									
1	In service on 1/1/2010	0	23	0	40	1	0	0	unk
2	Inspected and/or Tested in 2010 ¹	0	15	0	33	1	0	0	unk
3	Failed Inspection or Test in 2010	0	3	0	2	0	0	0	unk
Rows 4 - 6 pertain ONLY to NEW Premises Isolation preventers installed during 2010									
4	New preventers installed in 2010 ²	0	0	0	2	4	0	0	unk
5	Inspected and/or Tested in 2010 ¹	0	0	0	2	4	0	0	unk
6	Failed inspection or test in 2010 ³	0	0	0	1	0	0	0	unk
7	Preventers taken out of service in 2010 ³	0	0	0	0	1	0	0	0
Premises Isolation Total at end of 2010 ⁴		0	23	0	42	4	0	0	unk
In-Premises Protection (Fixture Protection or Area Isolation), including preventers within PWS-owned facilities.									
Rows 8 - 10 pertain ONLY to In-Premises Protection Preventers in service at beginning of 2010									
8	In service on 1/1/2010	4	74	1	168	31	0	0	unk
9	Inspected and/or Tested in 2010 ¹	4	52	0	108	22	0	0	unk
10	Failed Inspection or Test in 2010	0	3	0	6	0	0	0	unk
Rows 11 - 13 pertain ONLY to NEW In-Premises Protection Preventers installed during 2010									
11	New preventers installed in 2010 ²	0	4	0	6	1	0	0	unk
12	Inspected and/or Tested in 2010 ¹	0	4	0	6	1	0	0	unk
13	Failed inspection or test in 2010	0	1	0	0	0	0	0	unk
14	Preventers taken out of service in 2010 ³	0	3	0	0	1	0	0	0
In-Premises Protection Total at end of 2010 ⁴		4	75	1	174	31	0	0	unk
Grand Total at end of 2010		4	98	1	216	35	0	0	unk

¹Initial and/or routine annual inspection (for proper installation and approval status) and/or test (for testable assemblies only using DOH/USC test procedures). Includes preventers installed on connections where backflow prevention was not previously required and any preventers that replaced those in service at beginning of 2010. Replacement preventers may be of a different type than the original.

²Includes preventers installed on connections where backflow prevention was not previously required and any preventers that replaced those in service at the beginning of 2010. Replacement preventers may be of a different type than the original.

³New or existing preventers taken out of service, whether or not they were replaced by the same type or different type of preventer.

⁴Total at end of 2010 should be equal to the number of preventers in service at beginning of 2010 plus those installed during 2010 minus the number of preventers taken out of service during 2010.

Part 4B: Other Implementation Activities in 2010

Complete all cells. Enter zero (0) if not applicable.

Activity or Condition	Number
New service connections evaluated for cross-connection hazards to PWS in 2010.	1
New service connections requiring backflow protection to protect PWS. ¹	1
Existing service connections evaluated for cross-connection hazards to PWS in 2010.	1
Existing service connections requiring backflow protection to protect PWS. ^{1,2}	1
Exceptions granted to high-hazard premises per WAC 246-290-490(4)(b) in 2010. ³	0
CCC enforcement actions taken by PWS during 2010. ⁴	0

¹Include services where either premises isolation or in-premises preventers were required to protect the PWS.²Include existing services that need new, additional or higher level backflow prevention.³A DOH Exceptions to Hazard Premises Form must be attached for each exception granted during the year.⁴"Enforcement actions" mean actions taken by the PWS (such as water shut-off, PWS installation of backflow preventer) when the customer fails to comply with PWS's CCC requirements.**Part 5: Backflow Incidents and "Off-Normal" Events in 2010**

Backflow Incidents, Risk Factors and Indicators during 2010	Number (Enter 0 if none)	Check if Data Not Available
Backflow Incidents during 2010		
1 Backflow incidents that contaminated the PWS ⁵ .	0	<input type="checkbox"/>
2 Backflow incidents that contaminated the customer's drinking water system only ⁵ .	0	<input checked="" type="checkbox"/>
Risk Factors for Backflow during 2010		
3 Distribution main breaks per 100 miles of pipe.	0.00	<input checked="" type="checkbox"/>
4 Low pressure events (<20 psi in PWS distribution system).	0	<input checked="" type="checkbox"/>
5 Water outage events.	0	<input checked="" type="checkbox"/>
Indicators of Possible Backflow during 2010		
6 Total health-related complaints received by PWS. ⁶	0	<input type="checkbox"/>
7 Received during BWA or PN events. ⁷	0	<input type="checkbox"/>
8 Received during low pressure or water outage events.	0	<input type="checkbox"/>
9 Total aesthetic complaints (color, taste, odor, air in lines, etc.).	0	<input checked="" type="checkbox"/>
10 Received during BWA or PN events. ⁷	0	<input type="checkbox"/>
11 Number of these complaints received during low pressure or water outages events.	0	<input type="checkbox"/>

⁵Complete and submit a Backflow Incident Report form for each known backflow incident.⁶Such as stomach ache, headache, vomiting, diarrhea, skin rashes, etc.⁷"BWA" means Boil Water Advisory and "PN" means Public Notification for water quality reasons.

Part 6: Comments and Clarifications

Enter comments or clarifications to any of the information included in this report. Note for on-screen completion: Comments will not "word wrap" from one line to the next. Press to continue on new line. Maximum length of each comment is 255 characters, including spaces.

Part No.	Date Added	Comment
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Part 7: Report Completion Information

I certify that the information provided in this CCC Activities Report is complete and accurate to the best of my knowledge.		
CCC Program Mgr. Name ¹ : Robert R. Heivilin		Title: Utility Person IV
Signature:		Date: 04/29/2011
Phone: (206) 362-8100	E-mail: bobh@shorelinewater.org	
I have reviewed this report and certify that the information provided is complete and accurate to the best of my knowledge.		
PWS Mgr./Owner Name ² : Denny Clouse		Title: Operations Manager
Signature:	Op. Cert. No.:	Date: 04/29/2011

¹ CCC Program Manager is generally the CCS who is responsible for development and implementation of the PWSs CCC Program.

² The person that the CCC Program Manager reports to or other manager having direct responsibility and/or oversight of the CCC program.

APPENDIX E



Office of D. i. king Water

Cross-Connection Control Program Summary Report For 2010

Describe the characteristics of the PWS's CCC Program at the end of 2011. Complete this form only if PWS had written CCC program plan, policies or procedures at end of 2011.

Part 1: Public Water System (PWS) Identification

PWS ID: 39600	PWS Name: SHORELINE WATER DISTRICT	Count: KING
---------------	------------------------------------	-------------

Part 2: Cross-Connection Control (CCC) Program Characteristics

A. Type of Program Currently Implemented

Type of Program	Check One
Premises isolation only.	<input type="checkbox"/>
Combination program: reliance on both premises isolation and in-premises protection.	<input checked="" type="checkbox"/>
In transition from a combination program to a premises isolation only program.	<input type="checkbox"/>

B. Coordination with Authority Having Jurisdiction (AHJ) on Cross-Connection Issues

Indicate the status of coordination with AHJs in your service area. The AHJ is the entity that enforces the Uniform Plumbing Code. Check one box in each of last 3 columns for each AHJ in your service area.

AHJ No.	Name of AHJ (e.g., the City or County Building Department)	PWS Currently:		AHJ Declined to Coordinate
		Coordinates with AHJ	Has Written Agreement with AHJ	
1	City of Shoreline	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>
2	City of Lake Forest Park	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>
3		Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
4		Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>
5		Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>

¹ If more than 5 AHJs, attach separate sheet giving the above information.

C. Corrective or Enforcement Actions Available to the Purveyor

Type of Corrective Action	Indicate Whether Available	Most Often Used (Check One)
Denial or discontinuance of water service.	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	<input checked="" type="checkbox"/>
Purveyor installs backflow preventer and bills customer.	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>	<input type="checkbox"/>
Assessment of fines (in addition to elimination or control of cross-connection).	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>
Other corrective actions (describe):	Y <input type="checkbox"/> N <input type="checkbox"/>	<input type="checkbox"/>

D. CCC Program Responsibilities

Do not include enforcement action related procedures or circumstances.

CCC Program Activity	Responsible Party (Check one per row)	
	Customer	Purveyor
Hazard Evaluation by DOH-certified CCS	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Backflow preventer (BP) ownership	<input checked="" type="checkbox"/>	<input type="checkbox"/>
BP installation	<input checked="" type="checkbox"/>	<input type="checkbox"/>
BP <i>initial</i> inspection (for proper installation - all BPs)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
BP <i>initial</i> test (for testable assemblies)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
BP <i>annual</i> inspection (Air Gaps and AVBs)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
BP <i>annual</i> test (for testable assemblies)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
BP maintenance and repair	<input checked="" type="checkbox"/>	<input type="checkbox"/>

E. Backflow Protection for Fire Protection SystemsPlease **remember to enter number of days allowed** if you require retrofitting.

PWS coordinates with AHJ on CCC issues for fire protection systems(FPS).	Y <input type="checkbox"/> N <input checked="" type="checkbox"/> N/A <input type="checkbox"/>
PWS coordinates with local Fire Marshal on CCC issues for FPS.	Y <input type="checkbox"/> N <input checked="" type="checkbox"/> N/A <input type="checkbox"/>
PWS ensures backflow prevention is installed before serving new connections with FPS.	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>
PWS requires retrofits to high-hazard FPS.	Y <input type="checkbox"/> No. of days allowed: 0 N <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
PWS requires retrofits to low -hazard FPS.	Y <input type="checkbox"/> No. of days allowed: 0 N <input checked="" type="checkbox"/> N/A <input type="checkbox"/>

F. Backflow Protection for Irrigation Systems

Minimum level of backflow prevention required on irrigation systems without chemical addition.	Not Addressed <input type="checkbox"/> AVB <input type="checkbox"/> PV/SVBA <input checked="" type="checkbox"/> DCVA <input type="checkbox"/> RPBA <input type="checkbox"/>
PWS currently inspects AVBs upon <i>initial</i> installation.	Y <input type="checkbox"/> N <input checked="" type="checkbox"/> N/A <input type="checkbox"/>
PWS currently inspects AVBs upon repair, reinstallation or relocation.	Y <input type="checkbox"/> N <input checked="" type="checkbox"/> N/A <input type="checkbox"/>

G. Used Water

PWS prohibits, by ordinance, rules, policy or agreement, the intentional return of used water (e.g. for heating or cooling) into the distribution system.	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>
If not prohibited at present, date plan to prohibit use.	N/A <input checked="" type="checkbox"/>
Current number of service connections returning used water to distribution system.	0

H. Backflow Protection for Auxiliary Water Supplies¹ NOT Interconnected with PWS

Indicate the minimum backflow preventer and type of protection required for service connections having unapproved auxiliary water supplies when they are NOT interconnected to the PWS. Check one box per row.

Existing service connections.	None <input checked="" type="checkbox"/> DCVA <input type="checkbox"/> RPBA <input type="checkbox"/> AG <input type="checkbox"/>
Type of protection required.	None <input type="checkbox"/> In-premises protection <input type="checkbox"/> Premises isolation <input type="checkbox"/>

New service connections.	None <input type="checkbox"/> DCVA <input type="checkbox"/> RPBA <input checked="" type="checkbox"/> AG <input type="checkbox"/>	Attachment A
Type of protection required.	None <input type="checkbox"/> In-premises protection <input type="checkbox"/> Premises isolation <input checked="" type="checkbox"/>	

¹ An auxiliary water supply is any water supply on or available to customer's premises in addition to the purveyor's potable water supply.

I. Backflow Protection for Tanker Trucks and Temporary Water Connections

Minimum level of backflow protection (installed on or associated with the truck) required for tanker trucks taking water from PWS.	AG <input type="checkbox"/> DCVA <input checked="" type="checkbox"/> RPBA <input type="checkbox"/> Not Specified <input type="checkbox"/> Tanker trucks not allowed <input type="checkbox"/>
PWS requires tanker trucks to obtain water at designated filling sites each equipped with permanently installed backflow preventer(s).	Y <input type="checkbox"/> (Min. protection: DCVA <input type="checkbox"/> RPBA <input type="checkbox"/>) N <input checked="" type="checkbox"/> N/A <input type="checkbox"/> No sites provided <input type="checkbox"/>
PWS currently accepts tanker trucks approved by other PWSs without further inspection or testing.	Y <input type="checkbox"/> N <input checked="" type="checkbox"/> N/A <input type="checkbox"/>
Minimum level of backflow protection required for temporary water connections (e.g. for construction sites).	AG <input type="checkbox"/> DCVA <input type="checkbox"/> RPBA <input type="checkbox"/> Not specified <input checked="" type="checkbox"/> Temp. connections not allowed <input type="checkbox"/>
PWS requires testing each time the temporary connection backflow preventer is relocated.	Y <input type="checkbox"/> N <input checked="" type="checkbox"/> N/A <input type="checkbox"/> (Temp. connections not allowed)
PWS provides approved backflow preventer for temporary connections.	Y <input checked="" type="checkbox"/> N <input type="checkbox"/> N/A <input type="checkbox"/> (Temp. connections not allowed)

J. Backflow Protection for Non-Residential Connections

For each category shown, indicate whether PWS has non-residential connections of that type and the **minimum** level of *premises isolation* backflow protection required (whether or not PWS currently has that type of customer).

Type of Connection	PWS has Customers of this Type	Minimum Premises Isolation Backflow Protection Required
Commercial	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Not Required <input checked="" type="checkbox"/> DCVA <input type="checkbox"/> RPBA <input type="checkbox"/>
Industrial	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>	Not Required <input type="checkbox"/> DCVA <input type="checkbox"/> RPBA <input type="checkbox"/>
Institutional	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Not Required <input checked="" type="checkbox"/> DCVA <input type="checkbox"/> RPBA <input type="checkbox"/>

K. Backflow Protection for Wholesale Customers

Indicate whether the PWS requires backflow protection at interties with wholesale customers (other PWSs).

Type of Intertie	PWS has (plans to have) Customers of this Type	Backflow Protection Required
Existing	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Not specified / Not required <input type="checkbox"/> Always required <input checked="" type="checkbox"/> Required only if purchaser's CCC program is inadequate <input type="checkbox"/> Minimum required (if applicable): DCVA <input type="checkbox"/> RPBA <input checked="" type="checkbox"/>
New	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>	Not specified / Not required <input type="checkbox"/> Always Required <input type="checkbox"/> Required only if purchaser's CCC program is inadequate <input type="checkbox"/> Minimum required (if applicable): DCVA <input type="checkbox"/> RPBA <input type="checkbox"/>

L. Exceptions to Mandatory Premises Isolation

PWS's written CCC Program Plan <i>allows</i> system to grant Exceptions to mandatory premises isolation per WAC 246-290-490(4)(b)(iii).	Y <input type="checkbox"/> N <input type="checkbox"/> Doesn't Address <input checked="" type="checkbox"/>
PWS currently grants new Exceptions.	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>
PWS granted Exceptions in previous reporting years.	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>

Part 3: CCC Program Record-Keeping and Inventory

Indicate the type or name of computer software used by the PWS to track CCC records.

Cross-Track (BMI) <input type="checkbox"/>	BPMS <input checked="" type="checkbox"/>	XC2 (Engsoft) <input type="checkbox"/>	Tokay <input type="checkbox"/>	Other commercial CCC software (specify) <input type="checkbox"/>
Custom developed for or by PWS ¹ <input type="checkbox"/>	Other non-CCC software (e.g. Excel) <input type="checkbox"/>	None Used <input type="checkbox"/>		

¹ Do not include commercial CCC software customized for PWS. If PWS uses customized commercial software, check the box for the appropriate commercial software name.

Part 4: Comments and Clarifications

Enter comments or clarifications to any of the information provided in this report.

Part No.	Date Added	Comment

Part 5: CCC Program Summary Completion Information

I certify that the information provided in this CCC Program Summary is complete and accurate to the best of my knowledge.		
CCC Program Mgr. Name ¹ : Robert R. Heivilin		Title: Utility Person IV
Signature:		Date: 04/29/2011
Phone: (206) 362-8100	E-mail*: bobh@shorelinewater.org	
I certify that the information provided in this report accurately represents the status and description of this water system's CCC Program.		
PWS Mgr/Owner Name ² : Denny Clouse		Title: Operations Manager
Signature:	Op. Cert. No.:	Date: 04/29/2011

*Required Field. For security reasons, an e-mail address must be provided. DOH will e-mail you to confirm any changes made to your data

¹ The CCC Program Manager is generally the CCS responsible for developing and implementing the PWS's CCC program.

² The person that the CCC Program Manager reports to or other manager having direct responsibility and/or oversight of the CCC program. This person doesn't need to be in charge of the entire water system.

APPENDIX F



1519 NE 177th St. • P.O. Box 55367 • Shoreline, WA 98155 • Phone: 206.362.8100 • Fax: 206.361.0629

Annual Backflow Prevention Assembly Testing Notice

June 21, 2012

TEST FORM DUE NO LATER THAN: July 21, 2012

Customer Name
Address
Shoreline, WA 98155

Re: Backflow Prevention Assembly Test Due
Raferty - 16329 35 AVE NE

Dear Customer,

Our records indicate the following backflow prevention assemblies are located at your facility. These backflow prevention assemblies must be tested and certified, as required by State and local regulatory authority, no later than the date indicated: **July 21, 2012.**

The purpose of the program is to protect the integrity of the water distribution system as well as the health, safety and general welfare of customers like you who use it. Backflow prevention assembly tests are required to be completed annually on all backflow devices installed on your property and the completed test forms submitted and kept on file at Shoreline Water District. A certified backflow prevention assembly tester must perform the annual backflow prevention assembly test and certification. The backflow tester you choose may submit your test results to Shoreline Water District, however, the owner is ultimately responsible for submitting the test results. Shoreline Water District is not responsible for the expense of testing your backflow prevention assembly(s).

Please note that if your system is not brought into compliance, tested and evidence of compliance provided to the Shoreline Water District within 30 days from the date of this letter, the Shoreline Water District may discontinue water service to this address until evidence of your system's compliance has been provided. Your prompt attention to this matter will avoid disruption of your water service.

If you have any questions regarding the above backflow testing requirements, please call: (206) 362-8100

Sincerely,

Bob Heivilin
Utility Person 4
Cross-Connection Control Program
(206) 362-8100

Assemblies Due to be Tested:

Type	Mfr	Size	Model	SN	Due
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1519 NE 177th St. • P.O. Box 55367 • Shoreline, WA 98155 • Phone: 206.362.8100 • Fax: 206.361.0629

Annual Backflow Prevention Assembly Testing Notice

SECOND NOTICE

June 21, 2012

TEST FORM DUE NO LATER THAN: July 21, 2012

Customer Name
Address
Shoreline, WA 98155

Re: Backflow Prevention Assembly Test Over Due
Raferty - 16329 35 AVE NE

Dear Customer,

Our records indicate that we have not received current test reports for the following backflow prevention assemblies are located at your facility. This is our second notice in this regard. A previous notice was sent on: **06/21/12**. These backflow prevention assemblies must be tested and certified, as required by State and local regulatory authority, no later than the date indicated: **July 21, 2012**.

The purpose of the program is to protect the integrity of the water distribution system as well as the health, safety and general welfare of customers like you who use it. Backflow prevention assembly tests are required to be completed annually on all backflow devices installed on your property and the originals submitted and kept on file at Shoreline Water District. A certified backflow prevention assembly tester must perform the annual backflow prevention assembly test and certification. The owner are responsible for submitting the test results to Shoreline Water District. Shoreline Water District is not responsible for the expense of testing your backflow prevention assembly(s).

Please note that if your system is not brought into compliance, tested and evidence of compliance provided to the Shoreline Water District within 15 days from the date of this letter, the Shoreline Water District may discontinue water service to this address until evidence of your system's compliance has been provided. Your prompt attention to this matter will avoid disruption of your water service.

If you have any questions regarding the above backflow testing requirements, please call: (206) 362-8100

Sincerely,

Bob Heivilin
Utility Person 4
Cross-Connection Control Program
(206) 362-8100

Assemblies Due to be Tested:

Type	Mfr	Size	Model	SN	Due
------	-----	------	-------	----	-----



1519 NE 177th St. • P.O. Box 55367 • Shoreline, WA 98155 • Phone: 206.362.8100 • Fax: 206.361.0629

Annual Backflow Prevention Assembly Testing Shut-Off Notice

June 21, 2012

TEST FORM DUE NO LATER THAN: July 21, 2012

Customer Name
Address
Shoreline, WA 98155

Facility Name
Located at 12345 Main St., Shoreline, WA 98155

Dear Customer,

This is our third and FINAL notice in this regard. Our records indicate that we have not received the annual test reports on the following backflow prevention assembly:

We have previously sent you notices on the following dates:

June 21, 2012
00/00/00

In order for backflow prevention assemblies to continue to operate efficiently they must be tested and serviced when required. As well, in order to comply with the enabling legislation the listed backflow prevention assemblies must be tested annually by a certified and licensed tester. This letter is to give you notice that the requested tests must be completed and the necessary inspection forms returned to this office within **5 days** of the date of this letter or the water service to the subject premises may be discontinued without further notice. Completed test forms may be delivered to the address below:

Shoreline Water District
1519 NE 177th St.
Shoreline, WA 98155
or Fax: 206-361-0629

You are hereby notified that the water supply to the above noted premises will be discontinued if the backflow prevention assemblies are not tested within 5 days. Water service may not be resumed until testing of backflow prevention assemblies has been completed and the resulting fees have been paid.

If you have any questions, do feel free to contact the Cross Connection Control Supervisor at the above address or you may phone **(206) 362-8100**.

Sincerely,

Bob Heivilin

Over Due Backflow Assemblies:

Type	Mfr	Size	Model	SN	Due
------	-----	------	-------	----	-----

There are no BFP Assembly records at this Facility which are overdue for testing at this time.

BACKFLOW PREVENTION ASSEMBLY TEST REPORT

Return reports to:

Attachment A
Shoreline Water District
Water Quality / Backflow
Prevention
PO Box 55367
Shoreline WA 98155

FAX: (206) 361-0629

Assembly ID _____ Schedule Code _____ Authorized Tester: _____

Facility Name _____ Commercial: ☐ Residential: ☐

Mailing Address _____

Service Address _____ City: _____ Zip: _____

Contact Name _____ Phone: _____ FAX: _____

Equip Location _____

Hazard Type _____ DCVA ☐ RPBA ☐ PVBA ☐ AG ☐ Other _____

New Install ☐ Existing ☐ Replacement ☐ Old SN# _____ Proper Installation? ☐ Yes ☐ No

Make of Assembly: _____ Model: _____ Serial Number _____ Size: _____

Initial Test	DCVA / RPBA CHECK VALVE #1	DCVA / RPBA CHECK VALVE #2	RPBA	PVBA/SVBA
Passed <input type="checkbox"/> Failed <input type="checkbox"/>	Leaked <input type="checkbox"/> _____ PSID	Leaked <input type="checkbox"/> _____ PSID	Opened at _____ PSID #1 Check _____ PSID Air Gap OK _____	Air Inlet Opened at _____ PSID Did not Open <input type="checkbox"/>
New Parts and Repairs	Clean Replace Part <input type="checkbox"/> <input type="checkbox"/> _____ <input type="checkbox"/> <input type="checkbox"/> _____ <input type="checkbox"/> <input type="checkbox"/> _____ <input type="checkbox"/> <input type="checkbox"/> _____	Clean Replace Part <input type="checkbox"/> <input type="checkbox"/> _____ <input type="checkbox"/> <input type="checkbox"/> _____ <input type="checkbox"/> <input type="checkbox"/> _____ <input type="checkbox"/> <input type="checkbox"/> _____	Clean Replace Part <input type="checkbox"/> <input type="checkbox"/> _____ <input type="checkbox"/> <input type="checkbox"/> _____ <input type="checkbox"/> <input type="checkbox"/> _____ <input type="checkbox"/> <input type="checkbox"/> _____	Check Valve Held at _____ PSID Leaked <input type="checkbox"/> Cleaned <input type="checkbox"/> Repaired <input type="checkbox"/>
Test After Repairs Passed <input type="checkbox"/> Failed <input type="checkbox"/>	Leaked <input type="checkbox"/> _____ PSID	Leaked <input type="checkbox"/> _____ PSID	Opened at _____ PSID #1 Check _____ PSID	Air Inlet _____ PSID Check Valve _____ PSID

Air Gap Inspection: Supply Pipe Diameter: _____ " Separation: _____ " Pass ☐ Fail ☐

Remarks: _____ ☐ USC 10th Edit. Line Pressure _____ PSI

☐ Confined Space

Tester Signature: _____ Cert. No.: _____ Date: _____

Tester Name Printed: _____ Testers Phone # () _____

Repaired By: _____ Date: _____

Final Test By: _____ Cert. No.: _____ Date: _____

Calibration Date: _____ Make/Model: _____ Gauge # _____

APPENDIX G



Water Usage Questionnaire

Multi-Family (Duplex or more) / Commercial /

Multi-Family / Commercial / Industrial / Fire / Irrigation / Construction

PLEASE RETURN THIS COMPLETED FORM TO: **Shoreline Water District**
Attn: Water Quality Division
1519 NE 177th Street
Shoreline, WA 98155

Today's Date _____ Meter Application # _____

Project Name _____ WSEA # _____

Business Name _____

Business Type _____

Physical Property Address _____

City _____ State _____ Zip code _____

Property Owner _____

Mailing Address _____

Mailing City _____ State _____ Zip code _____

Contact Person _____ Phone Number _____

(1) Please indicate if your facility has, or will have, any of the following:

	Yes	No		Yes	No
Air conditioning system	<input type="checkbox"/>	<input type="checkbox"/>	Chemical feed tank for industrial process	<input type="checkbox"/>	<input type="checkbox"/>
Air washer	<input type="checkbox"/>	<input type="checkbox"/>	Chemical feed (<i>commercial cleaners</i>)	<input type="checkbox"/>	<input type="checkbox"/>
Aquarium make-up water	<input type="checkbox"/>	<input type="checkbox"/>	Chlorinators	<input type="checkbox"/>	<input type="checkbox"/>
Aspirator, chemical	<input type="checkbox"/>	<input type="checkbox"/>	Computer cooling lines	<input type="checkbox"/>	<input type="checkbox"/>
(<i>Herbicide, pesticide, weedicide</i>)			Condensate tanks	<input type="checkbox"/>	<input type="checkbox"/>
Aspirator, Medical / lab	<input type="checkbox"/>	<input type="checkbox"/>	Cooling towers	<input type="checkbox"/>	<input type="checkbox"/>
Autoclave	<input type="checkbox"/>	<input type="checkbox"/>	Decorative ponds	<input type="checkbox"/>	<input type="checkbox"/>
Autopsy table	<input type="checkbox"/>	<input type="checkbox"/>	Degreasing equipment	<input type="checkbox"/>	<input type="checkbox"/>
Auxiliary Water System	<input type="checkbox"/>	<input type="checkbox"/>	Dental equipment / cuspidors	<input type="checkbox"/>	<input type="checkbox"/>
(<i>Well, pond, creek, other</i>)			Dialysis equipment	<input type="checkbox"/>	<input type="checkbox"/>
Baptismal fountain	<input type="checkbox"/>	<input type="checkbox"/>	Dye vats and tanks	<input type="checkbox"/>	<input type="checkbox"/>
Bathtub, below rim filler	<input type="checkbox"/>	<input type="checkbox"/>	Etching tanks	<input type="checkbox"/>	<input type="checkbox"/>
Bedpan washer	<input type="checkbox"/>	<input type="checkbox"/>	Fermenting tanks	<input type="checkbox"/>	<input type="checkbox"/>
Beverage dispenser (<i>post-mix Co2</i>)	<input type="checkbox"/>	<input type="checkbox"/>	Fertilizer injection	<input type="checkbox"/>	<input type="checkbox"/>
Boiler feed lines	<input type="checkbox"/>	<input type="checkbox"/>	Film processors	<input type="checkbox"/>	<input type="checkbox"/>

	Yes	No		Yes	No
Bottle washing equipment	<input type="checkbox"/>	<input type="checkbox"/>	Fire Department pumper connections	<input type="checkbox"/>	<input type="checkbox"/>
Box hydrant (<i>irrigation</i>)	<input type="checkbox"/>	<input type="checkbox"/>	Fire system (<i>with booster pump</i>)	<input type="checkbox"/>	<input type="checkbox"/>
Building three stories or more tall	<input type="checkbox"/>	<input type="checkbox"/>	Fire system (<i>without chemicals</i>)	<input type="checkbox"/>	<input type="checkbox"/>
Car wash	<input type="checkbox"/>	<input type="checkbox"/>	Fire system (<i>with antifreeze or chemicals</i>)	<input type="checkbox"/>	<input type="checkbox"/>
Fume hoods (<i>lab</i>)	<input type="checkbox"/>	<input type="checkbox"/>	Livestock drinking tanks	<input type="checkbox"/>	<input type="checkbox"/>
Garbage can washers	<input type="checkbox"/>	<input type="checkbox"/>	Make-up tanks	<input type="checkbox"/>	<input type="checkbox"/>
Heat exchangers	<input type="checkbox"/>	<input type="checkbox"/>	Photo developing sinks / tanks	<input type="checkbox"/>	<input type="checkbox"/>
(<i>other than double wall with leak path</i>)			Pump prime lines	<input type="checkbox"/>	<input type="checkbox"/>
Heat pumps	<input type="checkbox"/>	<input type="checkbox"/>	Radiant heat system (with chemicals)	<input type="checkbox"/>	<input type="checkbox"/>
High pressure washers	<input type="checkbox"/>	<input type="checkbox"/>	Radiator flushing equipment	<input type="checkbox"/>	<input type="checkbox"/>
Hot tubs (<i>direct water connection</i>)	<input type="checkbox"/>	<input type="checkbox"/>	Recreational vehicle sewage dump	<input type="checkbox"/>	<input type="checkbox"/>
Hot water heating boilers	<input type="checkbox"/>	<input type="checkbox"/>	Sewer connected equipment	<input type="checkbox"/>	<input type="checkbox"/>
Hydrotherapy baths	<input type="checkbox"/>	<input type="checkbox"/>	Solar water heating system	<input type="checkbox"/>	<input type="checkbox"/>
Ice makers	<input type="checkbox"/>	<input type="checkbox"/>	Spas	<input type="checkbox"/>	<input type="checkbox"/>
Industrial fluid systems	<input type="checkbox"/>	<input type="checkbox"/>	Steam generating equipment	<input type="checkbox"/>	<input type="checkbox"/>
Irrigation system (<i>no chemicals</i>)	<input type="checkbox"/>	<input type="checkbox"/>	Still	<input type="checkbox"/>	<input type="checkbox"/>
Irrigation system (<i>chemical</i>)	<input type="checkbox"/>	<input type="checkbox"/>	Swimming pools	<input type="checkbox"/>	<input type="checkbox"/>
Laboratory equipment	<input type="checkbox"/>	<input type="checkbox"/>	Trap primers	<input type="checkbox"/>	<input type="checkbox"/>
Laundry machines (<i>commercial</i>)	<input type="checkbox"/>	<input type="checkbox"/>	Used, reclaimed or gray water systems	<input type="checkbox"/>	<input type="checkbox"/>
			X-ray equipment	<input type="checkbox"/>	<input type="checkbox"/>

(2) Are you aware of any existing backflow protection located at this property?

Please describe _____

(3) Please provide the name of all products or chemicals that are mixed with water at your location:

(4) Please provide the name of all products or chemicals that are stored in bulk at your location:

Name of person completing this form _____

THIS SECTION TO BE COMPLETED BY SWD CCS/WQ						
TYPE OF WATER USE	HAZARD ASSESSMENT		BACKFLOW PROTECTION REQUIRED			
	LOW	HIGH	DCVA	DCDA	RPBA	RPDA
DOMESTIC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IRRIGATION	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FIRE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

BACKFLOW REQUIRED?	<input type="checkbox"/> YES	<input type="checkbox"/> NO	CCS INITIALS
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Single Family Residential Water Usage Questionnaire

PLEASE RETURN THIS COMPLETED FORM TO:

**Shoreline Water District
Attn: Water Quality Division
1519 NE 177th Street
Shoreline, WA 98155**

Today's Date _____

Meter Application # _____

Physical Property Address _____

City _____ State _____ Zip code _____

Property Owner _____

Mailing Address _____

Mailing City _____ State _____ Zip code _____

Contact Person _____ Phone Number _____

(1) Please indicate if your residence has, or will have, any of the following:

	Yes	No		Yes	No
Aspirator, chemical (Herbicide, pesticide, weedicide)	<input type="checkbox"/>	<input type="checkbox"/>	Hot tubs (direct water connection)	<input type="checkbox"/>	<input type="checkbox"/>
Auxiliary Water System (Well, pond, creek, other)	<input type="checkbox"/>	<input type="checkbox"/>	Hot water heating boilers	<input type="checkbox"/>	<input type="checkbox"/>
Bathtub, below rim filler	<input type="checkbox"/>	<input type="checkbox"/>	Irrigation system (no chemicals)	<input type="checkbox"/>	<input type="checkbox"/>
Boiler feed lines	<input type="checkbox"/>	<input type="checkbox"/>	Irrigation system (chemical)	<input type="checkbox"/>	<input type="checkbox"/>
Building three stories or more tall	<input type="checkbox"/>	<input type="checkbox"/>	Fire system (with antifreeze or chemicals)	<input type="checkbox"/>	<input type="checkbox"/>
Computer cooling lines	<input type="checkbox"/>	<input type="checkbox"/>	Livestock drinking tanks	<input type="checkbox"/>	<input type="checkbox"/>
Decorative ponds	<input type="checkbox"/>	<input type="checkbox"/>	Radiant heat system (with chemicals)	<input type="checkbox"/>	<input type="checkbox"/>
Dialysis equipment	<input type="checkbox"/>	<input type="checkbox"/>	Recreational vehicle sewage dump	<input type="checkbox"/>	<input type="checkbox"/>
Fertilizer injection	<input type="checkbox"/>	<input type="checkbox"/>	Sewer connected equipment	<input type="checkbox"/>	<input type="checkbox"/>
Fire system (with booster pump)	<input type="checkbox"/>	<input type="checkbox"/>	Solar water heating system	<input type="checkbox"/>	<input type="checkbox"/>
Fire system (without chemicals)	<input type="checkbox"/>	<input type="checkbox"/>	Swimming pools	<input type="checkbox"/>	<input type="checkbox"/>
			Trap primers	<input type="checkbox"/>	<input type="checkbox"/>
			Used, reclaimed or gray water systems	<input type="checkbox"/>	<input type="checkbox"/>

(2) Are you aware of any existing backflow protection located at this property?

Please describe _____

Name of person completing this form _____

THIS SECTION TO BE COMPLETED BY SWD CCS/WQ						
TYPE OF WATER USE	HAZARD ASSESSMENT		BACKFLOW PROTECTION REQUIRED			
	LOW	HIGH	DCVA	DCDA	RPBA	RPDA
DOMESTIC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IRRIGATION	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FIRE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

BACKFLOW REQUIRED?	<input type="checkbox"/> YES	NO <input type="checkbox"/>	CCS INITIALS
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APPENDIX H



Cross-Connection Control Program BACKFLOW INCIDENT REPORT FORM

Note: use this form to comply with WAC 246-290-490(8)(g).

Part 1: Public Water System (PWS) Information

PWS ID:	PWS	Name:	Count	y:
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Part 2: Backflow Incident Information

A. Incident Identification

Incident date:	Time of incident:	Incident ID (DOH use):
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B. Information on Premises where Backflow Originated

Name of premises:	
Premises physical address:	
City:	,WA Zip:
Premises type: non-residential <input type="checkbox"/> residential <input type="checkbox"/>	
Premises category/description (Table 9 category*, if applicable):	
Most recent hazard evaluation prior to incident (mm/dd/yyyy): None <input type="checkbox"/>	
PWS's assessed hazard level:	Premises isolation required by PWS? Yes <input type="checkbox"/> No <input type="checkbox"/>
Type of backflow preventer required by PWS:	PWS relies on in-premises protection? Yes <input type="checkbox"/> No <input type="checkbox"/>
Other hazard evaluation information:	

*See WAC 246-290-490(4)(b)(i).

C. Method of Discovery of Backflow

How the backflow was discovered (check all that apply):	Direct observation	<input type="checkbox"/>	Water quality complaint	<input type="checkbox"/>
	Meter running backwards	<input type="checkbox"/>	Illness/injury complaint	<input type="checkbox"/>
	Water use decrease	<input type="checkbox"/>	Result of Investigation	<input type="checkbox"/>
	Disinfectant residual monitoring ...	<input type="checkbox"/>	Other (Describe):	<input type="checkbox"/>
	Water quality monitoring	<input type="checkbox"/>		
Incident reported to the public water system by:	PWS Personnel <input type="checkbox"/> Premises Owner/Occupant <input type="checkbox"/> Other PWS Customer <input type="checkbox"/>			
	Backflow Assembly Tester <input type="checkbox"/> Other (Specify):			

D. Contaminant Information

Contaminant type (check all that apply):	Microbiological <input type="checkbox"/>	Chemical <input type="checkbox"/>	Physical <input type="checkbox"/>
Describe contaminant (for example, the organism name, chemical, etc.). Please attach lab analysis or MSDS, if available.			

E. Extent and Effects of Contamination

Estimated extent of contamination:	Contained within premises <input type="checkbox"/> Entered PWS distribution system <input type="checkbox"/>
Estimated number of connections affected:	Residential <input type="checkbox"/> Non-residential <input type="checkbox"/>
Estimated population affected or at risk:	Residential <input type="checkbox"/> Non-residential <input type="checkbox"/>
Number water quality complaints:	Describe water quality complaints:
Number illnesses reported:	Describe illnesses/irritation (specific illnesses, if known):
Number physical injuries(e.g. burns) or irritation(e.g. rashes) cases reported:	

Part 3: Cross-Connection Control Information at Backflow Site

A. Source of Contaminant

Source of contaminant or fixture type (check all that apply):	Air conditioner/heat exchanger	<input type="checkbox"/>	Industrial/commercial process	
	Auxiliary water supply	<input type="checkbox"/>	water/fluid.....	<input type="checkbox"/>
	Beverage machine	<input type="checkbox"/>	Medical/dental fixture	<input type="checkbox"/>
	Boiler, hot water system	<input type="checkbox"/>	Reclaimed water system.....	<input type="checkbox"/>
	Chemical injector/aspirator	<input type="checkbox"/>	Swimming pools, spa	<input type="checkbox"/>
	Fire protection system	<input type="checkbox"/>	Wastewater (sewage) system	<input type="checkbox"/>
	Irrigation system (PWS supplied)	<input type="checkbox"/>	Other (specify):	<input type="checkbox"/>
			

B. Distribution System Pressure Conditions in the Vicinity of the Backflow Incident

Type of backflow:	Backsiphonage <input type="checkbox"/>	Typical distribution system pressure in vicinity of incident (if range, enter lower end of range):	psi	
	Backpressure <input type="checkbox"/>			
Main/pressure status at time of incident (check all that apply):	Normal	<input type="checkbox"/>	Source/plant outage	<input type="checkbox"/>
	Main break	<input type="checkbox"/>	Scheduled water shutoff by PWS	<input type="checkbox"/>
	Fire fighting	<input type="checkbox"/>	Unscheduled/emergency shutoff	<input type="checkbox"/>
	Other high usage	<input type="checkbox"/>	Unknown	<input type="checkbox"/>
	Power outage	<input type="checkbox"/>	Other (specify)	<input type="checkbox"/>

Describe causes and circumstances leading to backflow:
.....
.....
.....

C. Backflow Preventer Information/Installation/Approval Status at Site of Backflow

Complete the tables in C and D for the *premises isolation* preventer for either of the following situations:

- If a premises isolation backflow preventer is installed **and** the contaminant entered the PWS distribution system.
- If the premises isolation assembly is the only backflow preventer at the site.

In all other cases, complete tables in C and D for the *in-premises* backflow preventer installed at the fixture. If more than one backflow preventer was involved in the backflow incident, copy tables C and D and complete them for the additional preventer(s).

If no backflow preventer was installed at the time the incident occurred, check this box ☐ and go directly to Part 4. Don't fill out the tables below (in C and D).

Backflow preventer information:	Type installed:	Installed for:
	Make:	Model: Size:
	Serial number:	Date installed:
Installation status (check all that apply):	Properly installed/plumbed <input type="checkbox"/> Improperly protected bypass present <input type="checkbox"/> Improperly installed/plumbed <input type="checkbox"/> If so, explain:	
Commensurate with assessed degree of hazard?	Yes <input type="checkbox"/> No <input type="checkbox"/>	If not, explain:
DOH/USC-approved at time of backflow incident?	Yes <input type="checkbox"/> No <input type="checkbox"/>	If not, approved when installed? Yes <input type="checkbox"/> No <input type="checkbox"/>

D. Backflow Preventer Inspection/Testing Information at Site of Backflow

Most recent inspection/test information <i>prior</i> to backflow incident. Attach test report(s), if available.	No test report on record	<input type="checkbox"/>
	Date tested/inspected:	
	Passed test/inspection <i>without</i> repairs	<input type="checkbox"/>
	Failed initial test/inspection, passed <i>after</i> repair	<input type="checkbox"/>
Inspection/test information <i>after</i> backflow incident [per WAC 246-290-490(7)(b)]. Attach test report.	Failed test/inspection, no repairs made	<input type="checkbox"/>
	Not tested/inspected	<input type="checkbox"/>
	Date tested/inspected:	
	Passed test/inspection <i>without</i> repairs	<input type="checkbox"/>
Preventer failure information , if applicable (check all that apply):	Failed initial test/inspection, passed <i>after</i> repair.....	<input type="checkbox"/>
	Failed test/inspection, no repairs made.....	<input type="checkbox"/>
	Fouled check	<input type="checkbox"/> Damaged seat <input type="checkbox"/>
	Debris	<input type="checkbox"/> Other: <input type="checkbox"/>
If preventer failed inspection/test, did failure allow backflow?	Weather-related damage	<input type="checkbox"/>
	Yes <input type="checkbox"/> No <input type="checkbox"/> If yes, explain:	

Part 4: Corrective Action/Notifications

Action taken by PWS to restore water quality (check all that apply):	None	<input type="checkbox"/>	Other treatment (describe):	<input type="checkbox"/>
	Flushed/cleaned mains	<input type="checkbox"/>	Replaced mains	<input type="checkbox"/>
	Flushed/cleaned plumbing...	<input type="checkbox"/>	Replaced plumbing	<input type="checkbox"/>
	Disinfected mains	<input type="checkbox"/>	Other:	<input type="checkbox"/>
	Disinfected plumbing	<input type="checkbox"/>		
Action ordered by PWS to correct cross-connection (check all that apply):	None	<input type="checkbox"/>	Change existing preventer	<input type="checkbox"/>
	Eliminate cross-connection...	<input type="checkbox"/>	Repair/replumb	<input type="checkbox"/>
	Remove by-pass	<input type="checkbox"/>	Reinstall correctly	<input type="checkbox"/>
	Install new preventer ...	<input type="checkbox"/>	Replace with same type	<input type="checkbox"/>
	For <i>premises isolation</i>	<input type="checkbox"/>	Upgrade type	<input type="checkbox"/>
	For <i>fixture protection</i>	<input type="checkbox"/>	Other:	<input type="checkbox"/>
Action ordered accomplished?	Yes <input type="checkbox"/> Date:	No <input type="checkbox"/> If no, explain:		
Agency notifications per WAC 246-290-490(8)(f) (check all that apply):	DOH <input type="checkbox"/> Local Health Agency <input type="checkbox"/> Local Adm. Authority <input type="checkbox"/>	Issued by end of next business day:		
Notifications of consumers in area of incident (check all that apply):	Population at risk <input type="checkbox"/> Public notification (PN per DOH regs.) <input type="checkbox"/>	Boil Water Advisory <input type="checkbox"/> Other (describe):		
Other enforcement/corrective actions (describe):				

Part 5: Cost of Backflow Incident (optional)

Item	PWS Personnel Hours Expended	Cost to PWS (\$)	Cost to Premises Owner (\$)
Investigation			
Restoration of water quality			
Correction of cross-connection situation			
Litigation and/or settlement			
Other not included in above			

Part 6: Further Information/Documentation

Additional information about this incident such as pictures, sketches, newspaper/journal articles, water quality analyses, epidemiological reports, etc. would be helpful. Information may be in electronic form or hard copy.

Part 7: Form Completion Information

Note: Form should be completed by a person currently certified as a Cross-Connection Control Specialist.

I certify that the information provided in this Backflow Incident Report is complete and accurate to the best of my knowledge.			
CCC Program Mgr. Name (print):		Title:	
Signature:		CCS Cert. Number:	Date:
Phone:	E-m	ail:	
I have reviewed this report and certify that the information is complete and accurate to the best of my knowledge.			
PWS Mgr./Representative Name (Print):		Title:	
Signature:		Op. Cert. Number:	Date:

Please send completed backflow incident form:

By mail to:

Washington State Department of Health
Office of Drinking Water – CCC Program Manager
P O Box 47822
Olympia, WA 98504-7822

By email to: terri.notestine@doh.wa.gov or cccprogram@doh.wa.gov

Please send questions, comments, or suggestions about this form to us at the address above or e-mail them to cccprogram@doh.wa.gov

If you need this publication in an alternate format, call (800) 525-0127. For TTY/TDD, call (800) 833-6388.

APPENDIX I

King County: Certified Backflow Assembly Testers

BAT #	Name	Contact Number
B5680	Akins, Tom	(253) 970 - 2673
B5046	Allenfort, Jack	(425) 495 - 1939
B4454	Anderson, Scott	(206) 660 - 8763
B0255	Angus, Clifford	(206) 762 - 5900
B0815	Arndt, Larry	(206) 522 - 1830
B5710	Atkinson, Craig	(206) 714 - 4879
B3086	Attaway, Ron	(206) 947 - 0852
B4107	Babbel, Byron	(206) 242 - 3085
B5656	Bargelski, Chris	(206) 779 - 4016
B4123	Barth, James	(425) 766 - 2968
B5698	Baskin, Ron	(425) 443 - 5977
B4142	Bauer, Jacob	(206) 786 - 3460
B3632	Baxmann, Dale	(206) 795 - 9192
B4810	Beck, John	(253) 854 - 7228
B4811	Bellamy, Gordon	(206) 250 - 4120
B4345	Berenshtein, Uri	(206) 571 - 8804
B5031	Boe, Lance	(253) 839 - 3186
B3684	Borchardt, Rock	(425) 483 - 7202
B5433	Bowden, Thomas	(425) 260 - 5589
B3424	Brezina, Charles	(253) 941 - 6817
B0546	Broten, George	(206) 930 - 2867
B4203	Brown, Ronald	(425) 821 - 6801
B5657	Brown, Chris	(253) 273 - 9942
B5554	Bushman, Chad	(206) 651 - 6049
B2993	Bushong, Aaron	(425) 531 - 0805
B3751	Calis, Simon	(253) 405 - 2356
B2560	Carucci, Frank	(206) 781 - 8288
B5561	Chapman, Thomas	(206) 909 - 3071
B0030	Cole, Darren	(206) 528 - 2148
B0475	Collier, Michael	(206) 246 - 5325
B5528	Crosby, Stephen	(425) 361 - 1054
B5040	Cruz, Antonio	(206) 251 - 6753
B4027	Cuthbert, Rian	(253) 874 - 0186
B5756	Czarnecki, Nick	(206) 850 - 0171
B5251	Dantic, Jose	(425) 430 - 2442
B2681	Dennehy, Patrick	(206) 818 - 3559
B4296	Deraitus, Joshua	(253) 941 - 8383
B4981	Dixon, Mark	(206) 306 - 7083
B0838	Dochnahl, Richard	(425) 888 - 0433
B4982	Drexler, Joshua	(253) 720 - 0262

B1584	Dulin, Kevin	(425) 432 - 4590
B5562	Dunn, Tamar	(206) 772 - 2583
B2121	Dupleich, Bradley	(253) 854 - 0714
B1253	Edlund, Marilyn	(425) 255 - 5726
B5622	Ellisor, Stephen	(425) 269 - 4793
B4310	Elwanger, Jeffrey	(253) 691 - 5370
B5006	Finh, Gary	(206) 799 - 3845
B5025	Fisher, Scott	(425) 531 - 4192
B5590	Flannery, Jason	(425) 247 - 4242
B4250	Flowers, Ernest	(425) 254 - 8417
B2939	Foster, Ben	(206) 784 - 6161
B4541	Gallagher, Kevin	(425) 235 - 9962
B3945	Gardner, Daniel	(206) 440 - 9077
B3395	Garnett, Nils	(253) 838 - 9780
B5685	Gilbert, Dan	(206) 595 - 6272
B5539	Gilbreath, Jr., Odell	(206) 949 - 7955
B1423	Gittings, Michael	(253) 297 - 4387
B3198	Good, Bruce	(206) 322 - 3000
B3592	Graham, Kenneth	(253) 838 - 9780
B5263	Grant, Travis	(425) 449 - 2072
B4491	Guitierrez, Salvador	(253) 638 - 2080
B3946	Hale, Jeffrey	(206) 241 - 5909
B4103	Hanson, Loren	(425) 427 - 8889
B3088	Hanson, William	(206) 634 - 2461
B4728	Hasme, Michael	(206) 764 - 7006
B4704	Holt, John	(425) 888 - 1234
B5543	Holtzclaw, John	(360) 403 - 7325
B5471	Hulke, David	(206) 633 - 1700
B4088	Johnson, Anthony	(206) 909 - 2886
B4450	Jordison, Chad	(253) 639 - 9820
B0973	Keeney, George	(425) 487 - 2180
B5579	Keith, Kenneth	(206) 762 - 1450
B5648	Kilmer, Bruce	(425) 623 - 6533
B1208	Koch, Karl	(206) 762 - 3311
B5281	Kottwitz, Jonathan	(425) 398 - 9294
B5297	Kottwitz, Pamela	(425) 273 - 4512
B5253	Krieg, Jim	(206) 550 - 2173
B1345	Kroeger, James	(425) 486 - 1442
B4804	Lamb, Justin	(425) 220 - 5103
B5364	Landeck, Nathan	(206) 724 - 3250
B5759	Larson, Stephen	(206) 371 - 5629
B5565	Laufasa, John	(206) 949 - 5970
B4209	Law, Marcus	(206) 835 - 0763

B4832	Lindstrom, Paul	(206) 243 - 2384
B4179	Malavotte, Ronald	(360) 825 - 6417
B4730	Mann, Raymond	(253) 333 - 7720
B5592	Mauter, Stephen	(425) 890 - 1432
B3950	McClain, Scott	(206) 571 - 6164
B2298	McCulloch, Allen	(253) 859 - 1388
B2995	McKay, Grant	(425) 864 - 2300
B0205	McLaughlin, Dennis	(206) 364 - 9531
B4253	McLaughlin, Dominic	(206) 890 - 8337
B5255	Meister, John	(253) 468 - 7064
B5117	Meyer, Randall	(253) 826 - 0099
B4363	Miedema, Harley	(206) 463 - 6193
B4818	Miller, Jr., Larry	(206) 227 - 6643
B5349	Minisci, Jeffrey	(360) 340 - 0753
B3781	Mock, Steve	(253) 373 - 0377
B5289	Montoya, Augustine	(206) 422 - 9035
B4634	Morris, Stuart	(206) 628 - 5073
B5581	Murphy, Paul	(253) 606 - 3373
B3646	Nadeau, Jeffrey	(206) 783 - 4315
B2426	Nardone, Vince	(425) 481 - 2919
B1503	Nelson, Patricia	(425) 392 - 1523
B5440	Newhall, Greg	(425) 462 - 8200
B5688	Nickel, Mitchell	(206) 575 - 1962
B5320	No, Sung	(425) 686 - 4441
B5175	Norris, Jeffery	(425) 275 - 1207
B3361	Olivas, Gabriel	(425) 687 - 6368
B3933	Olsen, Frank	(253) 261 - 5839
B4706	O'Neill, Joshua	(253) 670 - 3038
B2809	Peters, James	(206) 764 - 1689
B4287	Pfeiffer, Linda	(425) 333 - 4934
B3951	Pitzl, Darren	(206) 241 - 5909
B4578	Pylkki, Eric	(425) 754 - 8383
B4090	Rhome, Richard	(206) 241 - 5909
B5061	Richards, Kirk	(425) 864 - 4953
B4779	Riehl, Kelly	(800) 869 - 6980
B5304	Romulo, Mariano	(206) 255 - 2971
B5596	Salter, James	(206) 551 - 5174
B5243	Sanders, Christopher	(206) 658 - 7925
B5496	Saulibio, Leslie	(206) 353 - 3616
B4672	Sayre, Zaran	(253) 941 - 4012
B5556	Schafle, Edward	(425) 747 - 5643
B4906	Scheuffele, Brook	(206) 375 - 0971
B5036	Seil, Mark	(425) 888 - 9535

B3255	Simkins, Jeremy	(425) 277 - 2888
B4495	Sizemore, John	(253) 638 - 6448
B3937	Smith, Gary	(425) 681 - 4048
B3265	Smith, Jeffrey	(425) 454 - 1190
B3953	Sorenson, Trisha	(425) 239 - 1372
B5692	Spiry, James	(206) 510 - 6558
B3337	Stalkfleet, Jeffery	(425) 303 - 0828
B5244	Strand, Vette	(425) 359 - 7777
B3834	Stuppi, Andrew	(253) 200 - 1661
B5225	Sutton, Chris	(425) 277 - 2888
B5206	Swanson, Toby	(206) 538 - 4821
B1528	Taller, Jr., Joseph	(253) 854 - 5291
B3284	Taylor, Charles	(425) 430 - 4473
B5499	Treharne, Darren	(425) 443 - 0921
B5738	Volynets, Alex	(877) 899 - 3473
B4708	Wagner, Ken	(206) 248 - 2340
B5446	Walsh, Michael	(206) 992 - 1389
B5502	Wayman, Scott	(425) 844 - 9319
B5271	Winterbourne, Gram	(425) 836 - 5193
B4101	Wu, Ying Tak	(206) 542 - 9284
B4334	Yanes, Melvin	(425) 271 - 5598
B5568	Yolian, Mesrop	(206) 261 - 9084

APPENDIX J

Common Household Hazards

Chemical Spray Applicators

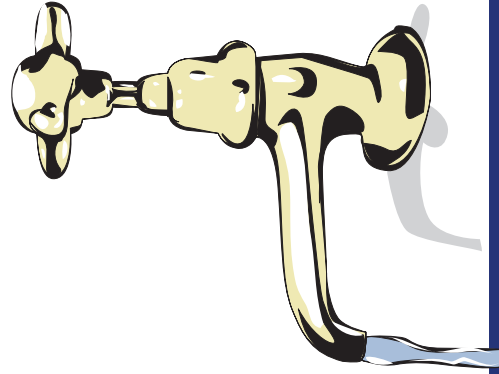
The chemicals used on your lawn and garden can be toxic or fatal if ingested. These chemicals include pesticides, herbicides, and fertilizers. Even strong cleaning chemicals sprayed on cars, house siding, etc., may cause health problems if ingested.

Submerged Hoses

Water held in pools, ponds or other vats open to the air and exposed to humans or animals may contain microbiological contaminants. Hoses submerged in buckets or containers can act as a conduit for contaminants under backflow conditions.

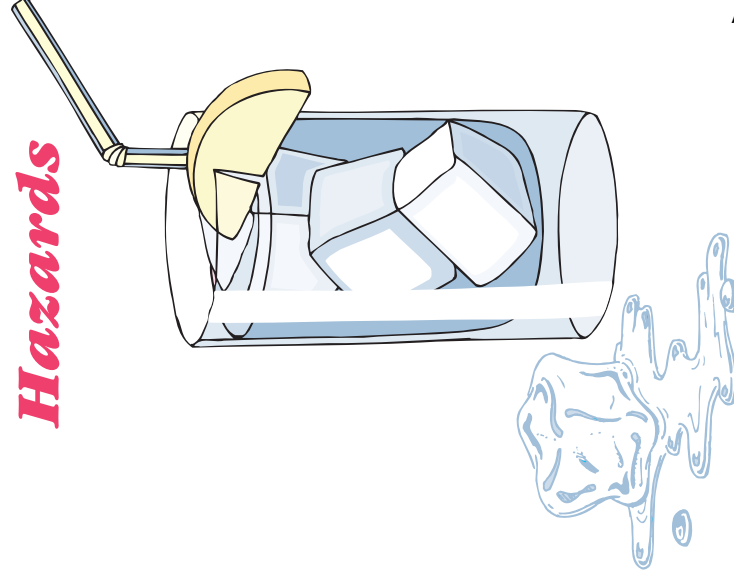
Underground Lawn Irrigation Systems

Underground irrigation systems often have puddles of standing water around the ground-level sprinkler heads. The sprinkler heads **are not** designed to be drip-tight under backflow conditions. The puddles of water may contain microbiological contaminants, such as excrement from animals or chemical residue from fertilizer and herbicides sprayed on the lawn.



Help protect your Drinking Water from Contamination

Household Hazards



For further
information
contact your
local water
purveyor or the
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Control Committee
through the
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or on the web at
www.pnws-awwa.org

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How Contamination Occurs

Water normally flows in one direction, from the public water system through the customer's cold or hot water plumbing to a sink tap or other plumbing fixture. The plumbing fixture is the end of the potable water system and the start of the waste disposal system.

Under certain conditions water can flow in the reverse direction. This is known as **backflow**. Backflow occurs when a backsiphonage or backpressure condition is created in a water line.

Backsiphonage may occur due to a loss of pressure in the water distribution system during a high withdrawal of water for fire protection, a water main or plumbing system break, or a shutdown of a water main or plumbing system for repair. A reduction of pressure below atmospheric pressure creates a vacuum in the piping. If a hose bib was open and the hose was submerged in a wading pool during these conditions, the non-potable water in the pool would be siphoned into the house's plumbing and back into the public water system.

Backpressure may be created when a source of pressure, such as a pump, creates a pressure greater than that supplied from the distribution system. If a pump supplied from a non-potable source, such as a landscape pond, was accidentally connected to the plumbing system, the non-potable water could be pumped into the potable water supply.

How to Prevent Contamination of Your Drinking Water

Protect your drinking water by taking the following precautions:

Don't:

- Submerge hoses in buckets, pools, tubs, sinks, ponds, etc.
- Use spray attachments without a backflow prevention device.
- Connect waste pipes from water softeners or other treatment systems to the sewer, submerged drain pipe, etc.
- Use a hose to unplug blocked toilets, sewers, etc.

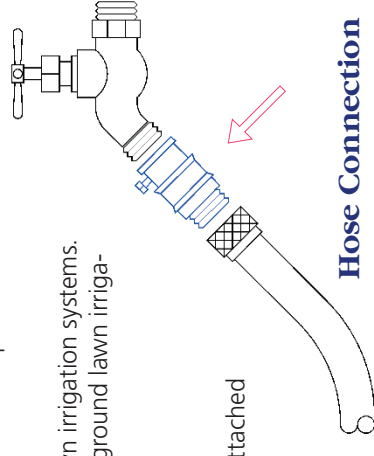
Do:

- ✓ Keep the ends of hoses clear of all possible contaminants.
- ✓ If not already equipped with an integral (built-in) vacuum breaker, buy and install hose bib type vacuum breakers on all threaded faucets around your home. These devices are inexpensive and are available at hardware stores and home improvement centers.
- ✓ Install an approved backflow prevention assembly on all underground lawn irrigation systems. Remember, a plumbing permit is required for the connection of an underground lawn irrigation system to your plumbing system.

Hose Connection Vacuum Breaker

Hose connection vacuum breakers are specifically made for portable hoses attached to threaded faucets. Their purpose is to prevent the flow of contaminated water back into the drinking water. These devices screw directly to the faucet outlet. They can be used on a wide variety of installations, such as service sinks, hose faucets near a wading pool, laundry tub faucets, etc.

Some units are designed for manual draining for freezing conditions. Some are furnished with breakaway set screws as a tamper proof feature. These device are not intended for operation under continuous pressure.



Protection of the Water Purveyor's Distribution System

In general, the installation of plumbing in compliance with the plumbing code will provide adequate protection for your plumbing system from contamination.

However, the water purveyor may require (as a condition of service) the installation of a backflow prevention assembly on the water service to provide additional protection for the public water system. A backflow prevention assembly will normally be required where a single-family residence has special plumbing that increases the hazard above the normal level found in residential homes, or where a hazard survey cannot be completed.

To help determine if a backflow prevention assembly is required, the water purveyor may send residential customers a Cross Connection Control Survey Questionnaire. The water purveyor will evaluate the returned questionnaires to assess the risk of contamination to the public water system. Based on the results of the evaluation, the installation of backflow prevention assemblies may be required on services to some customers.

Attachment A

What is a Cross Connection?

A cross connection is a point in a plumbing system where the potable water supply is connected to a non-potable source. Briefly, a cross connection exists whenever the drinking water system is or could be connected to any non-potable source (plumbing fixture, equipment used in any plumbing system). Pollutants or contaminants can enter the safe drinking water system through uncontrolled cross connections when backflow occurs.

Backflow is the unwanted flow of non-potable substances back into the consumer's plumbing system and/or public water system (i.e., drinking water).

There are two types of backflow: **backsiphonage** and **backpressure**. **Backsiphonage** is caused by a negative pressure in the supply line to a facility or plumbing fixture. Backsiphonage may occur during waterline breaks, when repairs are made to the waterlines, when shutting off the water supply, etc.

Backpressure can occur when the potable water supply is connected to another system operated at a higher pressure or has the ability to create pressure. Principal causes are booster pumps, pressure vessels and elevated plumbing.

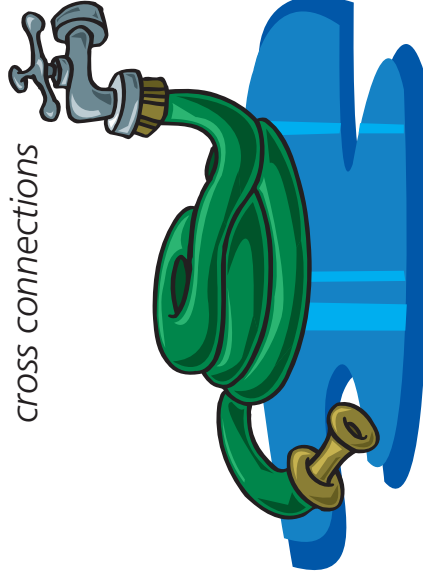
Backflow preventers are mechanical devices designed to prevent backflow through cross connections. However, for backflow preventers to protect as designed, they must meet stringent installation requirements.

For further
information
contact your
local water
purveyor or the
PNWS/AWWA
Cross-Connection
Control Committee
through the
PNWS office at
(877) 767-2992
or on the web at
www.pnws-awwa.org

Cross Connections can create *Health Hazards*

Drinking water systems
may become

Polluted
or
Contaminated
through uncontrolled
cross connections



Attachment A



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Pacific Northwest Section

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Why Be Concerned?

Most water systems in the United States and Canada have good sources of water and/or sophisticated treatment plants to convert impure water to meet drinking water standards. Millions of dollars are spent to make the water potable before it enters the distribution system so most water purveyors think that their supplies are not in jeopardy from this point on. Studies have proven this to be wrong. Drinking water systems may become polluted or contaminated in the distribution system through uncontrolled cross connections.

Cross connections are installed each day in the United States because people are unaware of the problems they can create. Death, illness, contaminated food products, industrial and chemical products rendered useless are some of the consequences of such connections. As a result, many hours and dollars are lost due to **cross connections**.

Where are Cross Connections Found?

Cross connections are found in all plumbing systems. It is important that each cross connection be identified and evaluated as to the type of backflow protection required to protect the drinking water supply. Some plumbing fixtures have built-in backflow protection in the form of a physical air gap. However, most cross connections will need to be controlled through the installation of an approved mechanical backflow prevention device or assembly. Some common cross connections found in plumbing and water systems include:

1. Wash basins and service sinks.
2. Hose bibs.
3. Irrigation sprinkler systems.
4. Auxiliary water supplies.
5. Laboratory and aspirator equipment.
6. Photo developing equipment.
7. Processing tanks.
8. Boilers.
9. Water recirculating systems.
10. Swimming pools.
11. Solar heat systems.
12. Fire sprinkler systems.

Every water system has cross connections. Plumbing codes and State drinking water regulations require cross connections to be controlled by approved methods (physical air gap) or approved mechanical backflow prevention devices or assemblies. The various types of mechanical backflow preventers include: reduced pressure backflow assembly (RPBA), reduced pressure detector assembly (RPDA), double check valve assembly (DCVA), double check detector assembly (DCDA), pressure vacuum breaker assembly (PVBA), spill resistant vacuum breaker assembly (SVBA) and atmospheric vacuum breaker (AVB).

For a backflow preventer to provide proper protection, it must be approved for backflow protection, designed for the degree of hazard and backflow it is controlling, installed correctly, tested annually by a State certified tester, and repaired as necessary. Some states require mandatory backflow protection on certain facilities where high health-hazard-type cross connections are normally found. The following is a partial list of those facilities:

1. Hospitals, mortuaries, clinics.
2. Laboratories.
3. Food and beverage processing centers.
4. Metal plating and chemical plants.
5. Car washes.
6. Petroleum processing and storage plants.
7. Piers and docks.
8. Sewage treatment plants.

What to Do?

It is impossible to cover all of the information pertaining to cross connections in a pamphlet. We hope the preceding information will inspire you to further educate yourself on the hazards of unprotected cross connections. Cross connection control manuals and training schools are offered throughout the Northwest. Information on manuals, schools and cross connection control can be obtained from:

Washington

Department of Health
Airdustrial Way, Bldg. 3
P.O. Box 47822
Olympia WA 98504-7822
(360) 236-3133

Oregon

Oregon Health Division
3420 Cherry Av NE, #110
Keizer OR 97303
(503) 373-7201

British Columbia, Canada

BC Water & Waste Association
Ste. 342 – 17 Fawcett Road
Coquitlam B.C. V3K 6V2
(604) 540-0111

Idaho

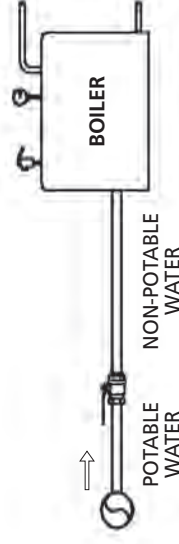
Idaho Division of Environment
1410 N Hilton
Boise ID 83706
(208) 373-0275

Additional sources of information may be found on the PNWS-AWWA web site:
www.pnws-awwa.org

Attachment A

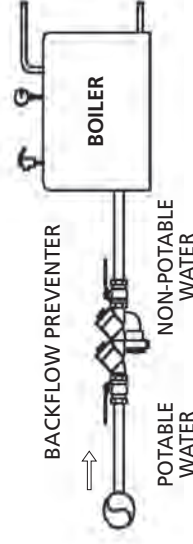
Wrong:

Uncontrolled Cross Connection



Right:

Controlled Cross Connection



Flow-through protection systems are those systems that do not have fire department pumper connections. They are constructed of approved potable water piping and materials to which sprinkler heads are attached. The system terminates at a connection to a toilet or other plumbing fixture to prevent the water from becoming stagnant.

Combination protection systems also do not have fire department pumper connections and are constructed of approved potable water piping and materials that serve both the fire sprinkler system and the consumer's potable water system.

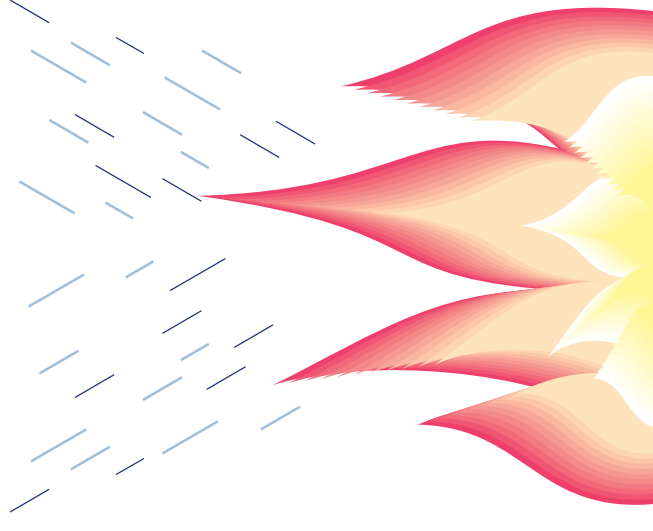
Both of the above two systems do not require backflow preventers because they are connected directly to the potable water and inherently designed to potable water standards.

Closed fire protection systems are separated from the potable water system by the minimum use of a Double Check Valve Assembly (DCVA) as long as no chemicals are used and a Reduced Pressure Backflow Assembly (RPBA) if chemicals are used. Closed systems may have a fire department pumper connection.

Note:

1. The water purveyor must be consulted for proper backflow prevention requirements.
2. It is important to have the system engineered hydraulically. The NFPA standards 13 and/or 13D must be considered when designing the fire system.
3. Flow and pressure may not be adequate for fire protection.
4. A plumbing and/or fire permit may be required prior to starting the project.
5. A system is less expensive to install at initial house construction.
6. Some water purveyor's requirements may be more stringent than others – consult you local purveyor for requirements.

Residential Fire Sprinkler Systems and Backflow Prevention



For further
information
contact your
local water
purveyor or the
PNWS/AWWA
Cross-Connection
Control Committee
through the
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Attachment A

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Residential Fire Sprinkler Systems

Residential fire sprinklers are in greater demand today than ever before. Personal fire safety is such a trend that in many areas ordinances or resolutions require fire sprinklers on all new residential construction.

Residential fire sprinkler systems help save lives and reduce property damage. However, from the water purveyor's point of view, the residential fire sprinkler system presents a potential pollutant and/or contaminant source to the potable water system from cross-connections. Both homeowners and the public may be exposed to health hazards from residential fire sprinkler systems. Such hazards include stagnant water, non-potable piping, heterotrophic bacteria, and chemicals. Therefore these systems must be evaluated for health and system hazards.

The following minimal information should be considered in the selection of backflow protection on residential fire sprinkler systems.

Residential fire sprinkler systems are categorized as **flow-through**, **combination**, and **closed** fire protection systems. Each of these systems has their advantages and disadvantages. It should also be noted that what the local fire departments, local administrative authorities and water purveyors will determine which of these systems can be found in any particular jurisdiction. It is imperative that the water purveyor, local administrative authority, fire department, and other agencies coordinate their efforts in the design and operation of these systems.

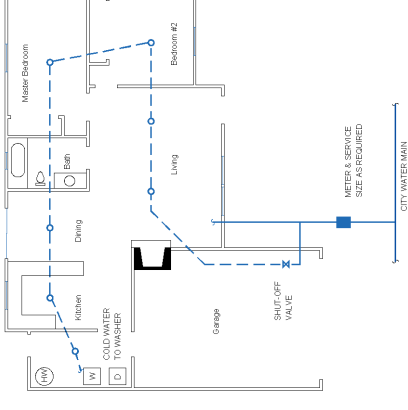
Flow-Through Fire Protection Systems

Advantages

1. Contains no standing or stagnant water.
2. No backflow protection is required.
3. Usually requires a single meter.

Disadvantages

1. Service line, meter and plumbing system must be designed hydraulically to supply both domestic and fire flow requirements.
2. Sprinkler system must have connection at the end to a clothes washer, dishwasher, toilet or other fixture to prevent water from becoming stagnant.



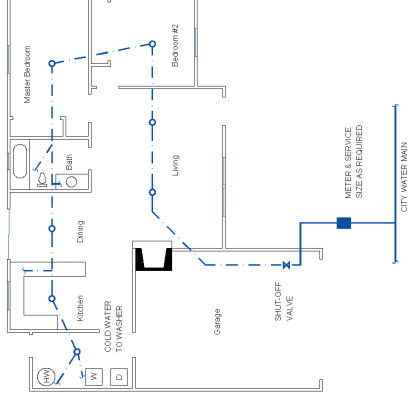
Combination Protection Systems

Advantages

1. Contains no standing or stagnant water.
2. No backflow protection is required.
3. Usually requires a single meter.
4. Water use throughout the potable water system eliminates need for water use at the end of the system.

Disadvantages

1. The service line, meter and plumbing system must be designed hydraulically to supply both domestic and fire flow requirements.



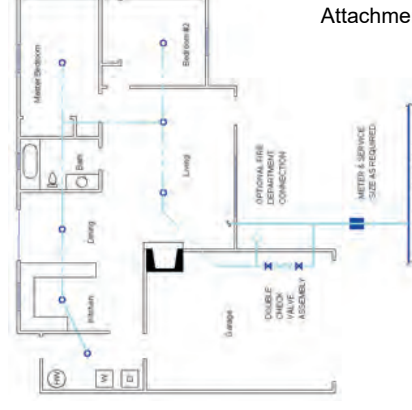
Closed Fire Protection Systems

Advantages

1. Installing a separately metered service line may be cheaper than upgrading an existing service.
2. A fire service rate is usually cheaper than a residential service rate.

Disadvantages

1. Approved backflow preventers must be installed, thereby increasing the homeowner's cost by its initial installation, and thereafter for annual testing and maintenance.
2. When chemicals are added to the fire sprinkler system to prevent freezing, a high health hazard exists. This requires a higher, more expensive, level of protection, i.e., a Reduced Pressure Backflow Assembly (RPBA).
3. If the fire service and domestic service are combined, the fire service may not be turned off because of safety reasons.



Approved Backflow Assemblies

The water purveyor relies on approved backflow prevention assemblies to protect the public water system. Approved assemblies are manufactured with isolation valves and test cocks to permit field-testing to demonstrate that the assemblies are properly functioning to prevent backflow.

In addition to the above assemblies, plumbing codes also allow the use of atmospheric vacuum breakers (AVB) on lawn irrigation systems without chemical addition. Because an atmospheric vacuum breaker is not designed to be tested, some water purveyors require the installation of approved, testable assemblies. Contact your water purveyor regarding the requirements for isolation of your lawn irrigation system.

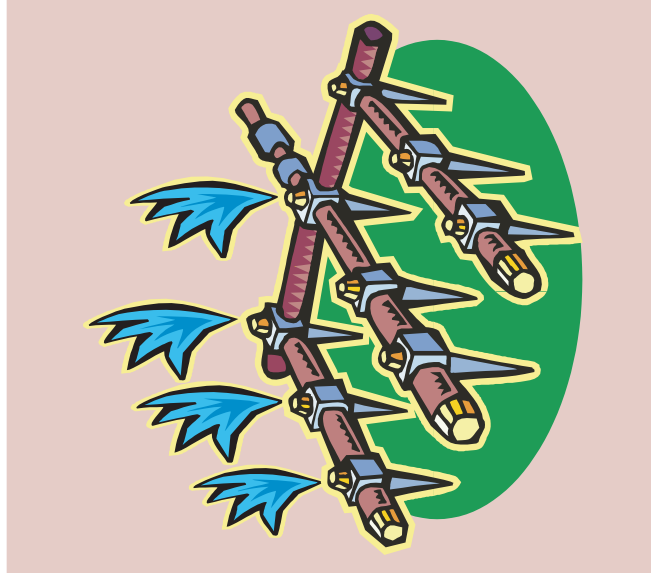
Note:

All irrigation piping should be considered a non-potable water system due to an actual or potential health hazard.

For further
information
contact your
local water
purveyor or the
PNWS/AWWA
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Lawn Irrigation Systems and Backflow Prevention



Attachment A



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Lawn (Turf) Irrigation Systems

For the protection of the water purveyor's distribution system, all irrigation systems must have an approved backflow prevention assembly that is compatible with the degree of hazard. Irrigation systems are categorized as high health hazard or moderate health hazard as defined below.

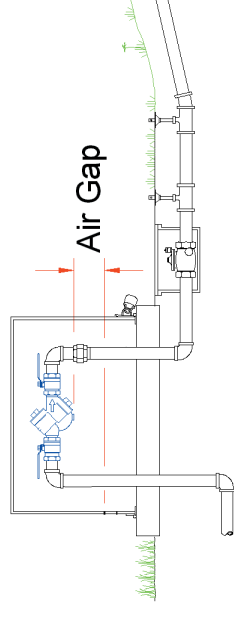
Any irrigation system that contains pumps or injectors for the addition of chemicals and/or fertilizers is considered a high hazard. This risk assessment is also based on the additional hazard posed by bacterial contaminants found on lawns, and on the possibility of changes being made to the irrigation system by the customer. An approved reduced pressure backflow assembly (RPBA), or an approved air gap separation, should be required in all cases where chemicals or herbicides may be injected into the irrigation system, or where an auxiliary water supply is also provided for irrigation water.

All irrigation systems that are not classified as a high health hazard are considered to be moderate health hazards. This risk assessment is based on the hazard posed by bacterial and chemical contaminants found on lawns, and on the possibility of changes being made to the irrigation system by the customer. An approved double check valve assembly (DCVA), or pressure vacuum breaker assembly (PVBA), should be required.

However, an approved PVBA does not provide adequate protection if it is subjected to flooding, back-pressure, elevated piping, or if compressed air is used to winterize the irrigation system. In these situations, an approved DCVA should be required as a minimum level of protection.

Reduced Pressure Backflow Assembly for Isolation of Lawn Irrigation System

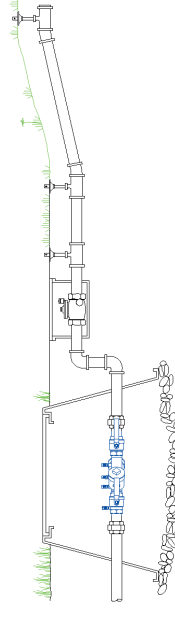
- The reduced pressure backflow assembly (RPBA) should be installed to isolate irrigation systems using injectors or pumps to apply fertilizer and other agricultural chemicals.
- The RPBA must be installed above ground to prevent the relief valve opening from becoming submerged.
- The RPBA should be installed in an insulated enclosure to provide freeze protection.
- The RPBA should be tested by a certified backflow assembly tester upon installation, after repair or relocation, and at least annually.



***Reduced Pressure Backflow Assembly
in Above-Ground Enclosure***

Double Check Valve Assembly for Isolation of Lawn Irrigation System

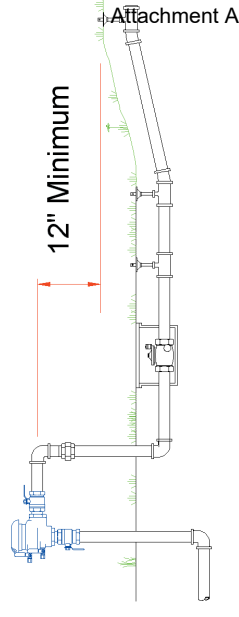
- The double check valve assembly (DCVA) may be installed to isolate all irrigation systems that do not use injectors or pumps to apply fertilizer and other agricultural chemicals.
- The DCVA may be installed in a below-ground enclosure provided the assembly test cocks are plugged; the test cocks are pointed up; adequate space is provided for maintenance and testing; and any compressed air connections are installed only downstream of the DCVA.
- The DCVA shall be tested by a certified backflow assembly tester upon installation, after repair or relocation, and at least annually.



***Double Check Valve Assembly
in Below-Ground Box***

Pressure Vacuum Breaker Assembly for Isolation of Lawn Irrigation Systems

- The pressure vacuum breaker assembly (PVBA) may be installed to isolate all irrigation systems that do not use injectors or pumps to apply fertilizer and other agricultural chemicals.
- The PVBA shall be installed at least 12 inches above the highest point in the irrigation piping.
- The PVBA shall be tested by a certified backflow assembly tester upon installation, after repair or relocation, and at least annually.



Pressure Vacuum Breaker Assembly

Protection from Thermal Expansion

Protection from thermal expansion is provided in a plumbing system by the installation of a **thermal expansion tank** and a **temperature and pressure relief valve** (T & P Valve) at the top of the tank.

The thermal expansion tank controls the increased pressure generated within the normal operating temperature range of the water heater. The small tank with a sealed compressible air cushion provides a space to store and hold the additional expanded water volume.

The T & P Valve is the primary safety feature for the water heater. The **temperature** portion of the T & P Valve is designed to open and vent water to the atmosphere whenever the water temperature within the tank reaches approximately 210° F (99° C). Venting allows cold water to enter the tank.

The **pressure** portion of a T & P Valve is designed to open and vent to the atmosphere whenever water pressure within the tank exceeds the pressure setting on the valve. The T & P Valve is normally pre-set at 125 psi or 150 psi.

Water heaters installed in compliance with the current plumbing code will have the required T & P Valve and thermal expansion tank. For public health protection, the water purveyor may require the installation of a check valve or backflow preventer downstream of the water meter. In these situations, it is essential that a T & P Valve and thermal expansion tank be properly installed and maintained in the plumbing system.

For further information contact your local water purveyor, City or County building department, licensed plumber or the

PNWS/AWWA

Cross-Connection Control Committee

through the

PNWS office at

(877) 767-2992

or on the web at

www.pnws-awwa.org

© 2009 R 11/09 [Brochure #5]

Protect Your Water Heater from Thermal Expansion

Without a functioning Temperature & Pressure Relief Valve your water heater can



American Water Works Association
Pacific Northwest Section

Attachment A

Thermal Expansion Danger

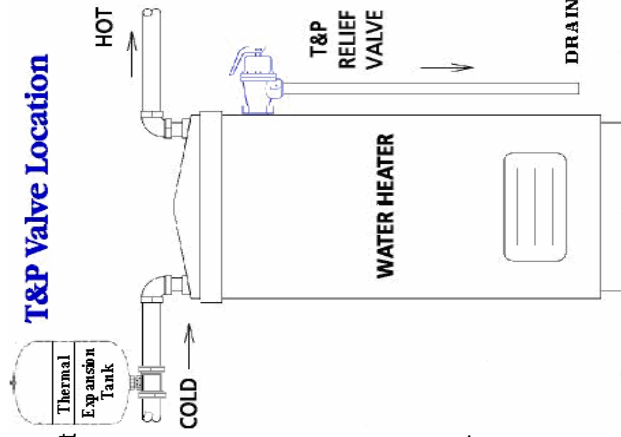
Most homes are supplied with hot water from an electric or gas heated tank. Until the heating element stops working, and one is faced with a cold shower, the water heater is usually taken for granted. However, if not properly maintained, a water heater may become a safety hazard.

Water expands in volume as its temperature rises. The extra volume caused by thermal expansion must go somewhere. If not, the heated water creates an increase in pressure. This is the principle of a steam engine.

The temperature and pressure in the water heater is reduced when hot water is withdrawn from a faucet and cold water enters the tank. The increase in pressure from thermal expansion can also be reduced by water flowing back into the public water system. However, when a check valve, pressure-reducing valve or backflow preventer is installed in the service pipe a "closed system" is created. Provisions must be made for thermal expansion in these cases.

The thermostat of the water heater normally maintains the water temperature at about 130° F (54° C). However, if the thermostat fails to shut off the heater, the temperature of the water will continue to increase.

If the water temperature increases to more than 212° F (100° C), the water within the tank becomes "super heated". When this super heated water is suddenly exposed to the atmosphere when a faucet is opened, it instantly turns to steam. As the pressure within the tank continues to build up under super heated conditions, the tank may explode.



What the Homeowner Should Do to Ensure Protection from Thermal Expansion

- The homeowner should check to see that an expansion tank and T & P Valve are in place.
- If there is any doubt, the homeowner should contact a licensed plumber.
- The T & P Valve should be periodically inspected to ensure that it is properly operating.
- Some T & P Valves are equipped with a test lever. Manually lifting the lever unseats the valve, allowing water to discharge. If water continues to leak from the T & P Valve after closing, the valve may need to be replaced. A drain line must be installed to avoid water damage and scalding injury when the valve operates.
- The T & P Valve should be periodically removed and visually inspected for corrosion deposits and to insure it has not been improperly altered or repaired.
- Installation specifications may vary; the above work can best be done by a licensed plumber. Installations should always be in accordance with Manufacturers Instructions.

Why the Installation of a Backflow Preventer is Required on a Water Service

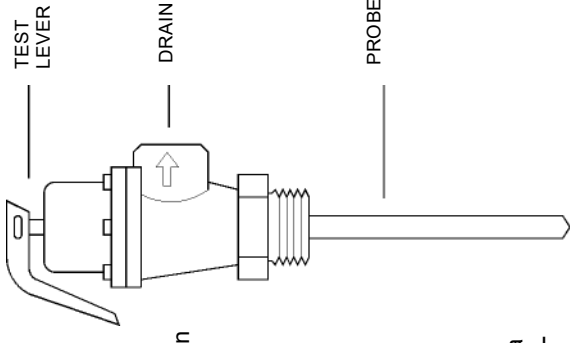
Water normally flows in one direction, from the public water system through the customer's cold or hot water plumbing to a sink tap or other plumbing fixture. The plumbing fixture is the end of the potable water system and the start of the waste disposal system.

Under certain conditions water can flow in the reverse direction. This is known as **backflow**. Backflow occurs when a backsiphonage or backpressure condition is created in a water line.

Backsiphonage may occur due to a loss of pressure in the water distribution system during a high withdrawal of water for fire protection, a water main or plumbing system break, or a shutdown of a main or plumbing system for repair. A reduction of pressure below atmospheric pressure creates a vacuum in the piping. If a hose bib was open and a flowing hose was submerged in a wading pool during these conditions, the non-potable water in the pool would be siphoned into the house plumbing then back into the public water system.

Backpressure may be created when a source of pressure, such as a pump, creates a pressure greater than that supplied from the distribution system. If a pump supplied from a non-potable source, such as a landscape pond, were accidentally connected to the plumbing system, the non-potable water could be pumped into the potable water supply.

Typical T&P Valve





**NORTH CITY WATER DISTRICT
RESOLUTION 2018.11.37**

**A RESOLUTION UPDATING APENDEX F IN NORTH CITY WATER
DISTRICT'S CROSS-CONNECTION CONTROL PROGRAM**

Background

1. North City Water District adopted the most recent version of the Cross Connection Control Program on December 18, 2012 by Resolution 2012.12.93.
2. Appendix F of the Cross-Connection Control Program included sample letters and test forms to be sent to NCWD customers reminding them of the annual backflow testing.
3. The District staff is recommending these letters be updated to better educate and support customer, improve customer compliance with backflow testing regulations and better meet the needs of the cross-control program.
4. The District staff is also recommending an additional letter be added which can be used as a door hanger when no response is received using all available contact data.
5. The District staff has drafted three updated letters to be used as cross-connection control letters to customers, and one new letter to be used as a door hanger.

Action


IT IS RESOLVED THAT:

6. The Board of Commissioners approve the update of the Cross Connection Control Program Appendix F by replacing the existing customer letters with the updated customer letters contained in Attachment B and adding the new letter contained in Attachment C.

ADOPTED by the Board of Commissioners of North City Water District at a public meeting this 20th day of November 2018.


ATTEST:

Position 2: Vacant



Charlotte Haines, Vice President

Approved as to Form:



Joe Bennett, District Attorney



Ron Ricker, Secretary



1519 NE 177th St. • P.O. Box 55367 • Shoreline, WA 98155 • Phone: 206.362.8100 • Fax: 206.361.0629

Annual Backflow Prevention Assembly Testing Notice

June 21, 2012

TEST FORM DUE NO LATER THAN: July 21, 2012

Customer Name
Address
Shoreline, WA 98155

Re: Backflow Prevention Assembly Test Due
Raferty - 16329 35 AVE NE

Dear Customer,

Our records indicate the following backflow prevention assemblies are located at your facility. These backflow prevention assemblies must be tested and certified, as required by State and local regulatory authority, no later than the date indicated: **July 21, 2012.**

The purpose of the program is to protect the integrity of the water distribution system as well as the health, safety and general welfare of customers like you who use it. Backflow prevention assembly tests are required to be completed annually on all backflow devices installed on your property and the completed test forms submitted and kept on file at Shoreline Water District. A certified backflow prevention assembly tester must perform the annual backflow prevention assembly test and certification. The backflow tester you choose may submit your test results to Shoreline Water District, however, the owner is ultimately responsible for submitting the test results. Shoreline Water District is not responsible for the expense of testing your backflow prevention assembly(s).

Please note that if your system is not brought into compliance, tested and evidence of compliance provided to the Shoreline Water District within 30 days from the date of this letter, the Shoreline Water District may discontinue water service to this address until evidence of your system's compliance has been provided. Your prompt attention to this matter will avoid disruption of your water service.

If you have any questions regarding the above backflow testing requirements, please call: (206) 362-8100

Sincerely,

Bob Heivilin
Utility Person 4
Cross-Connection Control Program
(206) 362-8100

Assemblies Due to be Tested:

Type	Mfr	Size	Model	SN	Due



1519 NE 177th St. • P.O. Box 55367 • Shoreline, WA 98155 • Phone: 206.362.8100 • Fax: 206.361.0629

Annual Backflow Prevention Assembly Testing Notice

SECOND NOTICE

June 21, 2012

TEST FORM DUE NO LATER THAN: July 21, 2012

Customer Name
Address
Shoreline, WA 98155

Re: Backflow Prevention Assembly Test Over Due
Raferty - 16329 35 AVE NE

Dear Customer,

Our records indicate that we have not received current test reports for the following backflow prevention assemblies are located at your facility. This is our second notice in this regard. A previous notice was sent on: **06/21/12**. These backflow prevention assemblies must be tested and certified, as required by State and local regulatory authority, no later than the date indicated: **July 21, 2012**.

The purpose of the program is to protect the integrity of the water distribution system as well as the health, safety and general welfare of customers like you who use it. Backflow prevention assembly tests are required to be completed annually on all backflow devices installed on your property and the originals submitted and kept on file at Shoreline Water District. A certified backflow prevention assembly tester must perform the annual backflow prevention assembly test and certification. The owner are responsible for submitting the test results to Shoreline Water District. Shoreline Water District is not responsible for the expense of testing your backflow prevention assembly(s).

Please note that if your system is not brought into compliance, tested and evidence of compliance provided to the Shoreline Water District within 15 days from the date of this letter, the Shoreline Water District may discontinue water service to this address until evidence of your system's compliance has been provided. Your prompt attention to this matter will avoid disruption of your water service.

If you have any questions regarding the above backflow testing requirements, please call: (206) 362-8100

Sincerely,

Bob Heivilin
Utility Person 4
Cross-Connection Control Program
(206) 362-8100

Assemblies Due to be Tested:

Type	Mfr	Size	Model	SN	Due
------	-----	------	-------	----	-----



1519 NE 177th St. • P.O. Box 55367 • Shoreline, WA 98155 • Phone: 206.362.8100 • Fax: 206.361.0629

**Annual Backflow Prevention Assembly Testing
Shut-Off Notice**

June 21, 2012

TEST FORM DUE NO LATER THAN: July 21, 2012

Customer Name
Address
Shoreline, WA 98155

Facility Name
Located at 12345 Main St., Shoreline, WA 98155

Dear Customer,

This is our third and FINAL notice in this regard. Our records indicate that we have not received the annual test reports on the following backflow prevention assembly:

We have previously sent you notices on the following dates:

June 21, 2012
00/00/00

In order for backflow prevention assemblies to continue to operate efficiently they must be tested and serviced when required. As well, in order to comply with the enabling legislation the listed backflow prevention assemblies must be tested annually by a certified and licensed tester. This letter is to give you notice that the requested tests must be completed and the necessary inspection forms returned to this office within **5 days** of the date of this letter or the water service to the subject premises may be discontinued without further notice. Completed test forms may be delivered to the address below:

**Shoreline Water District
1519 NE 177th St.
Shoreline, WA 98155
or Fax: 206-361-0629**

You are hereby notified that the water supply to the above noted premises will be discontinued if the backflow prevention assemblies are not tested within 5 days. Water service may not be resumed until testing of backflow prevention assemblies has been completed and the resulting fees have been paid.

If you have any questions, do feel free to contact the Cross Connection Control Supervisor at the above address or you may phone **(206) 362-8100**.

Sincerely,

Bob Heivillin

Over Due Backflow Assemblies:

Type	Mfr	Size	Model	SN	Due
------	-----	------	-------	----	-----

There are no BFP Assembly records at this Facility which are overdue for testing at this time.



1519 NE 177th St. • P.O. Box 55367 • Shoreline, WA 98155 • Phone: 206.362.8100 • Fax: 206.361.0629

Go Green! If you are not already receiving this via email send a request to waterquality@northcitywater.org

Annual Backflow Prevention Assembly Testing Notice

June 21, 2012

TEST FORM DUE NO LATER THAN: July 21, 2012

Customer Name

Address

City, State Zip

Re: Backflow Prevention Assembly Test Due

Location: Address

Dear Customer Name,

Our records indicate that you have a backflow assembly in your plumbing system. A backflow assembly is a mechanical water quality safety device located in the plumbing system which allows water to flow in the intended direction, but not in the reverse direction.

As mandated by the Washington State Department of Health under Washington State Administrative Code (WAC) 246-90-490, the assembly referenced below needs to be tested annually by a certified backflow assembly tester. The annual test ensures that your drinking water does not become contaminated and that backflow from your water system does not pollute the public water supply. Failure to comply with annual testing requirement can result in termination of water service to the property.

A list of certified testers is attached for your convenience. The backflow tester you choose may submit your test results directly to North City Water District. However, the owner is ultimately responsible for ensuring the test results are received by the District in a timely manner. North City Water District is not responsible for the expense of testing your backflow prevention assemblies.

North City Water District thanks you for working with us to protect the safety of our water system. The District is here to assist you. Please call **(206) 362-8100** with any questions you may have.

Sincerely,

Bob Heivilin, Utility Person 4

Cross-Connection Control Program - (206) 362-8100

WaterQuality@northcitywater.org

Name
Address

Backflow Assembly List:

Type	Mfr	Size	Model	SN	Due
1. DCDA-II 357 NE 163 ST	APOLLO/CONBR	3/8"		15263	04/01/2018
2. DCDA-II 357 NE 163 ST	FEBCO	3/8"	LF856-VU	15245	10/31/2018



1519 NE 177th St. • P.O. Box 55367 • Shoreline, WA 98155 • Phone: 206.362.8100 • Fax: 206.361.0629

Go Green! If you are not already receiving this via email send a request to waterquality@northcitywater.org

Annual Backflow Prevention Assembly Testing Notice

SECOND NOTICE

November 15, 2018

TEST FORM DUE NO LATER THAN: **November 30, 2018**

Customer Name

Address

City, State Zip

Re: Backflow Prevention Assembly Test Over Due

Location: Facility name - Address

Dear Dao Vo,

Our records indicate that we have not received current test reports for the following backflow prevention assemblies located at your facility. This is our second notice in this regard. A previous notice was sent on: **08/02/18**.

These backflow prevention assemblies must be tested and certified, as required by the Washington State Department of Health under Washington State Administrative Code (WAC) 246-90-490. A non-compliant or failed backflow assembly poses potential risk of contamination to the public water supply. The purpose of the program is to **protect the integrity of the water distribution system** as well as the health, safety and general welfare of customers like you who use it.

Your system needs to be brought into compliance, tested and evidence of compliance provided to the North City Water District by **November 30, 2018**. Your prompt attention to this matter will avoid disruption of your water service. Please submit reports to waterquality@northcitywater.org or by mail attention "Backflow Reports".

Thank you for your cooperation in protecting our drinking water. Please feel free to contact us if you have any questions regarding the above backflow testing requirements at waterquality@northcitywater.org or (206) 362-8100.

Sincerely,

Bob Heivilin - Utility Person 4

Cross-Connection Control Program - (206) 362-8100

Facility Name
Located at Address

Over Due Backflow Assemblies:

Type	Mfr	Size	Model	SN	Due
DCVA	Wilkins	1"	950XL	1306847	08/31/2018
14708 15th Avenue NE					
Location: Fire System					



1519 NE 177th St. • P.O. Box 55367 • Shoreline, WA 98155 • Phone: 206.362.8100 • Fax: 206.361.0629

Go Green! If you are not already receiving this via email send a request to waterquality@northcitywater.org

Annual Backflow Prevention Assembly Testing Notice

November 15, 2018

RESPONSE REQUIRED BY: **November 20, 2018**

Customer Name

Address

City, State Zip

RE: FINAL NOTICE - WATER SHUT OFF

Location: Facility Name - Address

Dear Customer Name,

You previously received several letters explaining the Washington State Health Department mandate requiring backflow assemblies to be annually tested by a certified backflow tester. To date, we have not received a report indicating the test has been satisfactorily performed. If the test was completed, please contact your backflow assembly tester requesting that they resubmit your test report to our office. Submit reports by email to waterquality@northcitywater.org or by mail attention "Backflow Reports".

We are here to support you in complying with this important public safety regulation. Please contact North City Water District at **(206) 362-8100** to discuss the status of your backflow device to avoid service interruption. You must make immediate arrangements to have your backflow assembly tested and call North City Water District with the scheduled test date to avoid termination of water service.

Unfortunately, **your water service will be terminated**, if we do not hear from you by **November 20, 2018**, under the authority of the Washington State Administrative Code (WA)246-290-490. You will not receive any further notification.

If service to your property is terminated, it will not be restored until a test date is scheduled and the property owner will be **subject to a \$50 dispatch** fee which must be paid in full before water services is reconnected. Tampering with the meter or lock on a services that has been disconnected will result in in additional charges and penalties **starting at \$200**.

Thank you for your partnership in maintaining the integrity of our water system. We look forward to speaking with you soon.

Sincerely,

Bob Heivilin- Utility Person 4

Cross-Connection Control Program - (206) 362-8100

Our records indicate the following assembly at the location still needs testing:

Type	Mfr	Size	Model	SN	Due
DCVA	Wilkins	1"	950XL	1306847	08/31/2018
14708 15th Avenue NE					
Location: Fire System					

APPENDIX G – COLIFORM AND DISINFECTION BY-PRODUCTS MONITORING

NORTH CITY WATER DISTRICT

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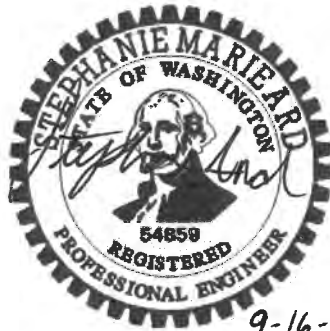
NORTH CITY WATER DISTRICT

Coliform Monitoring Plan

September 2019

NORTH CITY WATER DISTRICT COLIFORM MONITORING PLAN

SEPTEMBER 2019



9-16-2019

Prepared by:

MURRAYSMITH, INC.
1145 Broadway Plaza, Suite 1010
Tacoma, WA 98402

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APPENDICES

Appendix A – Repeat Sample Sites Locations

Appendix B – Distribution System E. coli Response Checklist

Appendix C – Level 1 and Level 2 Assessment Templates

Appendix D – Public Notification Templates

1.0 Introduction

Murraysmith, Inc. was authorized by the North City Water District (District) in May 2019 to revise the District's Coliform Monitoring Plan (Plan). This Plan meets all current regulatory requirements and provides the District with a water quality monitoring plan that can be used by District staff. This Plan is an update to the District's 2009 Coliform Monitoring Plan and will be submitted to the Washington State Department of Health (DOH) in accordance with the regulatory requirements contained in *WAC 246-290-300 Monitoring Requirements*.

1.1 District and Seattle Public Utilities

The District purchases its water from Seattle Public Utilities (SPU). As part of SPU's regional monitoring program, SPU performs all water quality analysis of the District's source water as well as all routine coliform sampling, analyses, and reporting for the District.

If a coliform sample comes back coliform-present, SPU notifies DOH and the District within 24 hours. The District then collects repeat samples, writes the necessary assessments, and follows-up with DOH.

This plan is intended for District use, and therefore, focuses on water quality and coliform monitoring as it applies to the District. For additional information about SPU's water quality and coliform monitoring procedures, please refer to SPU's most current *Comprehensive Water Quality Monitoring Summary*.

1.2 Drinking Water Regulatory Requirements

The District must comply with the following monitoring requirements: coliform monitoring, residual disinfectant concentration monitoring, disinfection byproduct concentration monitoring, and lead and copper monitoring. A description of each of these distribution system monitoring requirements is provided in the following sections.

SPU is responsible for all source monitoring requirements. A detailed description of their source monitoring plan and procedures is provided in SPU's *Comprehensive Water Quality Monitoring Summary*.

1.2.1 Coliform Monitoring

DOH, in accordance with the EPA, replaced its Total Coliform Rule with the Revised Total Coliform Rule (RTCR) in April 2016. The RTCR formalizes the process of protecting public water systems from contamination by requiring systems vulnerable to contamination to find and fix problems and pathways that could allow pathogens to enter the distribution system. The District's coliform monitoring requirements and procedures are detailed in **Section 3 – Coliform Monitoring Program** of this Plan.

1.2.2 Residual Disinfectant Monitoring

SPU adds chlorine to its water supply for the purpose of disinfection. In compliance with WAC 246-290-662, SPU provides water with a chlorine residual of at least 0.2 mg/L at points of supply to the District's distribution system.

The District is responsible for ensuring that water within its distribution system has a detectable residual disinfectant concentration at all times. The residual disinfectant concentration, measured as total chlorine, free chlorine, combined chlorine, or chlorine dioxide, must be detectable in at least 95 percent of the samples taken each calendar month. The results of the residual disinfectant concentration monitoring must be reported to the Department of Health (DOH) using DOH approved forms within ten days after the end of each month, unless otherwise directed by DOH.

The District installed chlorine analyzers at Supply Station 1, Supply Station 4, the 3.7 MG 590 Zone Reservoir and the 2.0 MG 432 Zone Reservoir to provide real-time chlorine residual monitoring of the water. The five chlorine analyzers provide detailed information for monitoring the disinfectant concentration of water that is supplied by SPU and improve system operation.

1.2.3 Disinfection Byproducts Monitoring

Chlorine, added by SPU to disinfect the water, may react with naturally occurring organic matter to form unintended disinfection byproducts that pose health risks. The EPA regulates these disinfection byproducts under the Stage 1 and Stage 2 Disinfectants and Disinfection Byproducts Rule (DBPR).

Stage 1 DBPR reduces drinking water exposure to disinfection products. Since SPU adds chlorine to the water supply prior to selling it to the District, SPU is responsible for Stage 1 DBPR monitoring.

Stage 2 DBPR strengthens public health protection by tightening compliance monitoring requirements for total trihalomethanes (TTHM) and five haloacetic acids (HAA5). The District collects TTHM and HAA5 data at a specified frequency and locations to characterize these contaminants levels in the system.

1.2.4 Lead and Copper Monitoring

DOH, under the Lead and Copper Rule Short-Term Revisions (LCR-STR), requires public water systems to monitor lead and copper levels in their water. Unlike other contaminants, lead and copper are not usually present in source water. Instead, corroding building plumbing, faucets and water fixtures leach lead and copper into the drinking water. Therefore, this monitoring determines if the District is distributing corrosive water that has the potential to cause lead and/or copper leaching into the drinking water, and if so, helps find the best way to control the corrosion. The action levels for lead and copper are 0.015 mg/L and 1.3 mg/L, respectively.

The District participates in SPU's regional lead and copper monitoring program. As part of the program, a total of 51 lead and copper samples are collected every three years, including five samples from the District's service area. These samples are collected between June and September. The most recent samples were collected in 2017 with the next samples scheduled to occur in 2020.

The District collects the samples from homes that are most vulnerable to lead and copper corrosion. SPU then analyzes the samples at the SPU Water Quality Laboratory and submits the sampling results and the calculated 90th percentile lead and copper levels to DOH.

2.0 System Information

The North City Water District is a special purpose district, organized under Title 57 of the Revised Code of Washington (RCW). The District provides water to a service area of approximately five square miles located in north King County. The District's service area includes a portion of the cities of Shoreline and Lake Forest Park. The District is primarily a residential area with a small amount of local business and manufacturing areas.

A summary of the District's water system's ownership and management is shown in **Table 2-1**. Additional information is provided in the following sections, and a map of the system is provided in **Figure 1 – Existing Coliform Monitoring Sample Sites**.

Table 2-1
Water System Ownership and Management

Water System Name North City Water District	County King	System I.D. Number 39600
Name of Plan Preparer Diane Pottinger, PE	Position District Manager	Daytime Phone 206-362-8100
Sources: DOH Source Number, Source Name, Well Depth, Pumping Capacity	Described in Section 2.1 below	
Storage: List and Describe	Described in Section 2.2 below	
Treatment: Source Number & Process	Described in Section 2.3 below	
Pressure Zones: Number and name	Described in Section 2.4 below	
Population by Pressure Zone	Described in Section 2.4 below	
Number of Routine Samples Required Monthly by Regulation:		30
Number of Sample Sites Needed to Represent the Distribution System:		16
*Request DOH Approval of Triggered Source Monitoring Plan?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>

2.1 Source of Water Supply

The District has five metered interties with SPU, four supply stations (SS) and one emergency intertie, as well as two booster pump stations (BPS). These interties with SPU deliver water from SPU's Tolt River and Cedar River transmission lines. Per the District's Wheeling Agreement with SPU amended in 2016, the District can receive a maximum of 3,330 gpm from these interties. The

District also owns, operates and maintains two metered 10-inch diameter emergency interties with the City of Mountlake Terrace.

Table 2-2 shows the District's sources as listed with DOH.

Table 2-2
Water Supply Sources

DOH NO.	Source Name	Metered	Category	Usage
S01	77050Y\Seattle	Yes	Purchase-Treated	Permanent
S02	77050Y\Seattle	Yes	Purchase-Treated	Permanent
S03	77050Y\Seattle	Yes	Purchase-Treated	Emergency
S04	572505\Mountlake Terrace	Yes	Purchase-Treated	Emergency

The District's SPU Interties, SPU Booster Stations, and City of Montlake Terrace emergency interties are discussed in the following sections.

2.1.1 SPU Interties

The District's Supply Station 1 (SS-1) is located off the Tolt transmission main at NE 192nd Street and 16th Avenue NE. It conveys SPU Tolt River Supply water directly into the 502 and 432 Zones. The rated capacity of SS-1 is approximately 1,800 gpm.

The District's Supply Station 2 (SS-2) is located at 40th PL NE and NE 196th Court. It provides lead supply to the 2.0 MG Reservoir and 432, 307 and 237 Zones. The rated capacity of SS-2 is approximately 2,700 gpm.

The District's Supply Station 3 (SS-3) is located at NE 195th Street and 32nd Avenue NE. Similar to SS-1, it conveys SPU Tolt River Supply water directly into the 502 and 432 Zones. The rated capacity of SS-3 is approximately 1,500 gpm.

The District's Supply Station 4 (SS-4) is located within the right-of-way north of NE 185th Street and east of 5th Ave NE. It conveys "pumped" SPU Cedar River Supply water into the 590 Zone. The rated capacity of SS-4 is approximately 3,500 gpm. Should the District lose the Tolt Supply water, SS-4 can supply flow to the entire district until the Tolt Supply water is reestablished.

The SPU emergency intertie is connected to SPU's distribution system supplied by the Cedar River (Northwest Sub-Regional System). The intertie can supply the District's 590 Zone in an emergency.

2.1.2 SPU Booster Stations

The District's Booster Station 1 (BS-1) and Booster Station 2 (BS-2) are considered open system booster pump stations, as they transfer water to a higher-pressure zone where the water surface is open to the atmosphere. They both supply the 590 Zone and 3.7 MG Reservoir.

BS-1 is located at NE 160th Street and 8th Avenue NE and has two, 2,000 gpm pumps. BS-2 is located at NE 185th Street and 9th Avenue NE and has two, 2,300 gpm pumps.

Under adequate supply head conditions from SPU, the both stations can supply the 590 Zone without pumping. When pumping is required, only one of the two pumps is operated at a time and the pumps are alternated after each pumping cycle. The two-pump arrangement was designed for reliability and redundancy at each station.

2.1.3 City of Mountlake Terrace Emergency Interties

The District is connected to the City of Mountlake Terrace through two emergency intertie connections. Both interties are located along NE 205th Street and connect the District's 502 Zone to the City's 530 Zone. One is located at 19th Avenue NE and the other at the Ballinger Village Shopping Center. Due to the difference in hydraulic head between the two systems, water flows by gravity from the City's 530 Zone to the District's 502 Zone and must be pumped in order to transfer water in the other direction. This can be achieved with the dual fire hydrant arrangement in place and bringing in a trailer-mounted portable pumping unit.

2.2 Water Storage

The District has two above-ground water storage facilities, the 3.7 MG Reservoir and the 2.0 MG Reservoir.

The 3.7 MG Reservoir is physically located in the north-central portion of the 615 Zone. This reservoir provides storage for the 615 Zone, 590 Zone, 502 Zone and 400 Zone and additional storage for all other pressure zones throughout the system. The water level in the 3.7 MG Reservoir is controlled by telemetry coordination with BS-1 and BS-2.

The 2.0 MG reservoir is physically located east of the 432 Zone. This reservoir provides storage for the 432 Zone, 307 Zone and 237 Zone. Currently, SS-2 is the lead supply for the 2.0 MG reservoir and SS-1 and SS-3 provide lag supply.

Table 2-3 list the key characteristics of the District's two reservoirs.

Table 2-3
Water Storage Reservoirs

Name	Pressure Zone	Material	Volume (million gallon)	Overflow Elv. (feet)	Current Status
3.7 MG Reservoir	615	Steel	3.7	580	Active
2.0 MG Reservoir	432	Concrete	2.0	424	Active

2.3 Water Treatment

All water used within the District is supplied and treated to drinking water standards by SPU. Currently, SPU provides corrosion control, utilizes filtration, ozone and chlorination for disinfection of most waterborne pathogens and fluoridates the water supply for tooth-decay prevention.

2.4 Pressure Zones

The District has seven pressure zones within their retail service area. **Table 2-4** shows a list of the District's existing pressure zones and the estimated number of water service connections in each zone in 2018.

Table 2-4
Population per Pressure Zones

Pressure Zone	Minimum Elevation (feet)	Maximum Elevation (feet)	Estimated Population*	Number of Sampling Stations
615	335	485	3,384	2
590	310	475	11,597	4
502	245	410	4,767	3
432	105	330	4,264	4
400	225	255	34	0
307	65	195	760	1
237	20	110	635	2
Total			25,440	16

*As of December 2017

3.0 Coliform Monitoring Program

As stated previously, WAC 246-290-300 requires 30 samples from the District every month. Sampling sites have been selected as to be representative of the distribution system. The sampling sites are spread throughout the distribution system, pressure zones, and potential areas of concern.

Currently the District has 16 sample sites dispersed throughout the distribution system used for routine sampling and monitoring. **Table 3-1** lists current sampling sites, their addresses, pressure zone, sampling frequency, and the future pressure zone. See **Appendix A** for upstream and downstream repeat sample site locations. **Figure 1 – Existing Coliform Monitoring Sample Sites**, included below, gives a visual representation of the locations of these sample sites.

Table 3-1
Routine Sampling Sites

SPU Code	Location	Pressure Zone	Sample Frequency (Samples/Month)	Future Pressure Zone
42-1	15400 5 th Ave NE	590	2	520
42-2	20309 Ballinger Way NE	502	2	520
42-3	17700 Brookside Blvd NE	237	2	237
42-4	17538 10 th Ave NE	590	2	590
42-5	20002 30 th Ave NE	432	2	432
42-6	2330 NE Perkins Way	432	2	432
42-7	1612 NE 186 th St	502	2	520
42-8	17125 Hillside Dr NE	432	2	520
42-9	3404 NE 160 th St	432	2	520
42-10	1886 NE 171 st St	615	2	615
42-11	14541 25 th Ave NE	590	2	520
42-12	728 NE 204th Street	502	2	520
42-13	16505 5 th Ave NE	615	2	615
42-14	16747 41 st Ave NE	237	2	237
42-15	18012 15 th Ave SE	590	2	590
42-16	18012 15 th Ave SE	502	2	520
Total Monthly Samples			32	

3.1. Responsibilities of District and SPU

SPU performs all routine coliform sampling, analyses and reporting of the District's water system's water quality as part of SPU's regional monitoring program. The District is responsible for follow-up or repeat sampling at times when samples collected by SPU test positive for coliforms.

A brief summary of responsibilities for sampling and analysis are listed in **Table 3-2**.

Table 3-2
Water System Sampling and Analysis

Responsibilities of SPU	Responsibilities of the District
SPU is responsible for all coliform monitoring performed in the District, except repeat sampling required after an original sample has tested positive for total coliform.	The District is responsible for collection of repeat samples and chlorine measurements within 24 hours in follow-up to a positive coliform result.
SPU is responsible for laboratory analysis.	The District is responsible for notifying SPU of its current population for determining the minimum number of monthly coliform samples required.
SPU must notify the DOH within 24 hours of a coliform positive test result. SPU is also responsible for notifying the District.	The District is responsible for notifying SPU of any unusual circumstances in their distribution system that may cause a change to the coliform sample collection schedule.

3.2 Laboratory Information

SPU analyzes all the District's water quality samples at the SPU Water Quality Laboratory. The SPU Water Quality Laboratory contact information is listed below.

Address: 800 S Stacy Street
Seattle, WA 98134

Phone Number: (206) 684-7834

Refer to SPU's most recent Coliform Monitoring Plan for more information on their laboratory.

3.3 Procedures Followed When Coliform Presence is Detected

When a routine sample tests positive for total coliform and/or E. coli, the District acts according to the ***Distribution System E. coli Response Checklist*** included in **Appendix B** and the response plans outlined below. These actions are based on the Total Coliform Rule and DOH recommendations.

If laboratory calls and says the sample has ***"Total Coliform Present"***, then:

1. SPU notifies the District and DOH.
2. District flushes and "Find and Fix" source of contamination.
3. District takes 3 repeat samples (one from the same sample site, one within 5 connections upstream, one within 5 connections downstream) within 24 hours of notification of a

positive coliform sample from the lab.

4. If all repeat samples are negative for total coliform then no further samples are needed.
5. If a repeat sample comes back **"Total Coliform Present"** or two or more of the routine tests showed total coliform present, then the District must conduct a Level 1 or Level 2 Assessment, which are detailed later in this plan.

If a routine sample or a repeat sample shows both **"Total Coliform Present and E. coli Present"** then:

1. SPU notifies the District and DOH.
2. District flushes and "Find and Fix" source of contamination.
3. District takes 3 repeat samples, (one from the same sample site, one within 5 connections upstream, one within 5 connections downstream) within 24 hours of notification of a positive coliform sample from the lab.
4. District conducts a Level 2 Assessment, which is detailed later in this plan.
5. District notifies public within 24 hours if repeat samples test positive for total coliform bacteria and there is E. coli bacteria in one or more of the samples.

3.4 Level 1 and Level 2 Assessments

Any **"Total Coliform Present"** result is considered a *Treatment Technique Trigger*, and the RTCR requires a water system to take action. There are two assessment levels, Level 1 Assessment and Level 2 Assessment.

- Level 1 Assessment is a basic water system evaluation an owner, manager, or other knowledgeable person can do. A Level 1 treatment technique trigger occurs if the District has 2 or more total coliform-present results in the same month or fails to collect 3 repeats for every total coliform present routine sample.
- Level 2 Assessment is a complex evaluation that only a person with state-required qualifications can do. A Level 2 treatment technique trigger occurs when the District has an E. coli MCL violation or a second Level 1 treatment technique trigger within a rolling 12-month period.

Templates for both a Level 1 Assessment and a Level 2 Assessment are included in **Appendix C**.

Both types of assessments have three main components: investigation, discussion, and corrective action. Investigation includes identifying any defects that allow coliform to enter the distribution system. Discussion involves evaluating what was identified during the assessment that might have allowed the contamination to occur and the corrective action needed to fix it. Corrective action entails recording the steps taken (or will be taken) to fix the sanitary defect that allowed the

contamination to occur. When correcting contamination problems, the Department of Health uses two terms that should be defined, “Sanitary Defect,” and “Defect.”

- Sanitary Defect is a pathway for contaminants to enter the water system. This may be as simple as a missing reservoir vent screen or a poorly sealed hatch, or as substantial as a failing reservoir. Corrective action for a sanitary defect could be as simple as installing a new screen on a reservoir vent or replacing the seal on a hatch, or as substantial as building a new reservoir.
- Defect is an issue identified during an assessment that could have caused positive coliform samples such as an improper sampling technique. Corrective action for a defect might be as simple as training on correct sampling techniques.

3.5 Violations & Public Notification Requirements

There are four types of violations under the RTCR: Treatment Technique Violation, E. coli MCL Violation, Monitoring Violation, and Reporting Violation. The four violation types are described in detail below.

Each violation requires public notification depending on its tier, or risk to public health. **Table 3-3** lists the tier and public notification timeline for each RTCR Violation. **Appendix D** contains a sample Tier 1 public notifications developed by DOH.

Table 3-3
Public Notification Requirements

RTCR Violation Types	Tier Type	Notification Timeline
E. coli MCL	Tier 1	Issued within 24 hours
Treatment Technique	Tier 2	Issued within 30 days
Monitoring	Tier 3	Issued within 1 year
Reporting	Tier 3	Issued within 1 year

3.5.1 E. coli MCL Violation

If a system incurs an E. coli MCL violation, it must perform a **Level 2 assessment** and provide **Tier 1 public notification** to its customers. E. coli MCL violation occurs when one of the following is true:

- A total coliform-present repeat sample follows an E. coli-present routine sample.
- An E. coli-present repeat sample follows a total coliform-present routine sample.
- The lab fails to test a total coliform-present repeat sample for E. coli.
- The system fails to take three repeat samples following an E. coli-present routine sample.

3.5.2 Treatment Technique Violation

When a treatment technique violation occurs, a system must provide **Tier 2 public notification** to its customers. A coliform treatment technique violation occurs if a water system fails to conduct or fully complete a required Level 1 or Level 2 Assessment within 30 days of the treatment technique trigger, or a system fails to correct any sanitary defect by taking required corrective action within the required timeframe.

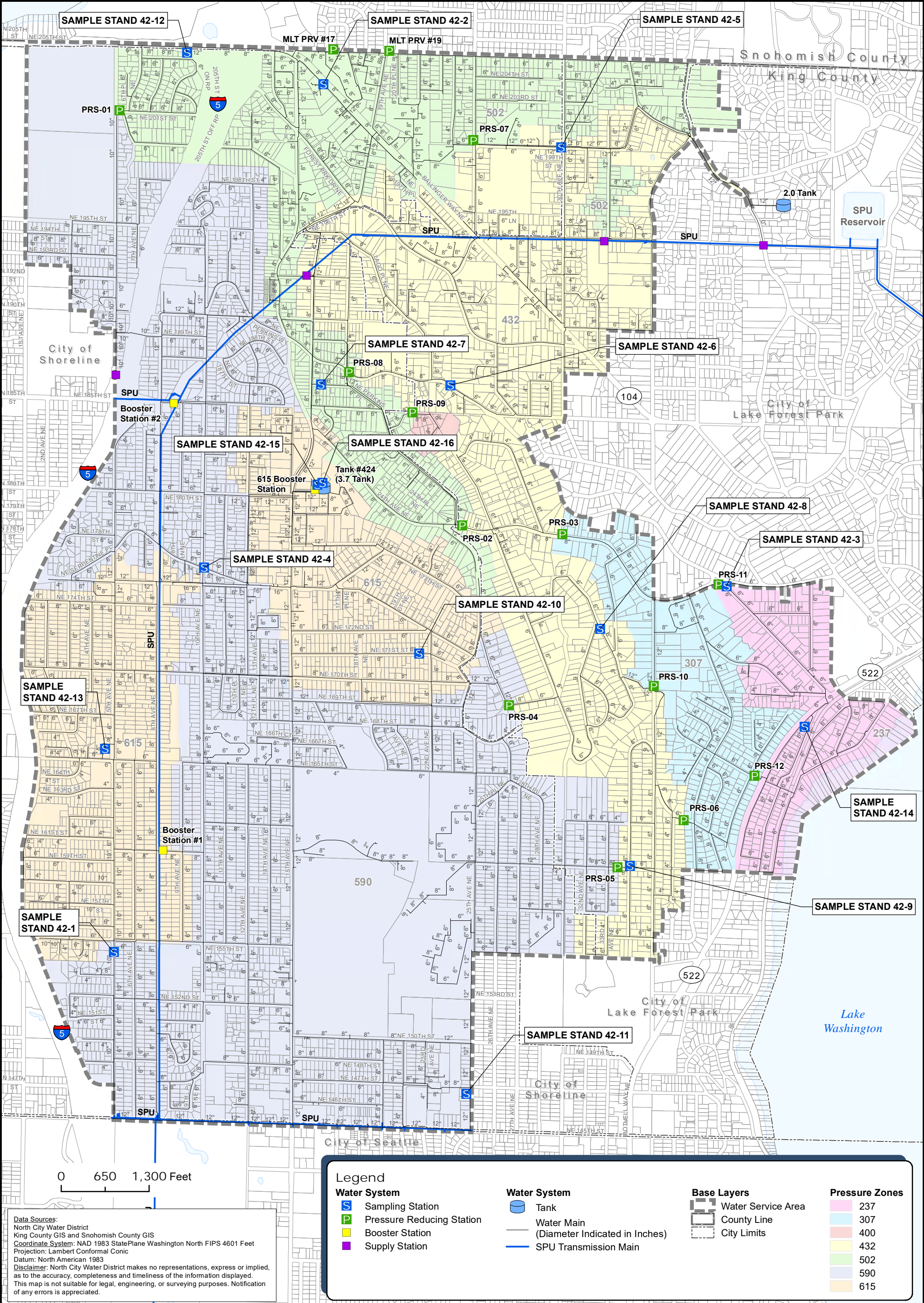
3.5.3 Monitoring Violation

Monitoring violations require **Tier 3 public notification** to the water system's customers. A monitoring violation occurs when a system fails to collect all routine samples, or a system fails to have each total coliform-present routine sample analyzed for E. coli.

3.5.4 Reporting Violation

Reporting violations require a **Tier 3 public notification** to the water system's customers. A reporting violation occurs if a system fails to submit a monitoring report or completed assessment form to Office of Drinking Water (ODW) in a timely manner, or a system fails to notify ODW of an E. coli-present sample in a timely manner.

K:\TAC_P\Projects\19\2482 - North City Coliform Monitoring Plan Update\CAD\GIS\MXD\19-2482-WA COLIFORM MONITORING SITES 11x17P.mxd 6/28/2019 12:03:20 PM Kent Harjala



Appendix A – Repeat Sample Site Locations

SPU Code	Sample Site Location	Upstream/Downstream Repeat Sample Sites
42-1	15400 5 th Ave NE	<p>↑</p> <p>15278 6th Ave NE 519 NE 155th St 503 NE 155th St 15422 5th Ave NE 15416 5th Ave NE</p> <p>Sample Stand</p> <p>↓</p> <p>15415 5th Ave NE 15410 5th Ave NE 15404 5th Ave NE 15320 5th Ave NE 15314 5th Ave NE</p>
42-2	20309 Ballinger Way NE	<p>↑</p> <p>20030 Ballinger Way NE 20041 Ballinger Way NE 20051 Ballinger Way NE 20059 Ballinger Way NE 20227 Ballinger Way NE</p> <p>Sample Stand</p> <p>↓</p> <p>20309 Ballinger Way NE 20319 Ballinger Way NE 20333 Ballinger Way NE 20330 15th Ave NE 20333 15th Ave NE</p>
42-3	17700 Brookside Blvd NE	<p>↑</p> <p>3352 NE 178th St 3350 NE 178th St 3346 NE 178th St 3340 NE 178th St 3330 NE 178th St</p> <p>Sample Stand</p> <p>↓</p> <p>17440 Brookside Blvd NE 17411 Brookside Blvd NE 17405 Brookside Blvd NE 17403 Brookside Blvd NE 17255 Brookside Blvd NE</p>
42-4	17538 10 th Ave NE	<p>↑</p> <p>17541 10th Ave NE 17542 10th Ave NE 17536 10th Ave NE 17530 10th Ave NE 1010 NE Serpentine PI</p> <p>Sample Stand</p> <p>↓</p> <p>1009 NE Serpentine PI 17517 10th Ave NE 17511 10th Ave NE 1002 NE 175th St 17503 10th Ave NE</p>

SPU Code	Sample Site Location	Upstream/Downstream Repeat Sample Sites
42-5	20002 30 th Ave NE	<p>↑</p> <p>3110 NE 200th St 3030 NE 200th St 3020 NE 200th St 3012 NE 200th St 20006 30th Ave NE</p> <p>Sample Stand</p> <p>↓</p> <p>2960 NE 200th St 2902 NE 200th St 2947 NE 200th St 2943 NE 200th St 2941 NE 200th St</p>
42-6	2330 NE Perkins Way	<p>↑</p> <p>18519 24th PI NE 2331 NE Perkins Way 2329 NE Perkins Way 2325 NE Perkins Way 2319 NE Perkins Way</p> <p>Sample Stand</p> <p>↓</p> <p>2301 NE Perkins Way 18708 23rd Ave NE 18709 23rd Ave NE 18712 23rd Ave NE 18716 23rd Ave NE</p>
42-7	1612 NE 186 th St	<p>↑</p> <p>18519 16th Ave NE 18531 16th Ave NE 18601 16th Ave NE 1604 NE 186th St 1607 NE 186th St</p> <p>Sample Stand</p> <p>↓</p> <p>1612 NE 186th St 1614 NE 186th St 1611 NE 186th St 1621 NE 186th St 1620 NE 186th St</p>
42-8	17125 Hillside Dr NE	<p>↑</p> <p>17506 32nd Ave NE 17412 32nd Ave NE 17413 32nd Ave NE 17407 32nd Ave NE 17404 32nd Ave NE</p> <p>Sample Stand</p> <p>↓</p> <p>17400 Hillside Dr NE 17125 Hillside Dr NE 17124 Hillside Dr NE 17121 Hillside Dr NE 17055 Hillside Dr NE</p>

SPU Code	Sample Site Location	Upstream/Downstream Repeat Sample Sites
42-9	3404 NE 160 th St	<p>↑</p> <p>16023 34th Ave NE 16022 34th Ave NE 16015 34th Ave NE 16014 34th Ave NE 16003 34th Ave NE</p> <p>Sample Stand</p> <p>3405 NE 160th St ↓</p> <p>15857 34th Ave NE 15849 34th Ave NE 15848 34th Ave NE 15838 34th Ave NE</p>
42-10	1886 NE 171 st St	<p>↑</p> <p>1866 NE 171st St 1873 NE 171st St 1878 NE 171st St 1886 NE 171st St 1879 NE 171st St</p> <p>Sample Stand</p> <p>1888 NE 171st St 1887 NE 171st St ↓</p> <p>1893 NE 171st St 2212 NE 171st St 2215 NE 171st St</p>
42-11	14541 25 th Ave NE	<p>↑</p> <p>14721 25th Ave NE 14717 25th Ave NE 14711 25th Ave NE 14705 25th Ave NE 14555 25th Ave NE</p> <p>Sample Stand</p> <p>14541 25th Ave NE 14533 25th Ave NE ↓</p> <p>14511 25th Ave NE 2412 NE 145th St 2406 NE 145th St</p>
42-12	728 NE 204th Street	<p>↑</p> <p>716 NE 204th St 729 NE 204th St 724 NE 204th St 733 NE 204th St 728 NE 204th St</p> <p>Sample Stand</p> <p>737 NE 204th St ↓</p> <p>20241 8th Ave NE 20238 8th Ave NE 20235 8th Ave NE 20226 8th Ave NE</p>

SPU Code	Sample Site Location	Upstream/Downstream Repeat Sample Sites
42-13	16505 5 th Ave NE	<p>↑</p> <p>520 NE 165th ST 518 NE 165th St 516 NE 165th St 16506 5th Ave NE 16511 5th Ave NE</p> <p>Sample Stand</p> <p>↓</p> <p>16502 4th Ave NE 16508 4th Ave NE 16515 4th Ave NE 16522 4th Ave NE 314 NE 165th St</p>
42-14	16747 41 st Ave NE	<p>↑</p> <p>17036 44th Ave NE 17043 Brookside Blvd NE 17020 Brookside Blvd NE 17001 Bothell Way NE 16840 Bothell Way NE</p> <p>Sample Stand</p> <p>↓</p> <p>16727 41st Ave NE 16721 41st Ave NE 16541 41st Ave NE 16535 41st Ave NE 16529 41st Ave NE</p>
42-15	18012 15 th Ave SE	<p>↑</p> <p>18012 15th Ave NE NC/DC Pump Station</p> <p>Sample Stand</p> <p>↓</p> <p>18005 15th Ave NE 1228 NE 180th St 1222 NE 180th St 1216 NE 180th St 18002 12th Ave NE</p>
42-16	18012 15 th Ave SE	<p>↑</p> <p>18425 16th Ave NE 18428 16th Ave NE 18422 16th Ave NE 18415 16th Ave NE 18416 16th Ave NE</p> <p>Sample Stand</p> <p>↓</p> <p>18012 15th Ave NE NC/DC Pump Station</p>

Distribution System <i>E. coli</i> 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.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We document all water main breaks, construction & repair activities, and low pressure and outage incidents.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can easily access and review documentation on water main breaks, construction & repair activities, and low pressure and outage incidents.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Our Cross-Connection Control Program is up-to-date.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We test all cross-connection control devices annually as required, with easy access to the proper documentation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We routinely inspect all treatment facilities for proper operation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We identified one or more qualified individuals who are able to conduct a Level 2 assessment of our water system.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have procedures in place for disinfecting and flushing the water system if it becomes necessary.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can activate an emergency intertie with an adjacent water system in an emergency.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have a map of our service area boundaries.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have consumers who may not have access to bottled or boiled water.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There is a sufficient supply of bottled water immediately available to our customers who are unable to boil their water.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have messages prepared and translated into different languages to ensure our consumers will understand them.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have the capacity to print and distribute the required number of notices in a short time period.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Policy Direction	Yes	No	N/A	To Do List
We have discussed the issue of <i>E. coli</i> -present sample results with our policy makers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If we find <i>E. coli</i> in a routine distribution sample, the policy makers want to wait until repeat test results are available before issuing advice to water system customers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(Cont.)				

Distribution System <i>E. coli</i> 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.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have a list of all of our customers' addresses.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have a list of customer telephone numbers or access to a Reverse 9-1-1 system.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have a list of customer email addresses.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We encourage our customers to remain in contact with us using social media.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have an active website we can quickly update to include important messages.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Our customers drive by a single location where we could post an advisory and expect everyone to see it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We need a news release to supplement our public notification process.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Level 1 Assessment Guidance Template

331-569, October 2017

Send your assessment to:

Northwest Region	20425 72nd Ave. South, Suite 310 Kent, WA 98032-2358	Phone: (253) 395-6750 Fax: (253) 395-6760 Email: carol.stuckey@doh.wa.gov ingrid.salmon@doh.wa.gov
Southwest Region	PO Box 47823 Olympia WA 98504-7823	Phone: (360) 236-3030 Fax: (360) 664-8058 Email: swro.coli@doh.wa.gov
Eastern Region	16201 Indiana Ave Suite 1500 Spokane Valley WA 99216	Phone: (509) 329-2100 Fax: (509) 329-2104 Email: ero.waterquality@doh.wa.gov

Water System Name:	County:	Water System ID #:
Assessor Name:	Email Address:	
Assessor Address, City, State, Zip:		ODW Only, Date Received:
Date(s) Assessment Completed:	Month and Year of TTT:	

Within 30 days of learning of the Treatment Technique Trigger (TTT), submit a completed assessment to [your regional office](#). Keep a copy in your water system files.

Use this *Level 1 Assessment Guidance Template* as a guide for a system with only a groundwater source(s).

Part A: The Assessment

- Review the most recent sanitary survey report.
- Assess the status of the system's significant deficiencies and findings, observations, and recommendations.
- Respond to all parts of this template that are applicable to the water system.
- Use additional pages if you need more space.

Part B: The Summary and Corrective Actions

- Summarize assessment findings. For corrective actions:
- Completed: include photos, work receipts, or reports.
- Not yet completed: include an action plan with timetable with dates.

Part A: Assessment	Corrective action needed?	Description, Comments, and Recommendations
1. Site and Sampling Protocol		
a. Is there a written coliform monitoring plan & sampling procedure that represents the distribution system? If yes, does the system follow the coliform monitoring plan?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No
b. Have there been changes in sampling conditions or procedures? Describe:	<input type="checkbox"/> Yes <input type="checkbox"/> No	
c. Inspect sampling sites where unsatisfactory samples have been collected. Are the sampling taps and locations: i. Free of potential sources of contamination? ii. In good condition?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
d. Do the coliform sample results from the last 90 days suggest ongoing water quality issues?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
e. Is this assessment required due to failure to collect all repeat samples? If yes, what were the procedures taken to ensure repeat samples will be collected in the future?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
		Attachment A

Part A: Assessment		Corrective action needed?		Description, Comments, and Recommendations
2. Distribution				
a. Are procedures in place to: <ul style="list-style-type: none"> i. Replace and repair system parts? ii. Regularly flush? iii. Routinely inspect vault(s)? iv. Implement a cross connection control program? v. Maintain positive pressure? 		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	
b. Have there been: <ul style="list-style-type: none"> i. Recent reports of low pressure (less than 20 PSI) or complete loss of pressure? ii. Changes in condition or operation? 		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	
c. Inspect the distribution system. Are there any: <ul style="list-style-type: none"> i. Visible line breaks or leaks? ii. Observed unprotected cross connections? iii. Waterlogged pressure tanks? iv. Evidence of vandalism or other security breaches? v. Other: 		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	
3. Storage Facilities - Is there a water storage tank? If no, skip to Section 4. Note: Pressure and hydropneumatic tanks are not storage tanks				
a. Are there: <ul style="list-style-type: none"> i. Procedures for periodic inspection and upkeep of the facility? ii. Any changes in storage condition or operations? 		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	
b. Inspect each storage tank. Are there: <ul style="list-style-type: none"> i. Overflow lines constructed to prevent contaminants? ii. Cracks or unprotected openings in the tank walls? iii. Reservoir roof cracks? iv. Unprotected roof openings? v. Improperly constructed access hatch or seal? vi. Evidence of vandalism or other security breaches? 		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	
c. If there is an air vent or opening for a water-level gauge, is it constructed to prevent entry of contaminants?		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
d. If the overflow line discharges to a storm drain, to surface water, or directly into a sanitary sewer, is it protected by a proper air gap?		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4. Treatment - Is treatment in use for any source? If no, skip to Section 5.				
a. If treatment includes disinfection, were chlorine residuals normal during the month the TTT occurred?		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	Attachment A

Part A: Assessment		Corrective action needed?	Description, Comments, and Recommendations
b. Inspect the treatment facility. Are there: i. Procedures in place for proper operation and maintenance? 1. Is the treatment system operating properly? ii. Changes in equipment or process? Describe. iii. Evidence of vandalism or other security breaches?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	
5. Source			
a. Are there procedures in place for periodic inspection and maintenance of the source facilities?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
b. Does each source have a raw water sample tap properly located? http://www.doh.wa.gov/portals/1/Documents/pubs/331-436.pdf		<input type="checkbox"/> Yes <input type="checkbox"/> No	
c. Inspect the source facilities. Is the:			
i. Sanitary control area free of all potential sources of contamination?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
ii. Wellhead or spring box above grade with no potential for flooding?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
iii. Well cap sealed and watertight?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
iv. Well casing free of unprotected openings?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
v. Pressure tank waterlogged?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
vi. Spring box (structure, hatch, and overflow) free of any unprotected openings?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
vii. Other:		<input type="checkbox"/> Yes <input type="checkbox"/> No	
d. Have there been any changes in condition or operation?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
6. Other assessment activities. Describe:			

Part B: Assessment Summary and Corrective Action Plan with Timetable			
1. Actions Completed		Assessor: Summarize the issues found where corrective actions have been completed. Include photos, work receipts, or reports to depict assessment findings.	
Describe issue found		Describe corrective action taken	Date Completed
2. Actions To be Taken		Assessor: Describe the issues found where corrective actions will be completed later.	Provide a timetable
Describe issue found		Describe planned corrective action	Expected Completion Date

Assessor has discussed the Assessment findings with the Water System Owner: ☐ Yes ☐ No

If no, note the date when the discussion will occur: _____

Signature of Assessor: _____ Date: _____

Office of Drinking Water staff will review this assessment and determine if any of the issues identified are Sanitary Defects - a defect that could provide a pathway of entry for microbial contamination into the distribution system, or a defect that is indicative of a failure or imminent failure in a barrier that is already in place.

OFFICE OF DRINKING WATER USE ONLY

Regional Office Reviewer: _____		Date of Review: _____		Assessment sufficient? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Likely Cause Determined? <input type="checkbox"/> Yes <input type="checkbox"/> No		Sanitary Defects Identified? <input type="checkbox"/> Yes <input type="checkbox"/> No		Corrective Actions Complete? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Corrective Action Plan Included? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		Corrective Action Plan approved? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A			
Comments:					



Level 2 Assessment Guidance Template

331-570, 2017

Send your
assessment to:

**Northwest
Region**

20425 72nd Ave. South, Suite 310
Kent, WA 98032-2358

Phone: (253) 395-6750
Fax: (253) 395-6760
Email: carol.stuckey@doh.wa.gov
ingrid.salmon@doh.wa.gov

**Southwest
Region**

PO Box 47823
Olympia WA 98504-7823

Phone: (360) 236-3030
Fax: (360) 664-8058
Email: swro.coli@doh.wa.gov

**Eastern
Region**

16201 Indiana Ave Suite 1500
Spokane Valley WA 99216

Phone: (509) 329-2100
Fax: (509) 329-2104
Email: joseph.perkins@doh.wa.gov

Water System Name: Click here to enter text	County: Click here to enter text	Water System ID #: Click here to enter text
Assessor Name: Click here to enter text	Email Address: Click here to enter text	
Assessor is: WDM 2, 3, or 4 OR PE OR LHJ (check one)		ODW Only, Date Received: Click here to enter text
Assessor Address, City, State, Zip: Click here to enter text		
Date(s) Assessment Completed: Click here to enter text	Month and Year of TTT: Enter date	

This assessment is required due to the repeated occurrence of total coliform bacteria, or the confirmation of *E. coli* bacteria in the distribution system. Conduct a thorough assessment of the water system per this guidance and within 30 days submit the assessment to your regional office. If this is the water system's second level 2 assessment and the cause for the contamination cannot be found and fixed, the system will be required to add the barrier of continuous disinfection treatment. Use this *Level 2 Assessment Guidance Template* for a system with only a groundwater source(s).

Part A: The Assessment

- Review the most recent sanitary survey report.
 - Assess the status of the system's significant deficiencies and findings, observations, and recommendations.
- Respond to all parts of this template that are applicable to the water system.
- Use additional pages if you need more space.

Part B: The Summary and Corrective Actions

- Summarize assessment findings. For corrective actions:
 - Completed: include photos, work receipts, or reports.
 - Not yet completed: include an action plan with dates for completion of each item.

Part A: Assessment	Corrective Action Needed?	Description, Comments, and Recommendations
1. Site and Sampling Protocol		
a. Is there a written coliform monitoring plan & sampling procedure that ensures each sample represents the distribution system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
b. Is there a program to ensure that all sample collectors are trained before being allowed to collect compliance samples?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
c. Are routine and repeat sample sites regularly monitored to ensure that no site will contaminate the sample?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
d. Do the coliform sample results from the last 24 months suggest ongoing or reoccurring water quality issues?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
e. Relative to the Unsatisfactory samples associated with the TTT: <ul style="list-style-type: none">i. Did a trained sample collector collect each sample?ii. Were the monitoring plan and sampling procedure followed?iii. Were there any changes in sampling conditions or procedures that may have contributed to the TTT?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No

Attachment A

Part A: Assessment		Corrective Action Needed?	Description, Comments, and Recommendations
f. Inspect the Unsatisfactory samples' sites: i. Are the sampling locations free of potential sources of contamination? ii. Are the sampling taps in good condition? iii. Other:		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
g. Was this TTT due to failure to collect all repeat samples? If yes, describe steps being taken to ensure all required repeat samples will be collected in the future.		<input type="checkbox"/> Yes <input type="checkbox"/> No	
2. Distribution System			
a. Are there standard procedures for proper maintenance including: i. Pipe replacement and repair? ii. Other distribution system components replacement and repair? iii. Regular flushing? iv. Routine vault inspections? v. Maintain positive pressure throughout?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
b. Is there a fully implemented cross connection control program?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
c. Is each air-vacuum-relief-valve vented above-grade?		<input type="checkbox"/> Yes <input type="checkbox"/> N/A	
d. Following work done in distribution system or any pressure loss event, are investigative coliform samples collected?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
e. Have there been any: i. Recent reports of low pressure (less than 20 psi) or complete loss of pressure? ii. Recent repairs or new construction? iii. Pipe leaks that are not yet repaired? iv. Recent use of fire hydrants such as hydrant maintenance or flushing by utility or fire department? v. Recent reports of a cross-connection incident? vi. Off-normal events such as discolored water, odd taste, or smell? vii. Other changes in distribution conditions or operations that may have contributed to the TTT?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	
f. Inspect the distribution system. Are there any: i. Visible line breaks or leaks? ii. Observed cross connections? iii. Waterlogged pressure tanks? iv. Indications of vandalism or other security breach? v. Other:		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
3. Storage Facilities – Is there storage? If no, skip to Section 4.			
a. Are there standard procedures for periodic inspection of the exterior of each storage facility including vents, hatches, fittings for level gage/controls, and overflows?		<input type="checkbox"/> Yes <input type="checkbox"/> No	

Part A: Assessment		Corrective Action Needed?		Description, Comments, and Recommendations
b. Are there standard procedures for periodic inspection and cleaning of the interior of each storage facility?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
If more than one tank, for each corrective action noted below, name which tank(s) the action applies to:				
c. Are all storage facilities secured from unauthorized entry and vandalism?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
d. If there is an air vent, is it constructed to prevent entry of contaminants?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No		
e. If there is a fitting for a level gage or level controls, is it constructed to prevent entry of contaminants?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No		
f. If there is an overflow line that discharges to a storm drain, surface water, or into a sanitary sewer, is it protected by a proper air gap?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No		
g. Has there been:				
i. Any recent work done at a storage facility?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
ii. Any other changes in storage conditions or operations?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
h. Inspect each storage tank. Are there any:				
i. Any floating objects in the tank?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
ii. Cracks or unprotected openings in tank walls?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
iii. Unprotected openings in the tank roof?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
iv. Gaps or weak areas in access hatch seals?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
v. Holes in the air vent screen?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No		
vi. Weak points in the attachment of the screen to the vent structure?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No		
vii. Holes in the screen on the open end of overflow line?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No		
viii. Obstructions compromising the proper air gap where the overflow line discharges into a storm drain, surface water, or sanitary sewer?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No		
ix. Indications of vandalism or other security breach?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
x. Other:	<input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No		
4. Treatment – Is there treatment? If no, skip to Section 5.				
a. List every type of treatment in use:	<input type="checkbox"/> Yes <input type="checkbox"/> No			
b. Is any source continuously treated with a disinfectant? If yes, Are there standard procedures for:	<input type="checkbox"/> Yes <input type="checkbox"/> No			
i. Proper operation and maintenance of disinfection treatment facilities?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
ii. Monitoring disinfectant residual frequency per DOH requirement?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
Were:				
iii. Chlorine residuals 0.2 mg/L or greater in the Unsatisfactory samples?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
List residuals:				
iv. Chlorine residuals normal throughout the month the TTT occurred?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
v. All chlorine residual measurements from the last 90 days indicative of any on-going or recurring treatment issue?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		

Part A: Assessment		Corrective Action Needed?	Description, Comments, and Recommendations
c. Have there been any:			
i. Changes in treatment equipment or processes?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
ii. Recent interruptions in any treatment process?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
iii. Recent maintenance performed on any treatment component?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
d. Inspect the treatment facilities:			
i. Is the treatment system operating properly?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
ii. Is there any evidence of vandalism or other security breach?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
iii. Other:	<input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5. Source (if more than one source, note source number as needed)			
a. Does each source comply with the Sanitary Control Area requirements (WAC 246-290-135(2)?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
b. Are all sources protected from fecal contamination by appropriate placement and construction?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
c. Are there standard procedures for periodic inspection and maintenance of the source facilities?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
d. Are the source facilities secured from unauthorized entry and vandalism?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
e. Has there been any:			
i. Recent use of an unapproved source?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
ii. Recent land use changes?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
iii. Standing water, heavy precipitation, or flooding around a source in the last month?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
iv. Recent failure of a source pump?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No	
v. Recent maintenance on a source pump or other source component?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
vi. Other changes in source conditions or operations?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
f. Inspect the source facilities. Is:			
i. Sanitary control area free of all potential sources of contamination?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
ii. Top of well casing or spring box at risk of submergence?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
iii. Well cap sealed and watertight?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No	
iv. Well casing or spring box free of unprotected openings?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
v. Pressure tank water logged or off-line?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No	
vi. There any evidence of vandalism or other security breach?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
vii. Other:	<input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No	
6. Other assessment activities.			
a. Is it time for the additional barrier of continuous disinfection to be installed at this system? If no, why not? Explain:		<input type="checkbox"/> Yes <input type="checkbox"/> No	
b. Other activities:			

Part B: Assessment Summary and Corrective Action Plan with Timetable			
1. Actions Completed		Assessor: Summarize the issues found where corrective actions have been completed. Include photos, work receipts, and/or reports to depict assessment findings.	
Describe issue found	Describe corrective action taken		Date Completed
Click here to enter text	Click here to enter text		
Click here to enter text	Click here to enter text		
Click here to enter text	Click here to enter text		
2. Actions To be Taken	Assessor: Describe the issues found where corrective actions will be completed later.		Provide a timetable
Describe issue found	Describe planned corrective action		Expected Completion Date
Click here to enter text	Click here to enter text		
Click here to enter text	Click here to enter text		
Click here to enter text	Click here to enter text		

Assessor has discussed the Assessment findings with the Water System Owner: ☐ Yes ☐ No

If no, note the date when the discussion will occur: [Click here to enter text](#)

Signature of Assessor: _____ Date: [Click here to enter text](#)

Office of Drinking Water staff will review this assessment and determine if any of the issues identified are Sanitary Defects - a defect that could provide a pathway of entry for microbial contamination into the distribution system, or a defect that is indicative of a failure or imminent failure in a barrier that is already in place.

OFFICE OF DRINKING WATER USE ONLY

Regional Office Reviewer: Click here to enter text	Date of Review: Click here to enter text	Assessment sufficient?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Likely Cause Determined? <input type="checkbox"/> Yes <input type="checkbox"/> No	Sanitary Defects Identified? <input type="checkbox"/> Yes <input type="checkbox"/> No	Corrective Actions Complete?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Corrective Action Plan Included? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Corrective Action Plan approved? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
Comments: Click here to enter text			

PUBLIC NOTIFICATION TEMPLATES

DRINKING WATER WARNING

E. coli MCL Violation

The _____ Water System, ID _____, located in _____ County is contaminated with *E. coli* bacteria.

E. coli bacteria were detected in the water supply on _____. These bacteria can make you sick and are a particular concern for people with compromised immune systems. Boiled or purchased bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and food preparation until further notice. Boiling kills bacteria and other organisms in the water.

What should you do? **DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.** Bring all water to a rolling boil, for 1 minute, and let it cool before using. Boiling kills bacteria and other organisms in the water.

E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Human pathogens in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a greater health risk for infants, young children, the elderly, and people with severely compromised immune systems.

The symptoms above are not caused only by organisms in drinking water. If you experience any of these symptoms and they persist, you may want to seek medical advice. People at increased risk should seek advice about drinking water from their health care provider.

What happened? What is the suspected or known source of contamination?

The following is being done to correct the problem:

We will consult with the State Department of Health about this incident. We will provide you notification when you no longer need to boil the water. We anticipate resolving the problem by _____.

For more information please contact: _____
(owner/operator) (phone #) (address) (email)

Please share this notice with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is sent to you by _____ Water System on ____ / ____ / ____

This notice is sent to you by _____ Water System on ____ / ____ / ____

Stage 2 DBP Collection Schedule 2020

Updated 12-17-2019

January 2020						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
29	30	31	1 New Year's Day	2	3	4
5	6 Redmond 8 Port of Seattle 2	7	8	9	10	11
12	13 Bellevue 8 Bothell 4 Mercer Island 4 Kirkland 4	14	15	16	17	18
19	20 M L King Day	21	22	23	24	25
26	27	28	29	30	31	1

- Samples may be collected any time during your assigned week.
- Bottles will be shipped the week prior to sampling.
- **Bold** = SPU collects Stage 2 samples.

Stage 2 DBP Collection Schedule 2020

Updated 12-17-2019

February 2020						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
26	27	28	29	30	31	1
2	3 Coal Creek 4 Seattle 12 Skyway 2	4	5	6	7	8
9	10 Northshore 8 North City 4 Sammamish 8 Duvall 2	11	12	13	14	15
16	17 Presidents' Day	18	19	20	21	22
23	24	25	26	27	28	29

- Samples may be collected any time during your assigned week.
- Bottles will be shipped the week prior to sampling.
- **Bold** = SPU collects Stage 2 samples.

Stage 2 DBP Collection Schedule 2020

Updated 12-17-2019

March 2020						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2 Soos Creek 4 Highline 8 KCWD 20 4 KCWD 90 4	3	4	5	6	7
8	9 Woodinville 2 Tukwila 4 KCWD 49 4 KCWD 119 2 Olympic View 4 KCWD 125 4 Cedar River 4	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	1	2	3	4

- Samples may be collected any time during your assigned week.
- Bottles will be shipped the week prior to sampling.
- **Bold** = SPU collects Stage 2 samples.

Stage 2 DBP Collection Schedule 2020

Updated 12-17-2019

April 2020						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
29	30	31	1	2	3	4
5	6 Redmond 8 Port of Seattle 2	7	8	9	10	11
12	13 Bellevue 8 Bothell 4 Mercer Island 4 Kirkland 4	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	1	2

- Samples may be collected any time during your assigned week.
- Bottles will be shipped the week prior to sampling.
- **Bold** = SPU collects Stage 2 samples.

Stage 2 DBP Collection Schedule 2020

Updated 12-17-2019

May							2020	
Sun	Mon	Tue	Wed	Thu	Fri	Sat		
26	27	28	29	30	1	2		
3	4 Coal Creek 4 Seattle 12 Skyway 2	5	6	7	8	9		
10	11 Northshore 8 North City 4 Sammamish 8 Duvall 2	12	13	14	15	16		
17	18	19	20	21	22	23		
24	25 Memorial Day	26	27	28	29	30		
31	1	2	3	4	5	6		

- Samples may be collected any time during your assigned week.
- Bottles will be shipped the week prior to sampling.
- **Bold** = SPU collects Stage 2 samples.

Stage 2 DBP Collection Schedule 2020

Updated 12-17-2019

Sun	Mon	Tue	Wed	Thu	Fri	Sat
31	1 Soos Creek 4 Highline 8 KCWD 20 4 KCWD 90 4	2	3	4	5	6
7	8 Woodinville 2 Tukwila 4 KCWD 49 4 KCWD 119 2 Olympic View 4 KCWD 125 4 Cedar River 4	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	1	2	3	4

June

2020

- Samples may be collected any time during your assigned week.
- Bottles will be shipped the week prior to sampling.
- **Bold** = SPU collects Stage 2 samples.

Stage 2 DBP Collection Schedule 2020

Updated 12-17-2019

July 2020						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
28	29	30	1	2	3	4 Independence Day
5	6 Redmond 8 Port of Seattle 2	7	8	9	10	11
12	13 Bellevue 8 Bothell 4 Mercer Island 4 Kirkland 4	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1

- Samples may be collected any time during your assigned week.
- Bottles will be shipped the week prior to sampling.
- **Bold** = SPU collects Stage 2 samples.

Stage 2 DBP Collection Schedule 2020

Updated 12-17-2019

August 2020						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
26	27	28	29	30	31	1
2	3 Coal Creek 4 Seattle 12 Skyway 2 Highlands 1	4	5	6	7	8
9	10 Northshore 8 North City 4 Sammamish 8 Duvall 2	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	1	2	3	4	5

- Samples may be collected any time during your assigned week.
- Bottles will be shipped the week prior to sampling.
- **Bold** = SPU collects Stage 2 samples.

Stage 2 DBP Collection Schedule 2020

Updated 12-17-2019

September 2020							Sun	Mon	Tue	Wed	Thu	Fri	Sat
							30	31	1	2	3	4	5
							6	7	8	9	10	11	12
								Labor Day	Soos Creek 4 Highline 8 KCWD 20 4 KCWD 90 4				
							13	14	15	16	17	18	19
								Woodinville 2 Tukwila 4 KCWD 49 4 KCWD 119 2 Olympic View 4 KCWD 125 4 Cedar River 4					
							20	21	22	23	24	25	26
							27	28	29	30	1	2	3

- Samples may be collected any time during your assigned week.
- Bottles will be shipped the week prior to sampling.
- **Bold** = SPU collects Stage 2 samples.

Stage 2 DBP Collection Schedule 2020

Updated 12-17-2019

October 2020						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
27	28	29	30	1	2	3
4	5 Redmond 8 Port of Seattle 2	6	7	8	9	10
11	12 Bellevue 8 Bothell 4 Mercer Island 4 Kirkland 4	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

- Samples may be collected any time during your assigned week.
- Bottles will be shipped the week prior to sampling.
- **Bold** = SPU collects Stage 2 samples.

Stage 2 DBP Collection Schedule 2020

Updated 12-17-2019

November 2020						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2 Coal Creek 4 Seattle 12 Skyway 2	3	4	5	6	7
8	9 Northshore 8 North City 4 Sammamish 8 Duvall 2	10	11 Veterans Day	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26 Thanksgiving Day	27	28
29	30	1	2	3	4	5

- Samples may be collected any time during your assigned week.
- Bottles will be shipped the week prior to sampling.
- **Bold** = SPU collects Stage 2 samples.

Stage 2 DBP Collection Schedule 2020

Updated 12-17-2019

December							Sun	Mon	Tue	Wed	Thu	Fri	Sat
							29	30	1	2	3	4	5
							6	7 Soos Creek 4 Highline 8 KCWD 20 4 KCWD 90 4	8	9	10	11	12
							13	14 Woodinville 2 Tukwila 4 KCWD 49 4 KCWD 119 2 Olympic View 4 KCWD 125 4 Cedar River 4	15	16	17	18	19
							20	21	22	23	24	25	26
							27	28	29	30	31	1 Christmas	2

2020

- Samples may be collected any time during your assigned week.
- Bottles will be shipped the week prior to sampling.
- **Bold** = SPU collects Stage 2 samples.

NORTH CITY WATER DISTRICT

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TECHNICAL MEMORANDUM

Date: December 19, 2019
To: Diane Pottinger, P.E., District Manager
Denny Clouse, Operations Manager
From: Dave Harms, P.E.
Subject: Hydraulic Modeling, System Analysis and CIP Update



1. Introduction

This technical memorandum (tech memo) summarizes the hydraulic model (model) update and calibration, system analysis and CIP update performed by BHC Consultants, in support of the District's Comprehensive Water System Plan (Plan) update. The purpose of this effort was twofold:

- Update piping, operational settings, system demands and diurnal demand variations in the District's model and perform an update to the model calibration.
- Utilize the updated model to perform a system-wide analysis and identify Capital Improvement Plan (CIP) projects for the 10- and 20-year planning cycles.

The hydraulic analysis resulted in a prioritized set of capital projects to be included in the District Plan. These projects included a significant reconfiguration of the District's existing pressure zones, increasing the level of service and providing operational redundancy, as described later in this tech memo. A water age analysis was also performed, comparing water age for the reconfigured pressure zones and related improvements to existing-baseline water age.

System improvements identified in the system analysis resolve deficiencies in meeting current District performance criteria. These improvements form the foundation for the updated CIP, which is documented in the District's Plan. A significant effort in performing model iterations and collaborating with the District on alternative improvements, resulted in an efficient, cost-effective and justifiable CIP. The CIP also includes additional District-identified projects, such as replacement of aging pipeline and completion of piping loops to improve water age and distribution system redundancy.



Figure 1 illustrates the existing system configuration as it is represented in the existing model. The hydraulic analysis was performed using InfoWater software, by Innovyze. The software is developed specifically for modeling pressurized flow in water distribution systems and runs interactively with ArcMap.

2. Model Update and Calibration

2.1 Model Update

The model is based on physical data (pipes, storage tanks, pumps, valves, etc.) that define the distribution system. The most recent significant update to the model was performed during the previous Water System Plan. At that time, piping updates were input to the model, operational settings were verified/updated, system demands were updated, and a model calibration was performed. Periodic minor updates to the model have occurred since then, as important system piping updates have occurred, or for specific interim analyses.

2.1.1 Piping

Multiple updates to system piping were input to the model for this analysis, including:

- Supply Station 4 was constructed to add a secondary source to the 590 Zone and additional supply (CIP 2010-07)
- Input of 8-inch piping creating additional looping in the commercial area, just northwest of the intersection between Ballinger Way and 19th Avenue NE (WSEA 2017.09.16)
- Replacement of a segment of existing 6-inch cast-iron (CI) piping with 12-inch ductile-iron (DI) piping at NE 165th Street and 5th Avenue NE (WSEA 2012.05.32)
- Extending the 615 Zone to the northwest, adding several residential parcels at the intersection of 15th Avenue and 24th Avenue NE (CIP 2011.06)
- Updating the piping configuration for Kellogg Middle School (WSEA 2018.09.26).
- Piping updates were input to the model, representing the final configuration of improvements at the North City/Denny Clouse pump station (CIP 2011.06)
- Piping updates were removed from the model, to exclude an extension of the 615 Zone to the south. That portion of the zone expansion project was not constructed.
- Additional piping updates



2.1.2 Operational Settings

The following updates to operational settings were input to the model:

- The operating range for the 3.7 MG Tank was changed from 68-feet minimum water depth to 70-feet, to provide additional emergency storage and increase fire flow residual pressures.
- Minor adjustments to PRV settings were made.

2.1.3 System Demands

The spatial distribution of system demands was updated for the 2015 water age analysis performed for the District. Consumption from billing data was geo-located to achieve the spatial distribution. The same distribution of demands was preserved for this analysis and globally factored to match current (2017) total system demand. Large individual customer demands were reviewed and updated in the model as appropriate.

Diurnal demand patterns were based in part on District SCADA data, and adjusted as necessary to match peaking factors provided by the District. Demand projections were updated for the analysis, based on population projections and per capita rates provided by the District. Future scenario diurnal demand patterns and peaking factors are unchanged from the 2017 demand scenario.

2.2 Calibration

Model calibration was performed after completion of the updates described above. Model simulations were initially performed to identify candidate hydrant locations for flow tests. Pressure gauges were attached to hydrants adjacent to selected flow test hydrants and pressure readings were recorded before, during and after the hydrant flow tests. Flow rates from the hydrants were identified using telemetry data from the District's SCADA system. Model simulations were then performed in an iterative manner, adjusting Hazen Williams 'C' values until simulated pressure drops matched field-recorded pressure drops within an acceptable tolerance. Model calibration is described in detail in the June 28, 2018 calibration memo to the District.



3. Analysis Assumptions and Criteria

3.1.1 Supply

- The District obtains all its water from SPU, through multiple connections to separate pressure zones. These supply connections (not including emergency/fire flow supply) are described in detail in the Plan and summarized herein:
 - Supply Station 4 (SS-4) is the primary 590 Zone supply. Booster Stations 1 and 2 (BS-1, BS-2) are secondary supplies to the 590 Zone.
 - The 615 Zone is supplied from the 590 Zone, through the North City/Denny Clouse Pump Station (NC/DCPS).
 - Supply Station 1 (SS-1) is the primary supply to the 502 Zone. Supply Station 3 (SS-3) is the secondary supply. The 502 Zone can also be supplied through a PRV from the 590 Zone, located in the NC/DCPS.
 - Supply Station 2 (SS-2) is the primary supply to the 432 Zone. It supplies water directly to the 2.0 Tank, which provides a free water surface to the 432 Zone that establishes pressures in the zone. The 432 Zone also receives water from the 590 Zone, through PRVs-4, 5, 7 and 8 and from the 502 Zone through PRVs-2 and 13.
 - The 307 Zone is supplied directly from the 432 Zone, through PRVs.
 - The 237 Zone is supplied directly from the 307 Zone (indirectly from the 432 Zone) through PRVs.

3.1.2 Analysis Criteria

- The minimum system pressure requirement is 30 psi, during the Peak Hour Demand (PHD) scenario and with storage tanks at the bottom of their respective equalizing ranges (30 ft below overflow in the 3.7 Res and 10 ft below overflow in the 2.0 Res), per State Department of Health (DOH) and District criteria.
 - Minimum transmission piping pressure must be at least 5 psi, except when adjacent to a storage tank.
- Maximum system pressures are based on minimum system demand and with storage tanks full. The District requires installation of service line PRVs if the maximum system pressure exceeds 80 psi.
- Fire flows are superimposed over existing Maximum Day Demand (MDD) conditions, assuming operational, equalizing and fire flow storage volumes have been depleted, in



accordance with (DOH) criteria. Minimum residual pressures during fire flow simulations must be greater than 20 psi at all locations in the distribution system.

- Fire flow simulation in the 615 Pressure Zone occurs with one of the fire pumps out of service, in accordance with Department of Health requirements.
- Fire flow simulation in the 590 Zone is performed alternatively, with BS-1 operating, then BS-2.
- Maximum allowed velocity in the distribution system is 10 feet per second for existing mains and 8 feet per second for new mains, for peak domestic and fire flow demand scenarios (District design standard criteria, Section 4 of the Plan)
- Baseline pump operations are consistent with reservoir level-based controls. Separate modeling scenarios were simulated, with 590 Zone supply provided individually by BS-1, then BS-2.
- PRVs are at their current set points.

4. Analysis Results and Recommendations

4.1 Existing Conditions

Maximum and minimum system domestic pressures and fire flow availability were initially analyzed for the existing distribution system configuration, operational settings and system demands. Note that the analysis was originally performed assuming the southern portion of the east 615 Zone extended further south, to NE 165th Street (from the 2010 CIP). The following figures are based on this assumption (2018), which was updated prior to completing the final analysis and identifying system improvements.

4.1.1 Minimum Pressures

Figure 2 illustrates minimum domestic pressures in the existing system configuration, during PHD and with storage tanks at the bottom of their equalizing ranges (30 ft below overflow in the 3.7 Res and 10 ft below overflow in the 2.0 Res). Model results indicate minimum pressure is below criteria (27 psi) at one location in the southern 432 Zone ("Nob"), on 32nd Avenue NE. Note that with the 2.0 Tank at the bottom of its operating level during PHD, the primary supply into the southern 432 Zone becomes PRV 2, even with the 25th Avenue pipeline open.



4.1.2 Maximum Pressures

Figure 3 illustrates existing maximum system pressures, during minimum system demand and with storage tanks full. All maximum system pressures exceed the 30 psi minimum pressure criteria and range to greater than 110 psi in a few areas. Areas experiencing these maximum pressures are primarily located in the southern portion of the District's service area.

4.1.3 Fire Flows

Systemwide fire flow simulations were performed individually, for each Land Use Category. Fire flow rates are assigned based on local land use/ zoning codes. The minimum required fire flow rate is 1,000 gpm for single-family residential zoned areas (Figures 4 and 5). The District considered a minimum fire flow rate in single family to be 1,500 gpm (Figures 6 and 7). Fire flow requirements increase with the density of residential developments and include 1,750 gpm (Figures 8 and 9) and 2,500 gpm (Figures 10 and 11) rates. Commercially zoned areas require a 3,000 gpm (Figures 12 and 13) rate. Fire flow rates for schools and churches are individually assigned a 3,500 gpm (Figures 14 and 15) rate. The fire flow modeling results shown in Figures 4 through 15 represent the model results only for nodes where the fire flow rate indicated is required. For example, Figures 14 and 15 show the results for the fire flow locations where 3,500 gpm is the required fire flow. Figures 14 and 15 do not show the results where 3,500 gpm fire flows are not required.

In accordance with the stated analysis criteria, each systemwide fire flow simulation was performed alternatively, with BS-1, then BS-2 operational. Figures 4 and 5 illustrate simulation results for the 1,000 gpm residential fire flow rate. Only two differences in fire flow deficiencies occur between the two alternative booster station operating scenarios. These differences are located along 10th Avenue, in the central 590 Zone. Most of the fire flow deficiencies are located on dead-end 6-inch or 4-inch pipelines, which cannot convey the required fire flow without exceeding the velocity criteria.

Although the District does not have a 1,500 gpm fire flow requirement, there was interest in determining deficiencies associated with this fire flow rate, for comparison with the 1,000 gpm residential rate. Figures 6 and 7 illustrate results for the 1,500 gpm rate. Model results indicate that 6-inch looped pipe typically does not support a 1,500 gpm rate due to excessive velocities. Nearly all deficiencies are limited by excessive velocity, except for one location in the southern



432 Zone, where the relatively higher elevation and smaller distribution piping results in residual pressures falling below the 20 psi criteria.

Medium density zoned residential developments require a 1,750 gpm fire flow rate. Results for this requirement are illustrated in Figures 8 and 9. High density zoned residential developments require 2,500 gpm. Results for this fire flow requirement are illustrated in Figures 10 and 11. Commercially zoned developments require 3,000 gpm. Figures 12 and 13 illustrate results for this requirement.

The District also requires 3,500 gpm for schools and churches. Schools and churches have been individually identified and assigned this fire flow requirement in the model. Figures 14 and 15 illustrate results for this requirement.

4.2 Future Scenario Analyses with Improvements

Improvements identified to resolve existing conditions deficiencies were then simulated for future (10- and 20-year) scenarios. Analysis results verified the adequacy of existing improvements, and any additional improvements necessary to meet performance criteria for the future scenarios. Figure 16 illustrates system improvements input to the model to resolve deficiencies. These improvements form the foundation for the CIP identified in the Plan.

The projects identified to resolve deficiencies using 2019 District design standards included a significant reconfiguration of the District's existing pressure zones. The existing 502 Zone has been expanded to encompass the southern portion of the 432 and 590 Zones. The HGL for this reconfigured zone was set at 520 feet. This pressure zone reconfiguration accomplishes several purposes:

- Resolves minimum domestic pressure deficiencies on 32nd Avenue NE, in the southern 432 Zone. These deficiencies are caused by a combination of relatively high elevation, compared to the 432 Zone HGL, distance from the 2.0 Tank supply source and older, smaller sized piping that experiences higher pressure loss.
- Resolves multiple fire flow deficiencies in the 432, 307, and 237 Zones caused primarily by residual pressure dropping below the 20 psi criteria at the same location in 32nd Avenue NE.
- Decreases high domestic pressures in the relatively lower elevation southern 590 Zone.



- Provides operational redundancy. The reconfigured zone can be supplied by:
 - SS-1
 - PRVs recommended to be installed at the southern 590 Zone boundary
 - A new supply station proposed to be located at the southern 590 Zone boundary
 - The NC/DCPS 590 to 520 PRV, reconfigured from the 502 HGL
 - The check valve installation at the PRV-13 location, for fire flows
 - PRV 1, for fire flows
- Analysis results indicate that the improved operational redundancy provides additional opportunities to manage (decrease) water age.
 - When the SS-1 & PRVs proposed for the 590-520 boundary are set at the same HGL, flow direction reverses as demand increases.
 - During minimum demand conditions, SS-1 supply travels south & mixes with PRV-supplied flow in the southern 590 Zone, at approximately 17th Avenue NE.
 - For PHD demand conditions, PRV-supplied flow travels east then north & mixes with SS-1 supply at approximately the location of PRV-10.

Another significant project is relocation of BS-1 to the District's new maintenance facility site, located on 15th Avenue adjacent to Hamlin Park. This project will include:

- 12-inch diameter suction line piping from the existing BS-1 site to the new pump station location.
- New pump station with approximately 2,000 gpm capacity duplex pumps.
- 1.5 MG concrete storage tank.
- New gravity feed supply station (SS-5) from SPU to the 520 Zone.
- 590 to 520 Zone PRV station.

With completion of the booster station relocation project, the District will have a new maintenance facility, booster station, supply station, storage tank and PRV station all located at one site.

The 615 Zone will be expanded to encompass a non-contiguous area surrounding the newly reconstructed Kellogg Middle School. This zone expansion will increase residual pressures to meet the 20 psi criteria for the increased fire flow requirement associated with the reconstructed



school. The expanded pressure zone will also increase domestic and residual fire flow pressures for this relatively higher elevation area. It will also improve fire flow availability in the 590 Zone, by removing and relocating areas with limiting residual pressures to the expanded 615 Zone.

The rest of the CIP projects are identified primarily to resolve excessive velocity occurring during fire flow conditions. Prioritization of CIP projects between the 10- and 20-year planning periods was accomplished through coordination with the District.

Several operational adjustments were identified in the hydraulic analysis. These adjustments assist with establishment of the 520 Zone, but also mitigate fire flow deficiencies without the need for additional piping improvements. The operational adjustments identified below will occur after the entire 520 Zone is created:

- Adjust NC/DCPS 590 – 520 PRV to a setting of 6 psi, equivalent to a 510-foot HGL. With this adjustment, the PRV will serve as a secondary/fire flow supply to the new 520 Zone.
- Adjust PRV-4 to 81 psi (506-foot HGL; 3-inch valve) and 76 psi (495-foot HGL; 8-inch valve), to serve the new 520 Zone.
- PRV-2 will be relocated further down the hill in NE 178th Street, to the intersection with 28th Avenue NE. The PRV should be adjusted to provide a 432-foot HGL. Actual pressure settings will depend on the elevation of the relocated PRV.
- Adjust PRV-1 to a setting of 64 psi, equivalent to a 486-foot HGL. This new setting will allow PRV-1 to supplement fire flows to the new 520 Zone, west of I-5.
- Adjust PRVs 6, 3 and 10, serving the 307 Zone. The recommended PRV settings will change the lead PRV from PRV-10 to PRV-6. These changes mitigate the need for piping improvements associated with fire flows.
 - Set PRV-6 to 56 psi (308-foot HGL; 2-inch valve) and 51 psi (296-foot HGL; 6-inch valve).
 - Set PRV-10 to 59 psi (238-foot HGL; 3-inch valve) and 54 psi (227-foot HGL; 8-inch valve).
 - Set PRV-3 to 43 psi (283-foot HGL; 1.5-inch valve) and 38 psi (271-foot HGL; 8-inch valve).



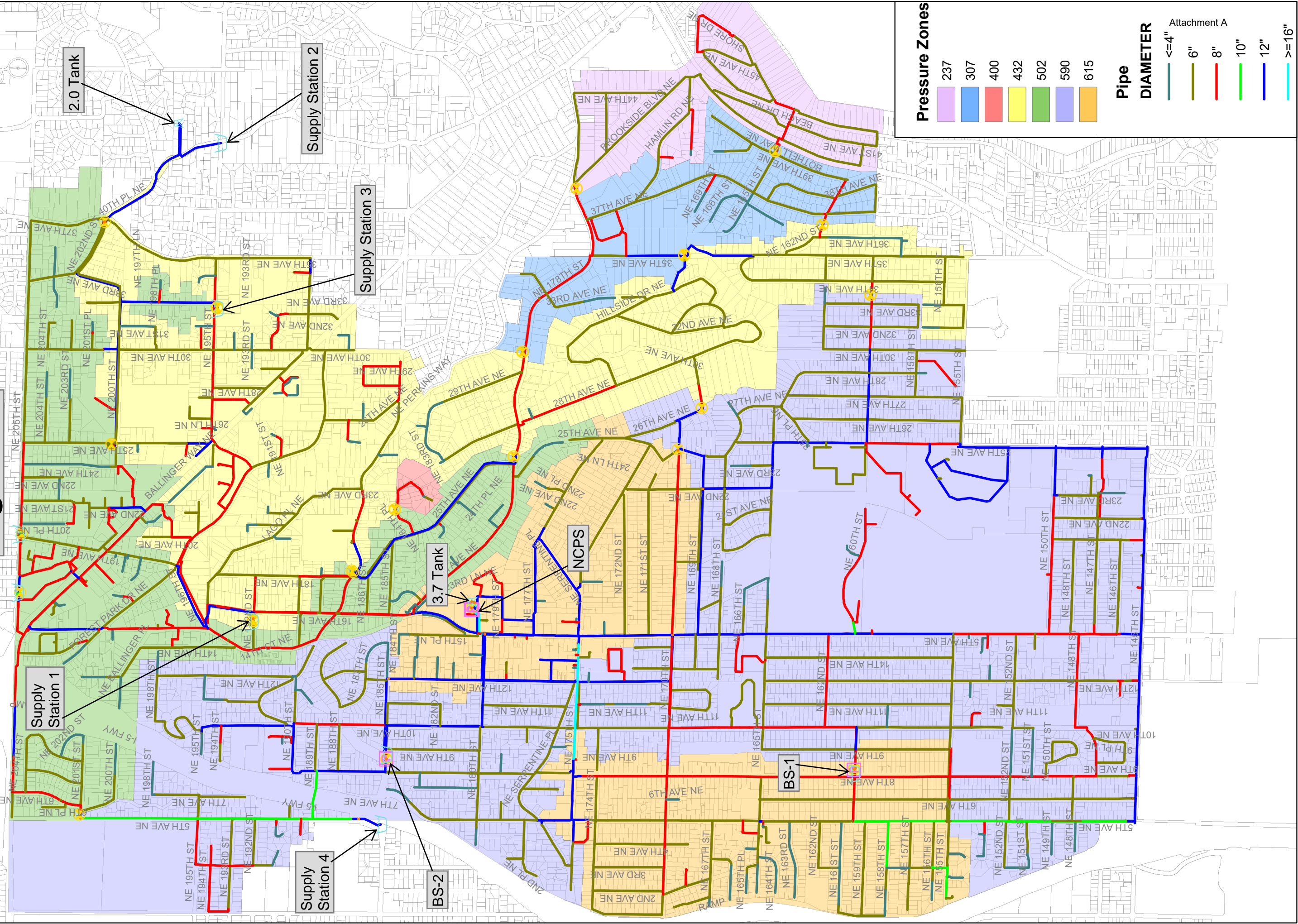
- Adjust PRV-12 to a setting of 45 psi (190-foot HGL; 2-inch valve) and 40 psi (178-foot HGL; 6-inch valve). The recommended PRV settings will rebalance fire flow distribution for the 1,750 gpm requirement and mitigate a velocity deficiency. Settings for the lead PRV (#11) to the 237 Zone are recommended to remain unchanged.
- Adjust the SS-1 432 Zone PRV to a setting of 59 psi (399-foot HGL) to provide additional flow for large 432 Zone fire flows. At the recommended setting, SS-1 will remain closed to the 432 Zone during normal/domestic supply conditions.

Attachments

- Figure 1 – Existing Model
- Figure 2 – 2017 Minimum System Pressures
- Figure 3 – 2017 Maximum System Pressures
- Figure 4 – Existing 1,000 gpm Fire Flow: BS-1 on
- Figure 5 – Existing 1,000 gpm Fire Flow: BS-2 on
- Figure 6 – Existing 1,500 gpm Fire Flow: BS-1 on
- Figure 7 – Existing 1,500 gpm Fire Flow: BS-2 on
- Figure 8 – Existing 1,750 gpm Fire Flow: BS-1 on
- Figure 9 – Existing 1,750 gpm Fire Flow: BS-2 on
- Figure 10 – Existing 2,500 gpm Fire Flow: BS-1 on
- Figure 11 – Existing 2,500 gpm Fire Flow: BS-2 on
- Figure 12 – Existing 3,000 gpm Fire Flow: BS-1 on
- Figure 13 – Existing 3,000 gpm Fire Flow: BS-2 on
- Figure 14 – Existing 3,500 gpm Fire Flow: BS-1 on
- Figure 15 – Existing 3,500 gpm Fire Flow: BS-2 on
- Figure 16 – Future CIP Model

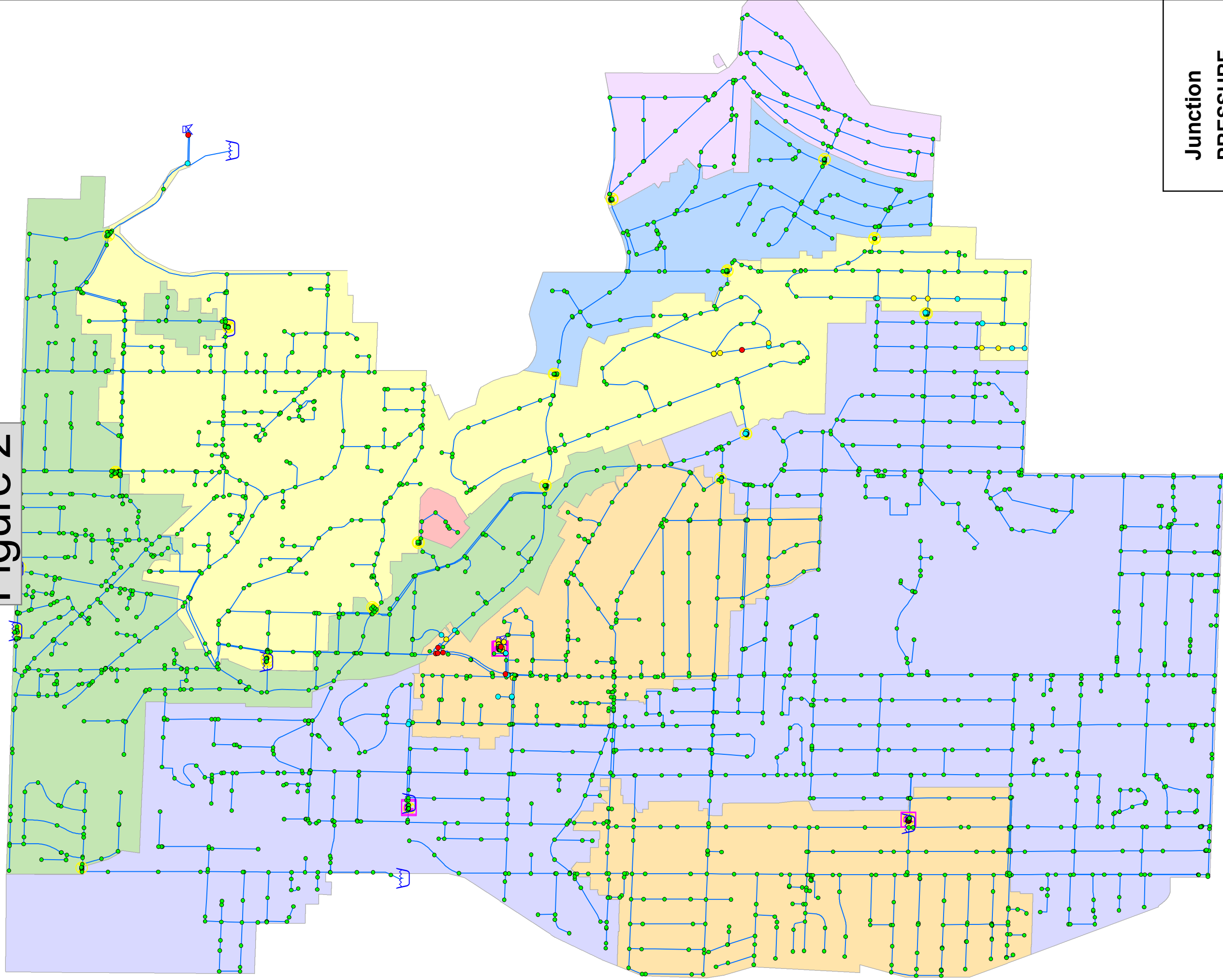
***North City Water District
Existing Model***

Figure 1



North City Water District 2017 Minimum System Pressures

Figure 2



**Junction
PRESSURE**

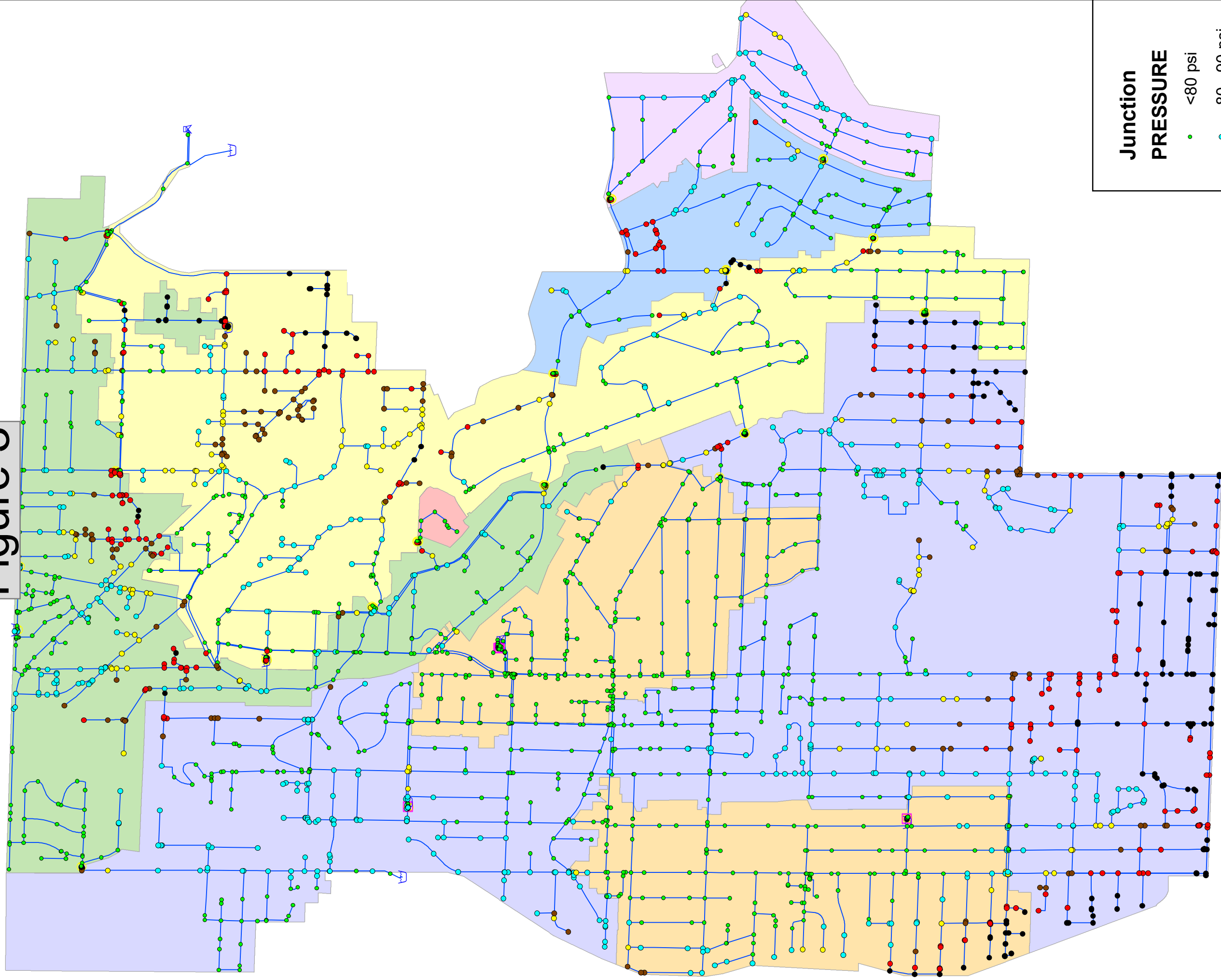
Attachment A

- < 30 psi
- 30 - 35 psi
- 35 - 40 psi
- > 40 psi

Minimum system pressures occur during Peak Hour
Demand conditions and with the storage tanks at the
bottom of their respective equalizing ranges

North City Water District 2017 Maximum System Pressures

Figure 3



**Junction
PRESSURE**

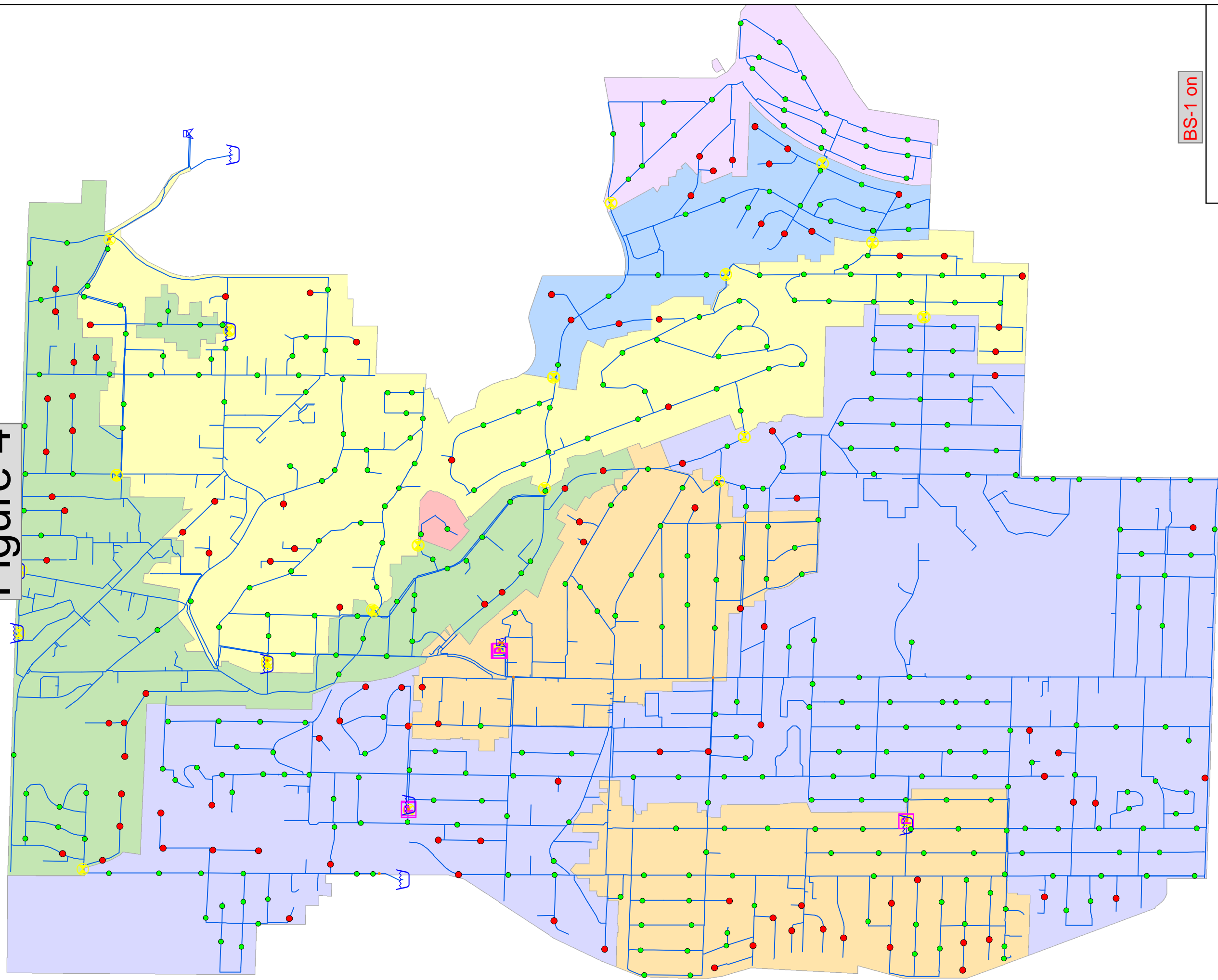
Attachment A

- <80 psi
- 80 - 90 psi
- 90 - 95 psi
- 95 - 100 psi
- 100 - 110 psi
- > 110 psi

Maximum system pressures occur during periods of minimum demand and with the storage tanks full

***North City Water District
Existing 1,000 gpm Fire Flow***

Figure 4



BS-1 on

Attachment A

Junction

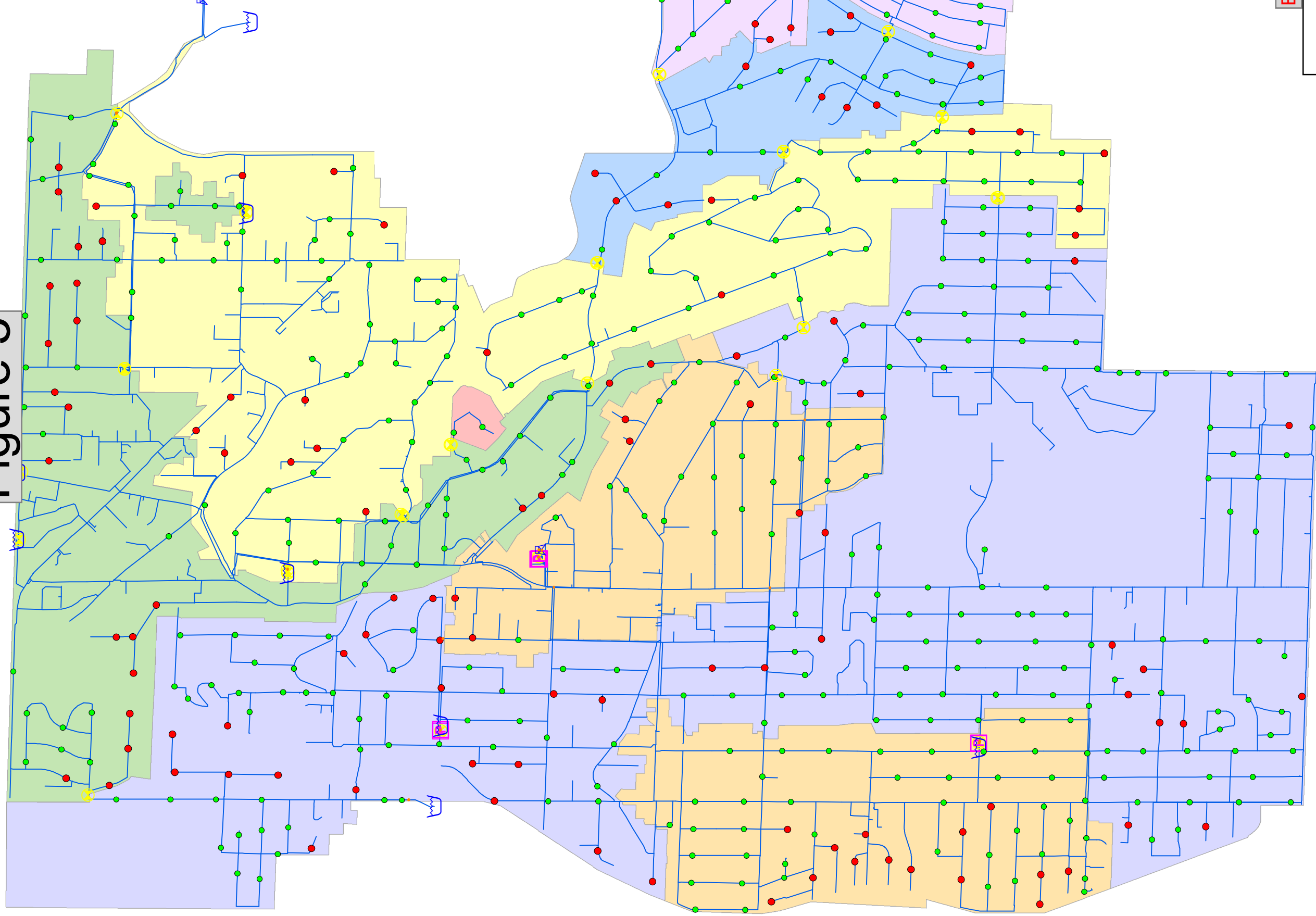
AVAIL_FLOW

- < 1000 gpm

- > 1000 gpm

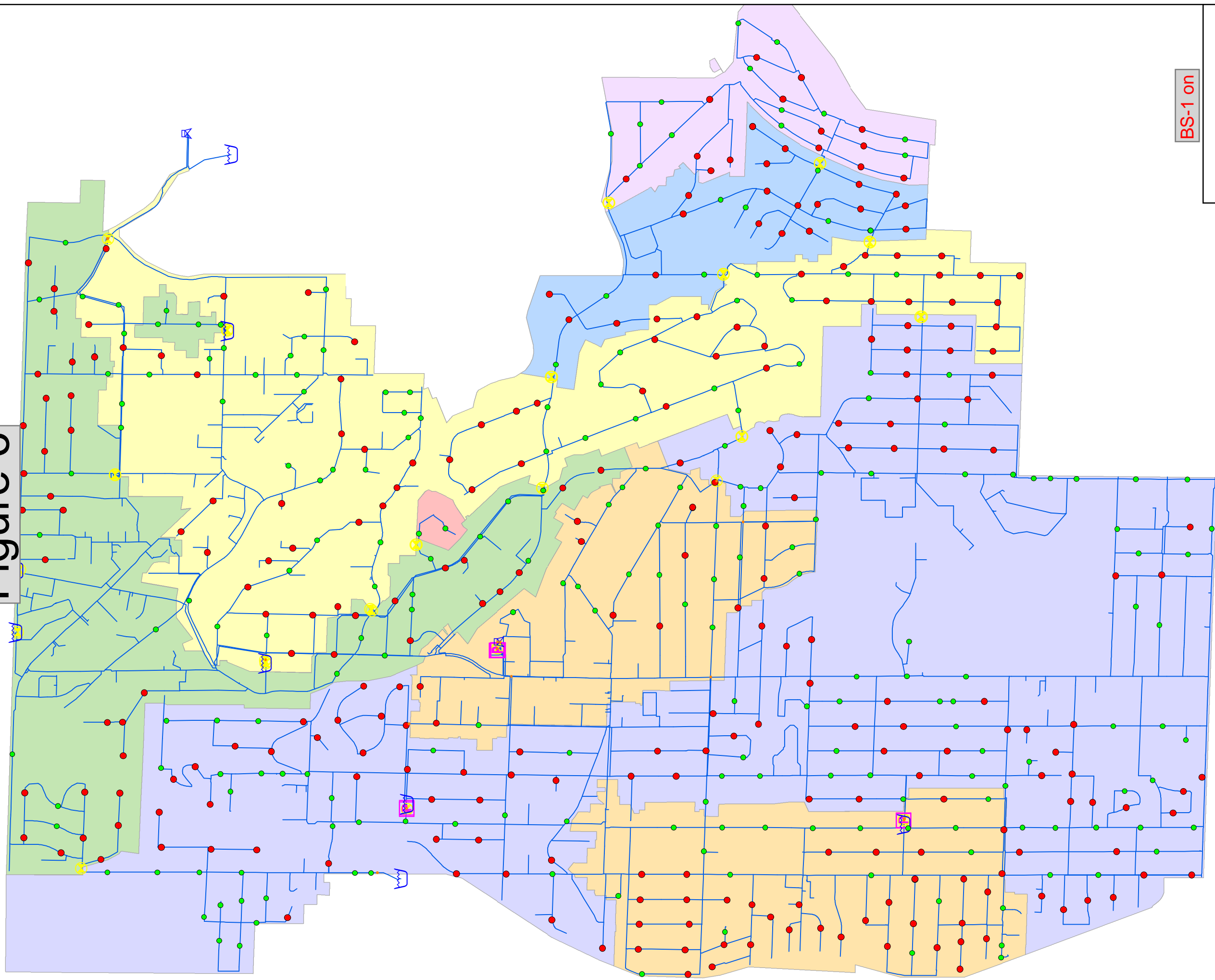
North City Water District Existing 1,000 gpm Fire Flow

Figure 5



***North City Water District
Existing 1,500 gpm Fire Flow***

Figure 6



BS-1 on

Attachment A

Junction

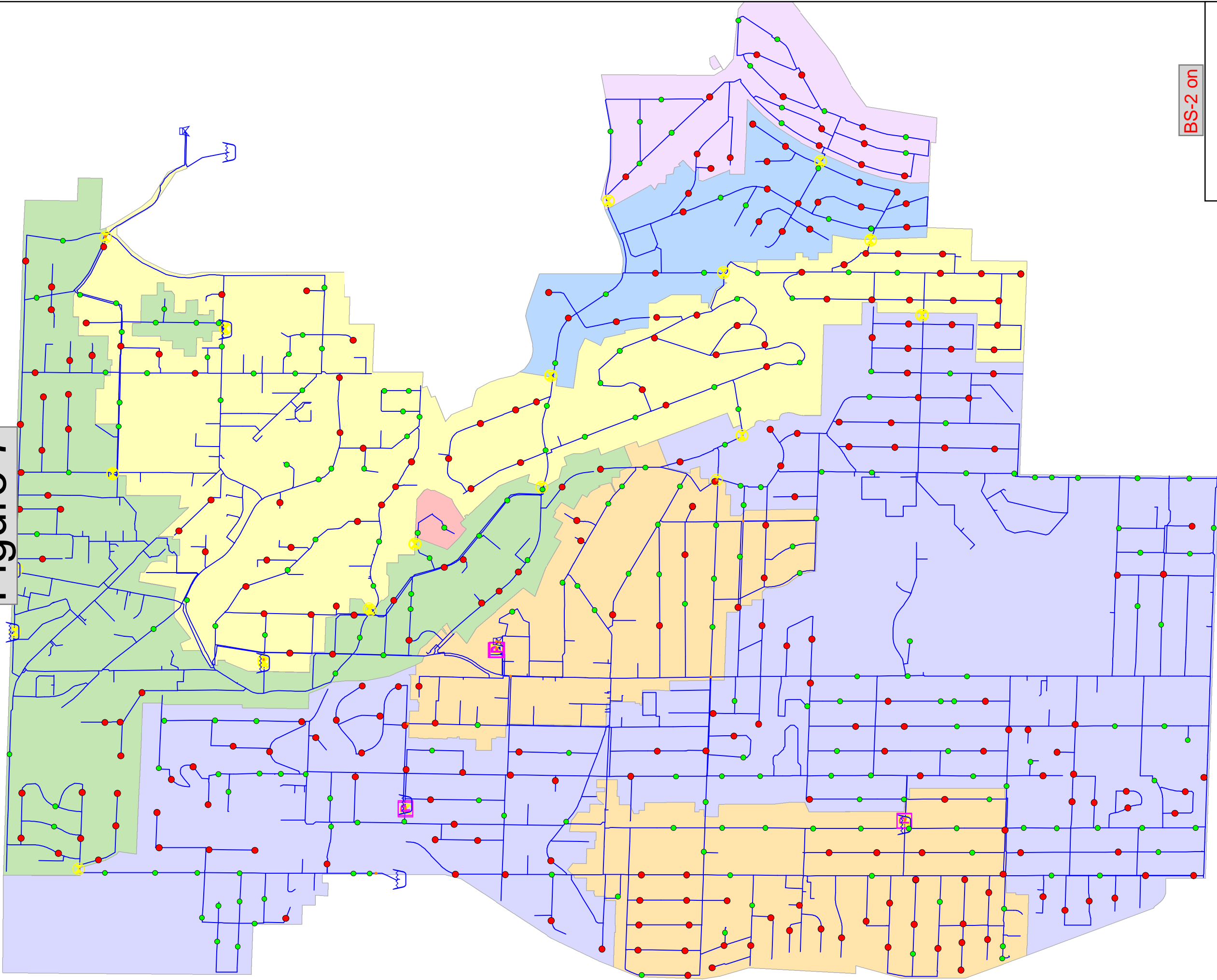
AVAIL_FLOW

- < 1500 gpm

- > 1500 gpm

***North City Water District
Existing 1,500 gpm Fire Flow***

Figure 7



BS-2 on

Attachment A

Junction

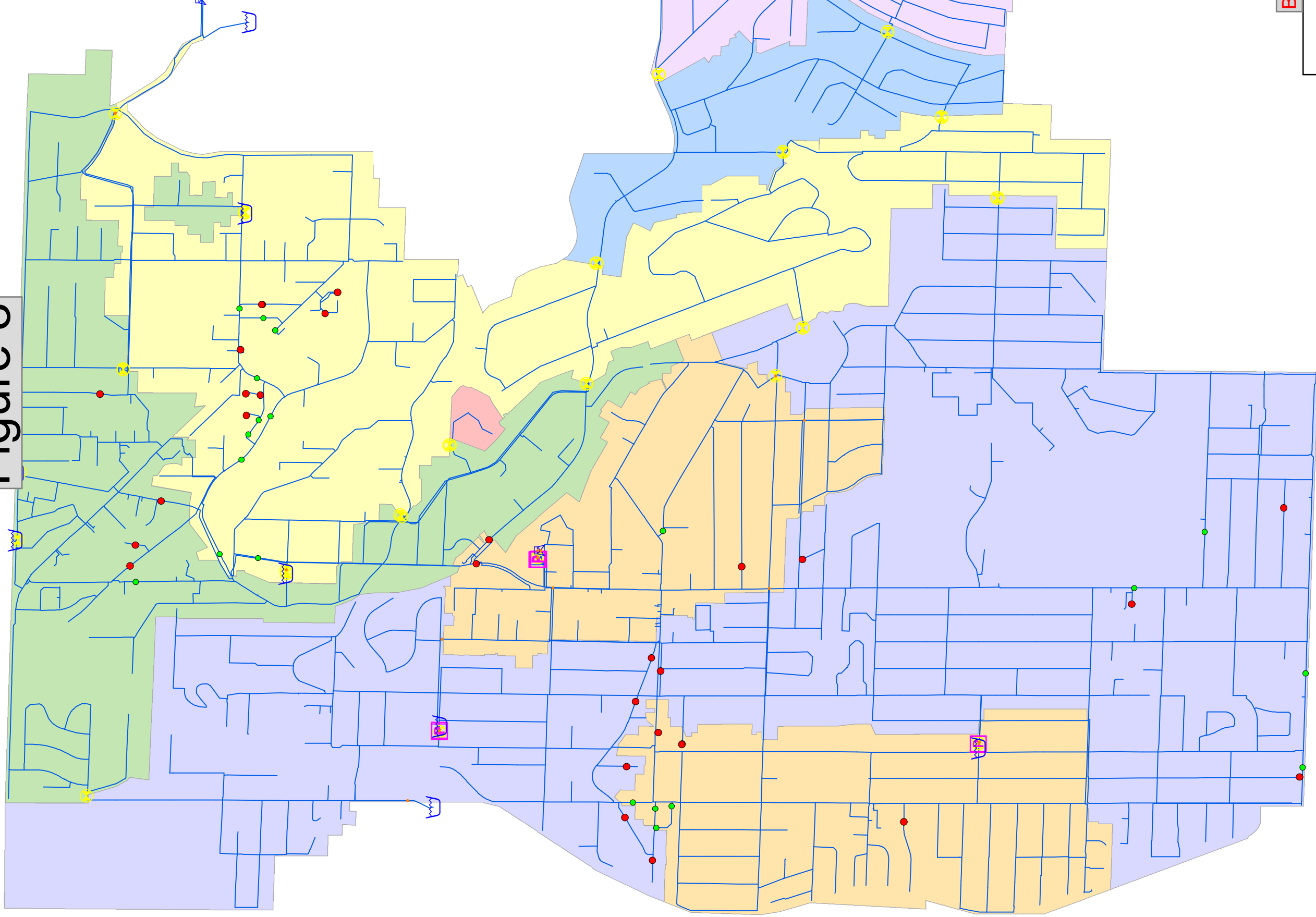
AVAIL_FLOW

- < 1500 gpm

- > 1500 gpm

*North City Water District
Existing 1,750 gpm Fire Flow*

Figure 8



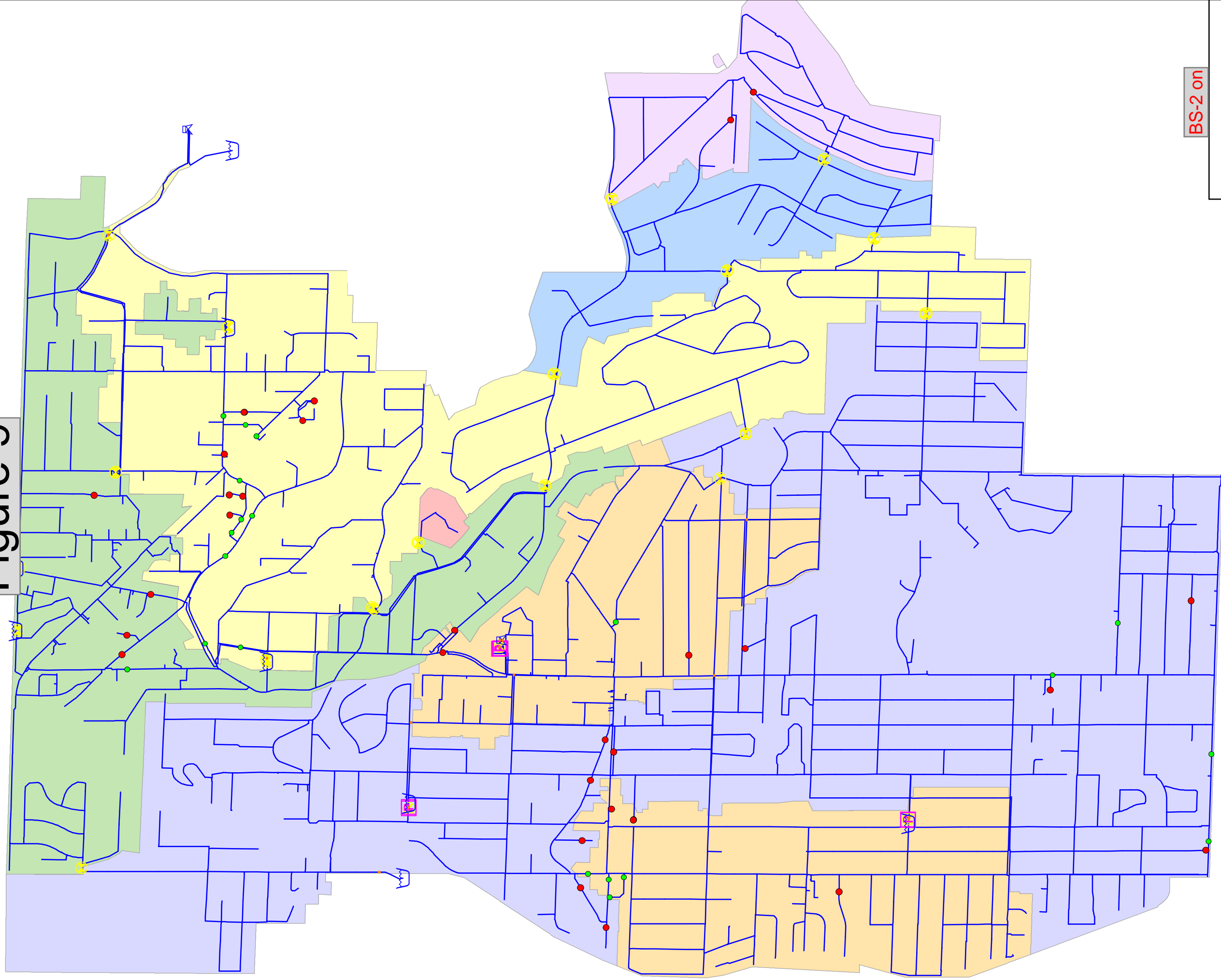
BS-1 on

Attachment A

Junction	AVAIL_FLOW
●	< 1750 gpm
●	> 1750 gpm

*North City Water District
Existing 1,750 gpm Fire Flow*

Figure 9



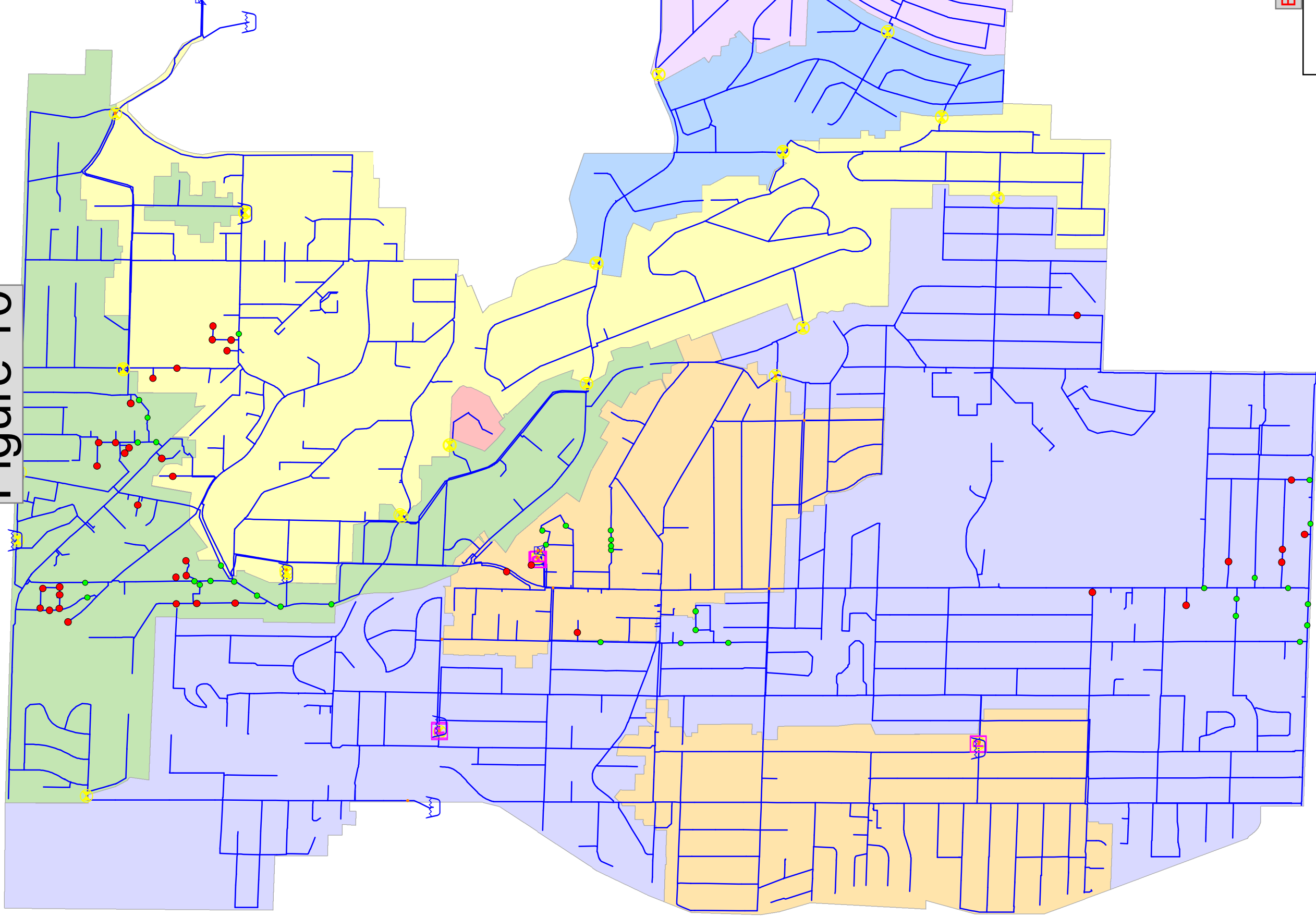
BS-2 on

Attachment A

Junction	AVAIL_FLOW
•	< 1750 gpm
•	> 1750 gpm

*North City Water District
Existing 2,500 gpm Fire Flow*

Figure 10



BS-1 on

Attachment A

Junction

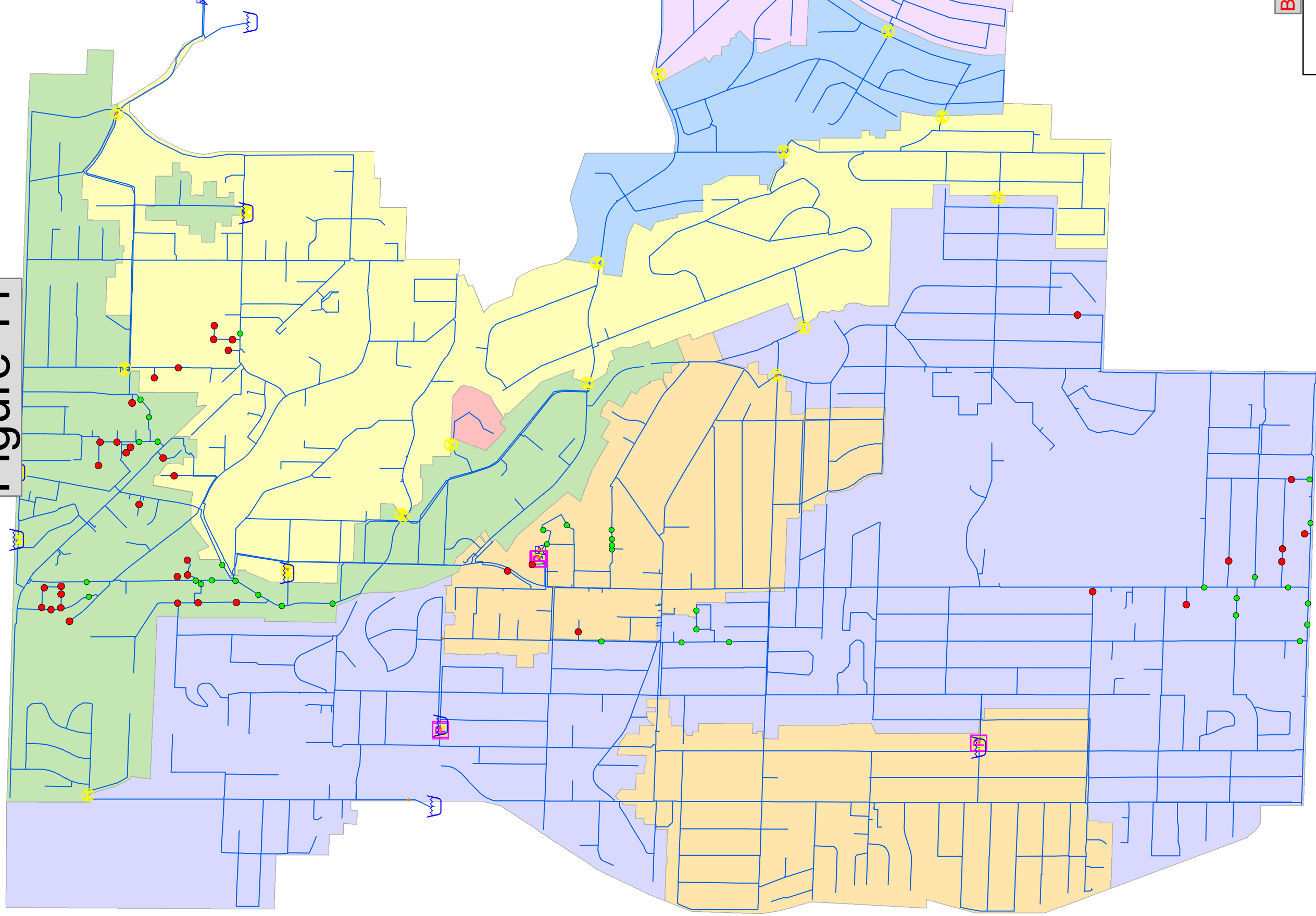
AVAIL_FLOW

• < 2500 gpm

• > 2500 gpm

North City Water District Existing 2,500 gpm Fire Flow

Figure 11



BS-2 on

Attachment A

Junction

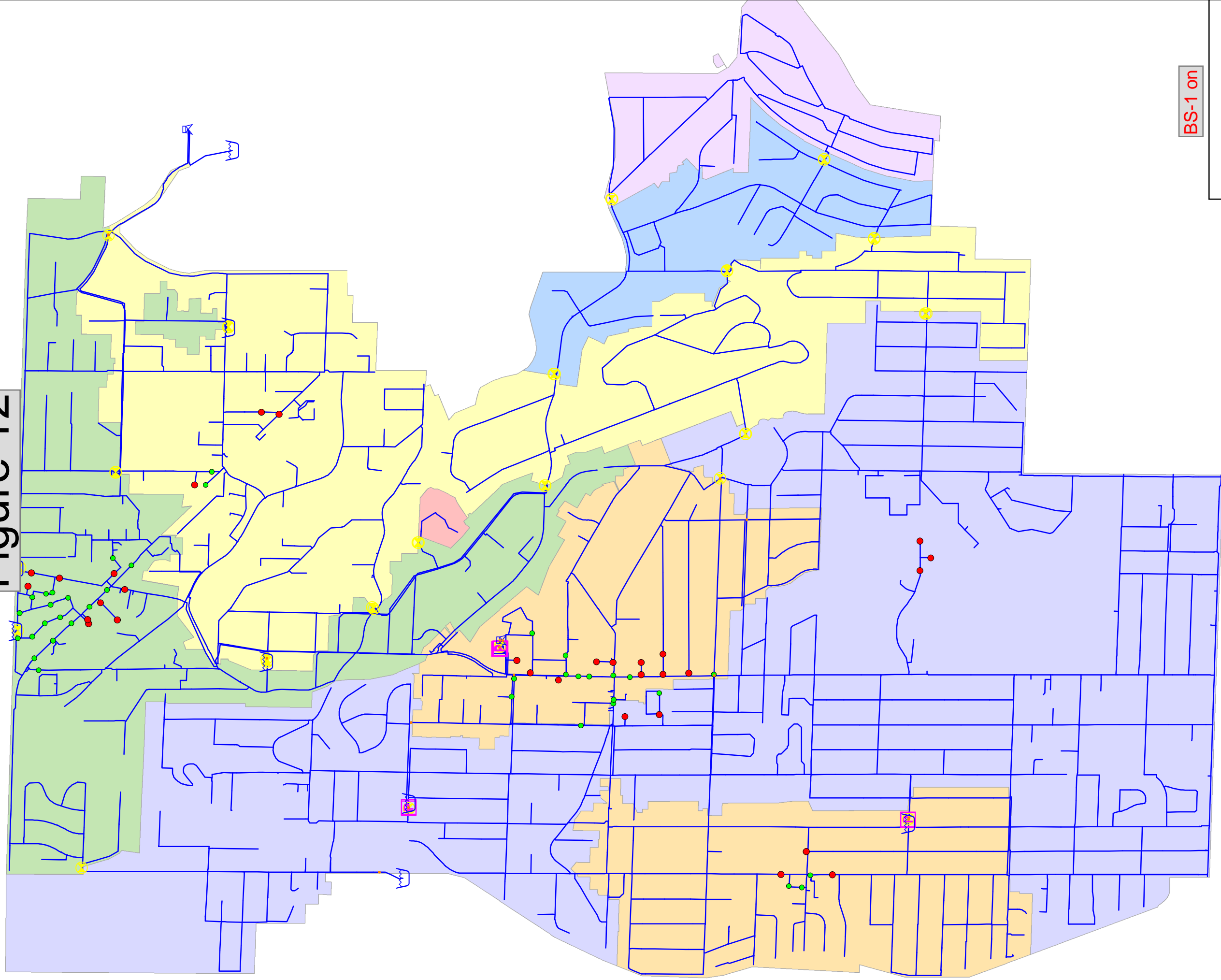
AVAIL_FLOW

• < 2500 gpm

• > 2500 gpm

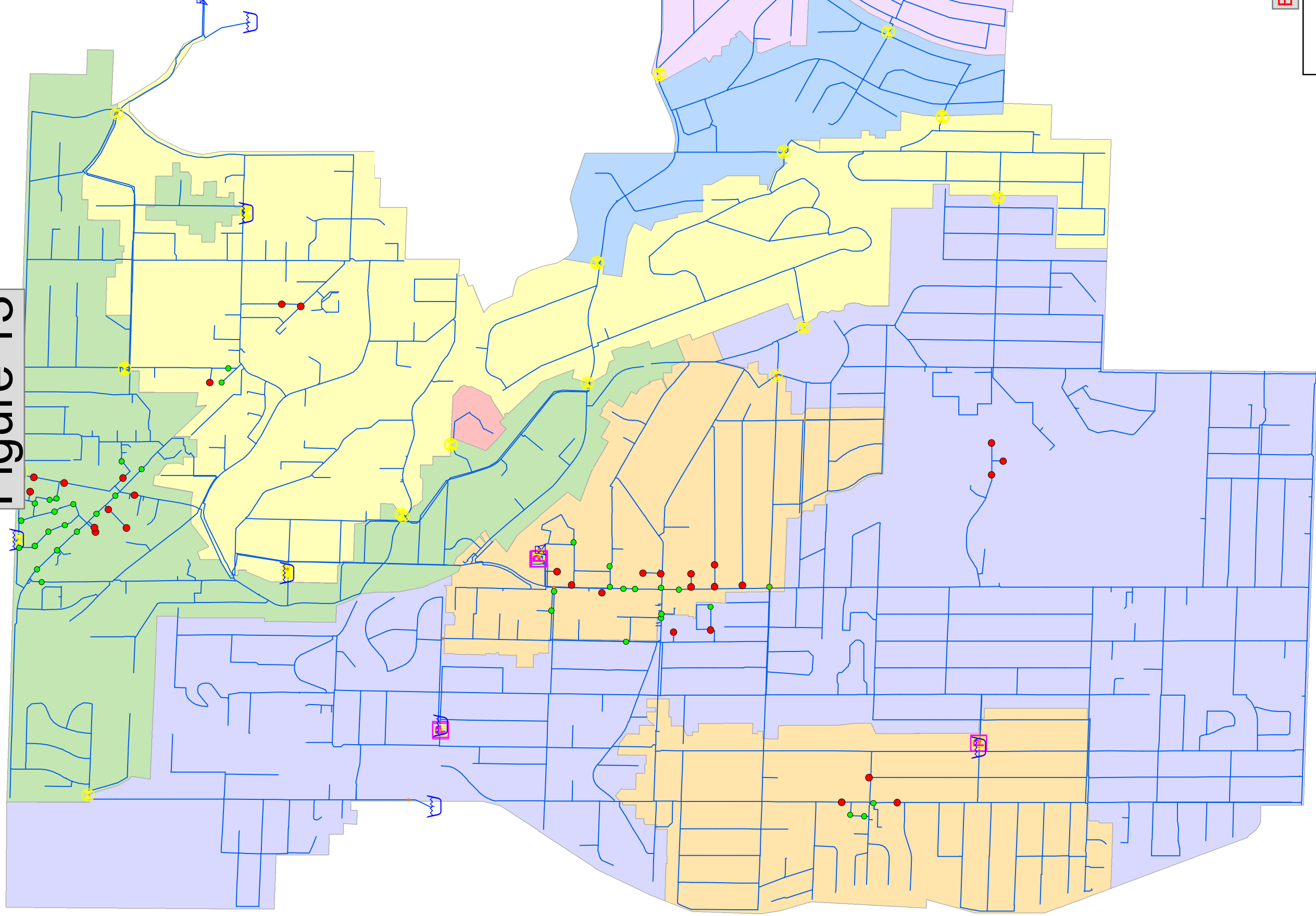
*North City Water District
Existing 3,000 gpm Fire Flow*

Figure 12



North City Water District Existing 3,000 gpm Fire Flow

Figure 13



BS-2 on

Attachment A

Junction

AVAIL_FLOW

•

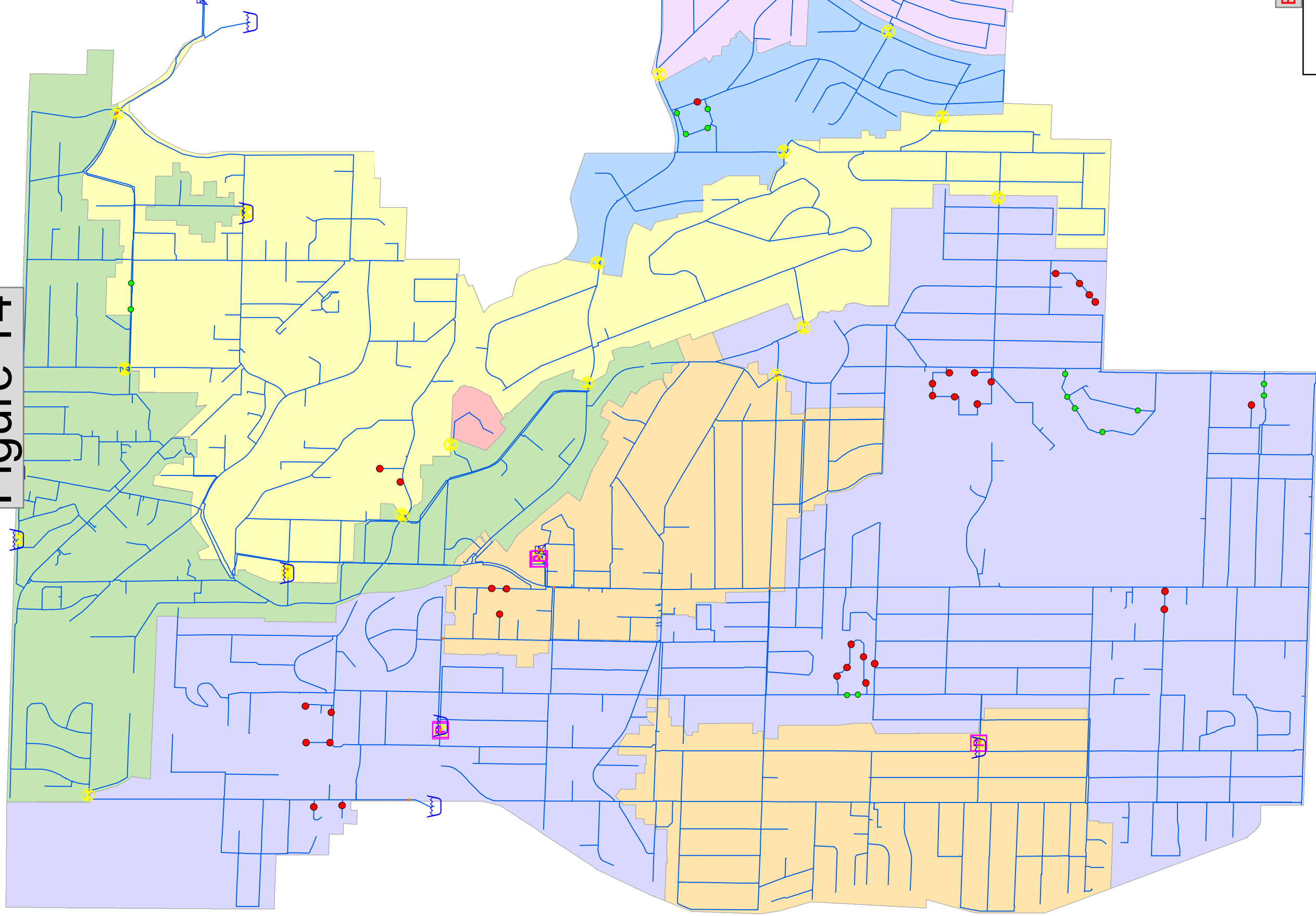
< 3000 gpm

•

> 3000 gpm

North City Water District Existing 3,500 gpm Fire Flow

Figure 14



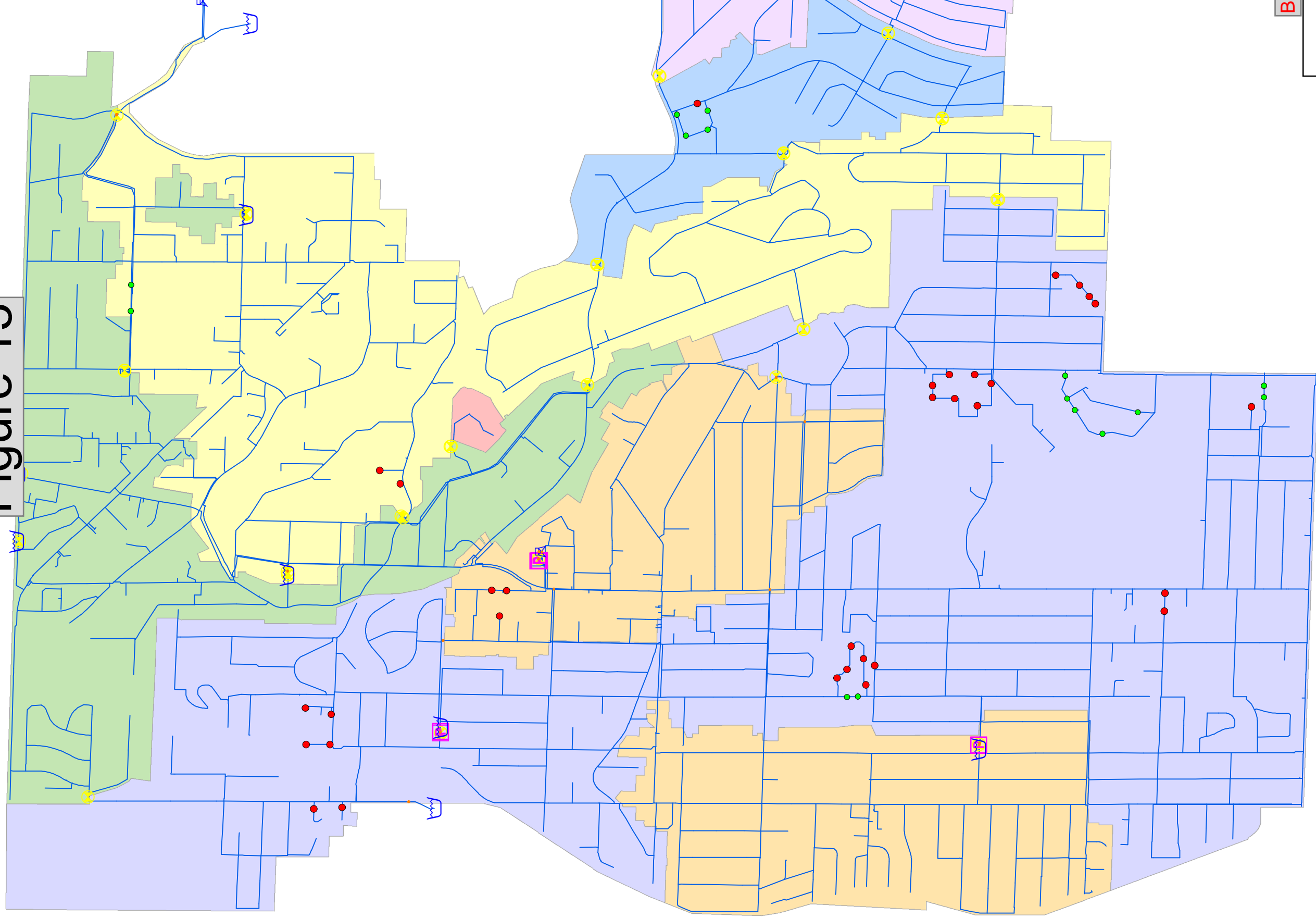
BS-1 on

Attachment A

Junction	AVAIL_FLOW
	< 3500 gpm
	> 3500 gpm

North City Water District Existing 3,500 gpm Fire Flow

Figure 15



BS-2 on

Attachment A

Junction

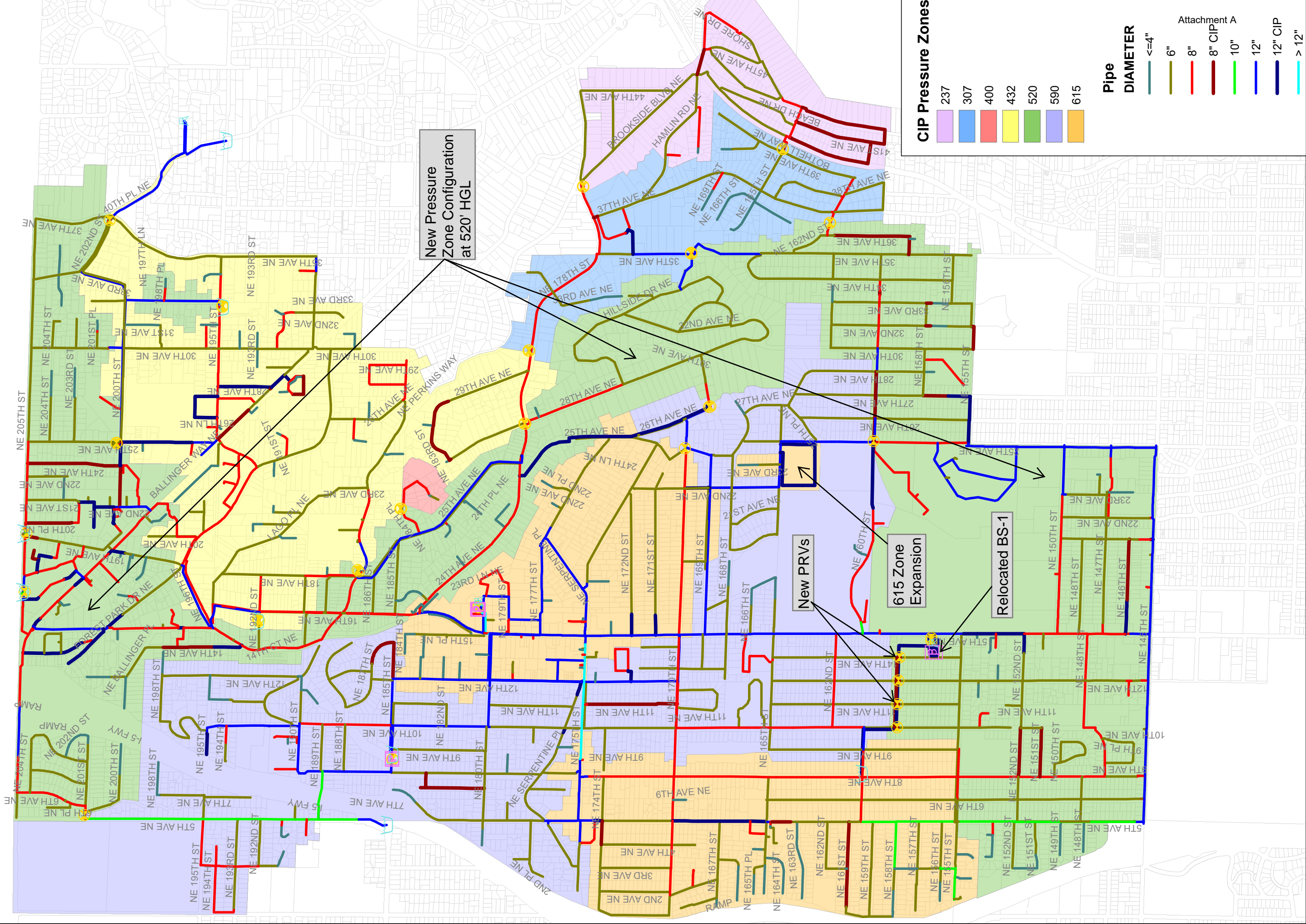
AVAIL_FLOW

• < 3500 gpm

• > 3500 gpm

North City Water District Future CIP Model

Figure 16



Rodney Langer

From: Diane Pottinger <dianep@northcitywater.org>
Sent: Wednesday, February 12, 2020 2:08 PM
To: Rodney Langer (rodneyl@chsengeers.com); Mary Dahl (maryd@chsengeers.com)
Cc: Denny Clouse
Subject: FW: clarification

Rodney-

Is this sufficient?

Diane

From: Dave Harms <Dave.Harms@bhccconsultants.com>
Sent: Wednesday, February 12, 2020 2:07 PM
To: Diane Pottinger <dianep@northcitywater.org>
Cc: Denny Clouse <dennyc@northcitywater.org>
Subject: RE: clarification

Diane,

I have downloaded and summarized system demands per zone in the model, and compared them to Table 2-4. For the system as a whole, model demands are a good match with the summary demands provided in the table, for the existing and future scenarios modeled, and for ADD, MDD and PHD demand scenarios.

Please let me know if you have questions or need additional information.

Best, Dave

Dave Harms, PE
Principal Engineer

BHC Consultants, LLC
1601 Fifth Avenue, Suite 500
Seattle WA 98101

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From: Diane Pottinger <dianep@northcitywater.org>
Sent: Wednesday, February 12, 2020 11:35 AM
To: Dave Harms <Dave.Harms@bhccconsultants.com>
Cc: Denny Clouse <dennyc@northcitywater.org>
Subject: clarification

Dave-

Can you answer the following statement that I can forward to Rodney?

- ***Please provide confirmation from BHC regarding their modeling accounts for demand forecast as presented in Section 2 – or greater MDD and PHD***

Diane Pottinger, P.E.

District Manager



1519 NE 177th Street | Shoreline, WA 98155

p. 206.362.8100 | f. 206.361.0629

This e-mail message is a public document and may be subject to public disclosure if requested by another party.

NORTH CITY WATER DISTRICT

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**NORTH CITY WATER DISTRICT
RESOLUTION 2019.12.43**

**AMENDING AND SUPERSEDING APPENDIX 3A OF THE
NORTH CITY WATER DISTRICT CODE**

Background

1. The Board most recently updated the Appendix 3A to the North City Water District Code on August 20, 2019 by Resolution 2019.08.30.
2. Resolution 2019.12.43 approves the District's 2020-2022 Operating Budgets, 2020 Wage Matrix and 2020-2031 Capital Budgets. The Revenue Requirement to meet these budgets is an additional \$277,926 for 2020 and \$289,044 for 2021 and \$300,605 for 2022.
3. Pursuant to RCW 57.08.005(10), the Board of Commissioners is authorized to fix rates and charges for water service.
4. Staff made presentations on the 2020-2022 Operating Budget and 2020-2031 Capital Budget to the Board at its November 19 and December 3 meetings. Despite an expected 5-7% increase in the wholesale water rate charged by SPU, the District's management proposed only a 4% operating budget increase.
5. At the December 3 Board meeting, the Board also discussed the Cost of Service review. Using 2018 water use, proposed Cost of Service rates were made, assuming a shift in customer charges were made reflecting actual costs. A 4% across the board rate increase over these "proposed Cost of Service rates, was made. This increase will be sufficient to cover all increased expenses, capital infrastructure need and the cost of inflation.
6. The Appendix also reflects the increase in hourly rates for fees and charges (Resolution 2019.08.30), the updated abandonment fee for existing service lines (Resolution 2018.12.41) and the reclassification of vans and pick up trucks as Utility Vehicles (Resolution 2018.03.090).
7. No other fees, charges or penalties are proposed at this time or are reflected in proposed amended Appendix 3A (see Attachment).
8. District staff recommends that the Board of Commissioners amend Appendix 3A of the North City Water District Code as shown in Attachment A. These new rates are consistent with the budget presentations at that both November 19 and December 3, 2019 Board meetings.

Action

IT IS RESOLVED THAT:

9. The North City Water District Board of Commissioner hereby adopts amended Appendix 3A to the District Code as shown in the Attachment, which is fully incorporated into this Resolution by this reference, superseding all previous versions of Appendix 3A.

ADOPTED by the Board of Commissioners of North City Water District at a regular open public meeting this 17th day of December 2019.

ATTEST:

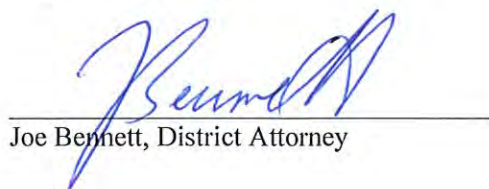


Ron Ricker, President

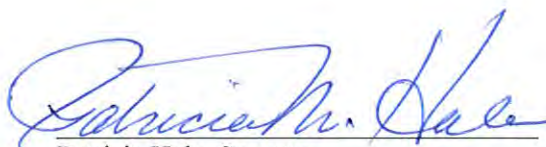


Charlotte Haines, Vice President

Approved as to Form:



Joe Bennett, District Attorney



Patricia Hale, Secretary

**APPENDIX 3A (INTERIM):
DISTRICT FEES, CHARGES, AND PENALTIES
EFFECTIVE AS OF 12-17-2019**

A. North City Water District Code Title 3 (Rates and Charges)

1. Total Low Density Capacity Charge - \$4,786 per Meter Equivalent
2. Total Low Density Fire Charge - \$724 per Meter
3. Total High Density Capacity Charge - \$4,786 per Meter Equivalent
4. Total High Density Fire Charge - \$1.22 per Square Foot

[Source: Res. 2017.07.13]

5. Installation Charges

Meter Size and Type	Meter Located along Minor and Collector Arterials, Non Arterial Streets, and Neighborhood Connectors	Meter Located along on a Principal Arterial or Major Highway
Five-eighths inch domestic meter	\$4,916.00	Actual cost of installation
One-inch domestic meter	\$5,061.00	Actual cost of installation
One-inch fire service using a separate trench	\$5,061.00	Actual cost of installation
Five-eighths inch or one-inch meter that is a second service using the same trench	\$1,511.00	Actual cost of installation
Meter greater than one-inch	Actual cost of installation	Actual cost of installation
Permit fees within the Right of Way	Actual cost of permit	Actual cost of permit

[Source: Res. 2016.06.19; and 2018.12.41]

6. Miscellaneous Services – Administrative Fees

Account transfer fee	\$10
NSF check fee	\$35
Leak Adjustment fee	\$10
Tenant billing (one time fee per owner)	\$25
Final bill reading fee	\$25
Delinquent service termination dispatch fee (1)	\$50
Delinquent service reactivation charge – during work hours	0
Delinquent service reactivation charge – after work hours	\$250

Emergency site visit – during work hours (2)	No charge
Emergency site visit – after hours	\$250
Unauthorized reactivation of delinquent terminated service	
Tampering/unauthorized reactivation of meter	\$200
Tampering so as to require repair/reinstallation	\$200 plus costs
Duplicate bill charge (bill sent to site and to owner)	\$1.25
Copy/Print charges	
First printed page	\$1.00
Each additional page	\$0.10

- (1) This fee cannot be waived after 8:00 am on the morning of service terminations. This fee will also be charged if crew members must return to a property which received after-hours reactivation and payment was not received for such reactivation.
- (2) Limit one free emergency visit per site free during normal water operations crew working hours. Additional site visits may be charged \$50 per site visit.

[Source: Res. 2012.12.90]

7. Miscellaneous Services – Operations Charges (hourly)

Labor	
- staff	\$100
- management	\$136

[Source: Res. 2019.08.30]

Equipment	
Backhoe	\$60
Dump Truck	\$110
Compressor	\$33
Utility Vehicle	\$22
Vacuum Truck	\$245

[Source: Res. 2019.12.43]

Abandon Existing Service Lines

North City Water District to Dig Ditch	
Permit Fee	Pass through cost
Crew Hours – 9 hours at \$100/hour	\$ 900.00
Vacuum Truck	\$ 245.00
Dump Truck – 1 hour at \$110/hour	\$ 110.00
Utility Vehicle – 3 hours at \$22/hour	\$ 66.00
Backfill	\$ 100.00
Asphalt Patch if needed based on a 6'x 5'x 4' thick (2019 costs)	\$1,650.00

	Total	\$2,671.00 + pass through permit fee costs
--	--------------	---------------------------------------------------

Contractor to Dig Ditch	
Crew Hours – 4 hours at \$100/hour	\$ 400.00
Service Truck – 2 hours at \$22/hour	\$ 44.00
Total	\$ 444.00

[Source: Res. 2019.12.43]

8. Permit Fee and Performance Bond – Fees Charged to Applicant

The cost of all permit fees and performance bond fees shall be passed through and charged to the applicant requesting such permits.

[Source: Res. 2008.08.24]

9. Pressure/Flow Test Fees:

Payable at District's actual cost.

10. Meter Test:

Property owners may request that a meter be tested for accuracy. Costs to test the meter shall be paid based upon the results of the testing. If the test results indicate that the meter is not accurate, (running fast), the District will adjust the billing appropriately and install a new meter at District's expense. If the test results indicate that the meter is registering accurately or slowly, the requestor will be billed for the cost of testing the meter and/or the replacement of the meter at current costs.

[Source: Res. 2008.08.24]

B. North City Water District Code Title 4 (Construction) Fees and Charges

[None]

C. North City Water District Code Title 5 (Development) Fees and Charges

1. Installation Charges – Fee:

- a. For a five-eighths inch and domestic meter: four thousand nine hundred and sixteen dollars (\$4,916);
- b. For a one-inch domestic meter: five thousand sixty-one dollars (\$5,061);
- c. For a one-inch fire service using a separate trench: five thousand sixty-one dollars (\$5,061);
- d. For a five-eighths inch or a one inch meter that is a second service using the same trench: one thousand five hundred eleven dollars (\$1,511);

- e. For a meter greater than one-inch: the actual cost of installation.
- f. Permit fees for installation within the right of way: the actual cost of the permit

[Source: Res. 2009.07.35; and 2018.12.41]

Fire Flow Analysis – Fee

- 2. \$650 (\$600 for consultant fee; \$50 for District cost of administration)
[Source: Res. 2018.12.39]

- 3. Fire Flow Analysis – Refund, when applicable

[None]

- 4. Water System Extension Agreements – Fees and Charges

Fee or Charge	Amount
Base Charge	\$860
Hydraulic Modeling (Additional) ¹	District current cost
Connection Charges*	
District's Plan Review (____ hours at \$100/hour)* ²	\$100/hour
District's Inspection (____ hours at \$100/hour)*	\$100/hour
District Management Review/Inspection (\$____ hours at \$136.00/hour)	\$136/hour
Chemicals	\$100
Test Pump	\$250
Injection Pump	\$250
Permit fees*	Pass-through charge
Pressure Test & Chlorination (____ hours at \$100/hour)*	\$100/hour
As-built Review (____ hours at \$100.00/hour)*	\$100/hour
Consultant's Plan Review (____ hours at \$150/hour)*	\$150/hour
Consultant's Inspection (____ hours at \$150/hour)*	\$150/hour
Legal (6 hours at \$275/hour)*	\$275/hour
SPU Facilities Charge	Pass-through charge – see Attachment B
2" Meter + Radio	District current cost
1" Meter + Radio	District current cost
5/8" x 3/4" Meter + Radio	District current cost

¹ The Developer should consult with the District regarding any project requiring extensive hydraulic modeling.

² Each asterisk (*) in this table denotes an *estimated* fee or charge, subject to revision to reflect the *actual* fee or charge.

Appendix 3A (Interim) – DISTRICT FEES AND CHARGES

For Board Consideration: December 17, 2019

¹ The Developer should consult with the District regarding whether additional hydraulic modeling is required.

^{*} Each asterisk (*) in this table denotes an estimated fee or charge, subject to revision to reflect the actual fee and charge.

[Source: Res. 2018.03.09; 2018.03.10; 2018.12.41, and 2019.09.30]

D. North City Water District Code Title 6 (Facilities) Fees and Charges

1. Penalties for Customer Violations of the District's Cross Connection Control Program

The schedule of fines for periods of noncompliance with the District's emergency water restrictions shall be as follows:

1 st , 2 nd violation	warning
3 rd violation	\$100 per day
4 th violation	Shutoff

2. Penalties for Back-Flow Assembly Tester Violations of the District's Cross Connection Control Program

Each violation	Shutoff
----------------	---------

3. Hydrant Use – Advance deposit for Fire Hydrant Meter Rental

\$1,600 (\$1,500 for security deposit; \$50 for backflow assembly testing fee; \$50 for permit fee)

[Source: Res. 2009.04.20]

4. Hydrant Use – Daily rental charge

\$30 per day

[Source: Res. 2009.04.20]

5. Hydrant Use – Penalty for Unauthorized Use

Each violation	110% of the Daily Rental Charge for Hydrant Use, per day
----------------	----------------------------------------------------------

6. Hydrant Use – Penalty for Failure to Pay Daily Rental Charge

10% of the Daily Rental Charge for Hydrant Use

[Source: Res. 2009.04.20]



Water Rates & Charges

2020 RATES

Meter Size				Meter Rate		Usage Rates				ERU Rate	
Rate Code	Single Family Residential or Open Air Condominium BI-MONTHLY					Usage 0 - 4 CCF	Usage 5 - 10 CCF	Usage 11 t- 24 CCF	Usage 25 and > CCF	ERU per Dwelling	
158	5/8 / 3/4	\$	51.47	\$	51.47	\$ 2.54	\$ 3.99	\$ 5.45	\$ 6.90	\$ 9.29	
101	1"	\$	95.35	\$	95.35	2.54	3.99	5.45	6.90	\$ 9.29	
115	1 ½"	\$	164.57	\$	164.57	2.54	3.99	5.45	6.90	\$ 9.29	
102	2"	\$	256.75	\$	256.75	2.54	3.99	5.45	6.90	\$ 9.29	
Rate Code	1" Flow-Through Residential Meters (domestic and fire protection) Billed Bi-Monthly					Usage 0 - 4 CCF	Usage 5 - 10 CCF	Usage 11 t- 24 CCF	Usage 25 and > CCF	ERU per Dwelling	
159	1"	\$	51.47	\$	51.47	\$ 2.5400	\$ 3.9900	\$ 5.4500	\$ 6.9000	\$ 9.2900	
Rate Code	Multifamily Residential BI-MONTHLY					Usage Threshold		Water Use Charge		ERU by Sq Ft	
558	5/8 / 3/4	\$	51.47	\$	51.47	0 and > CCF		\$ 4.43		\$ 9.29	
501/521	1"	\$	95.35	\$	95.35	0 and > CCF		\$ 4.43		\$ 9.29	
515/525	1 ½"	\$	164.57	\$	164.57	0 and > CCF		\$ 4.43		\$ 9.29	
502/522	2"	\$	256.75	\$	256.75	0 and > CCF		\$ 4.43		\$ 9.29	
503/523	3"	\$	578.57	\$	578.57	0 and > CCF		\$ 4.43		\$ 9.29	
Rate Code	Multifamily Residential BI-MONTHLY/MONTHLY					Usage Threshold		Water Use Charge		ERU by Sq Ft	
504/524	4"	\$	850.70	\$	425.35	0 and > CCF		\$ 4.43		\$ 9.29	
506/526	6"	\$	1,586.99	\$	793.49	0 and > CCF		\$ 4.43		\$ 9.29	
Rate Code	Non Residential - Commercial BI-MONTHLY					Usage Threshold		Water Use Charge		ERU by Sq Ft	
458	5/8 / 3/4	\$	51.47	\$	51.47	0 and > CCF		\$ 4.43		\$ 9.29	
401	1"	\$	95.35	\$	95.35	0 and > CCF		\$ 4.43		\$ 9.29	
415	1 ½"	\$	164.57	\$	164.57	0 and > CCF		\$ 4.43		\$ 9.29	
402	2"	\$	256.75	\$	256.75	0 and > CCF		\$ 4.43		\$ 9.29	
403	3"	\$	578.57	\$	578.57	0 and > CCF		\$ 4.43		\$ 9.29	
404	4"	\$	850.70	\$	850.70	0 and > CCF		\$ 4.43		\$ 9.29	
406	6"	\$	1,586.99	\$	1,586.99	0 and > CCF		\$ 4.43		\$ 9.29	
408	8"	\$	2,464.65	\$	2,464.65	0 and > CCF		\$ 4.43		\$ 9.29	
Rate Code	Non Residential - Municipal BI-MONTHLY/MONTHLY					Usage Threshold		Water Use Rate		ERU by Sq Ft	
118	5/8 / 3/4	\$	51.47	\$	25.73	0 and > CCF		\$ 4.43		\$ 9.29	
111	1"	\$	95.35	\$	47.68	0 and > CCF		\$ 4.43		\$ 9.29	
119	1 ½"	\$	164.57	\$	82.28	0 and > CCF		\$ 4.43		\$ 9.29	
112	2"	\$	256.75	\$	128.37	0 and > CCF		\$ 4.43		\$ 9.29	
113	3"	\$	578.57	\$	289.29	0 and > CCF		\$ 4.43		\$ 9.29	
114	4"	\$	850.70	\$	425.35	0 and > CCF		\$ 4.43		\$ 9.29	
Rate Code	Non Residential - Wholesale BI-MONTHLY/MONTHLY					Usage Threshold		Water Use Rate		Rate Code	Mon ERU by Sq Ft
626	6"	\$	1,586.99	\$	793.49	0 and > CCF		\$ 4.43		606	\$ 9.29
628	8"	\$	2,464.65	\$	1,232.33	0 and > CCF		\$ 4.43		608	\$ 9.29
Rate Code	LIFE SAVING MEDICAL TREATMENT Single Family Residential or Open Air Condominium BI-MONTHLY					Usage 0 - 4 CCF	Usage 5 - 10 CCF	Usage 11 t- 24 CCF	Usage 25 and > CCF	ERU per Dwelling	
358	5/8 / 3/4	\$	51.47	\$	51.47	\$ 2.54	\$ 3.99	\$ 5.45	\$ 6.90	\$ 9.29	
301	1"	\$	95.35	\$	95.35	2.54	3.99	5.45	6.90	\$ 9.29	
315	1 ½"	\$	164.57	\$	164.57	2.54	3.99	5.45	6.90	\$ 9.29	
302	2"	\$	256.75	\$	256.75	2.54	3.99	5.45	6.90	\$ 9.29	
Rate Code	Fire Sprinkler Service BI-MONTHLY/MONTHLY										
F10	1.0"	\$	10.30	\$	5.15						
F15	1.5"	\$	13.24	\$	6.62						
F20	2"	\$	21.33	\$	10.67						
F30	3"	\$	80.92	\$	40.46						
F40	4"	\$	102.99	\$	51.49						
F60	6"	\$	154.48	\$	77.24						
F80	8"	\$	213.33	\$	106.66						
Rate Code	Irrigation BI-MONTHLY/MONTHLY					Usage Threshold		Water Use Charge			
258/258	5/8 / 3/4	\$	44.58	\$	22.29	0 and > CCF		\$ 7.70			
211/211	1"	\$	78.13	\$	39.07	0 and > CCF		7.70			
215/215	1 ½"	\$	130.13	\$	65.07	0 and > CCF		7.70			
202/202	2"	\$	201.65	\$	100.82	0 and > CCF		7.70			
203/203	3"	\$	468.37	\$	234.19	0 and > CCF		7.70			
204/204	4"	\$	678.51	\$	339.26	0 and > CCF		7.70			
206/206	6"	\$	1,242.62	\$	621.31	0 and > CCF		7.70			
208/208	8"	\$	1,913.66	\$	956.83	0 and > CCF		7.70			

Fee added to the customers total billing.

**NORTH CITY WATER DISTRICT
RESOLUTION 2018.12.41**

**AMENDING AND SUPERSEDING APPENDIX 3A OF THE
NORTH CITY WATER DISTRICT CODE**

Background

1. The District is in the process of updating its Code. In July 2015, the District renamed the code the North City Water District Code and began transitioning titles from the former Shoreline Water District Code to the North City Water District Code.
2. The Board most recently updated the Appendix 3A of the Code was on March 20, 2018 by Resolution 2018.03.09.
3. Resolution 2018.12.40 approves the District's 2019-2020 Operating Budgets, 2019 Wage Matrix and 2019-2024 Capital Budgets. The Revenue Requirement to meet these budgets is an additional \$268,809 for 2019 and \$279,805 for 2020.
4. Pursuant to RCW 57.08.005(10), the Board of Commissioners is authorized to fix rates and charges for water service.
5. Staff made presentations on the 2019-2020 Budget to the Board at its November 20 and December 4 meetings. In 2019 and 2020, SPU is proposing to increase its wholesale cost by approximately 6% each year. In spite of this significant increase, the District's management proposed only a 4% increase in the water rate that it charges customers across the board for 2019. This will be sufficient to cover all increased expenses, capital infrastructure need and the cost of inflation. New service rates will be subject to a Cost-of -Service Rate Study to be conducted in 2019 (see Attachment).
6. New charges associated with connecting to the District's water system include a flat fee for Chemicals - \$100, Test Pump - \$250, and Injection Pump - \$250 (see Attachment).
7. The District is being charged permit fees for doing work within each city. Staff recommends including this as a pass through charge to property owners. No set permit fee is included in the Attachment as it will vary within each city and from year to year.
8. SPU has adopted new facility charges on November 13, 2017 effective January 1, 2019. In accordance to Resolution 2012.12.89, the District is to remit the amounts collected to SPU. The most current SPU pass-through supply facility charges were adopted in Resolution 2014.01.04. No other fees, charges or penalties are proposed at this time or are reflected in proposed amended Appendix 3A (see Attachment).
9. District staff recommends that the Board of Commissioners amend Appendix 3A of the North City Water District Code as shown in Attachment A. Following the December 4, 2018 Board meeting, the Board of Commissioners directed staff to bring back a resolution adopting the new rates consistent with the budget presentations at that both November 20 and December 4, 2018 Board meetings.

Action


IT IS RESOLVED THAT:

10. North City Water District Code hereby adopts amended Appendix 3A as shown in the Attachment, which is fully incorporated into this Resolution by this reference, superseding all previous versions of Appendix 3A.


ADOPTED by the Board of Commissioners of North City Water District at a regular open public meeting this 18th day of December 2018.

ATTEST:

Position #2 vacant


Charlotte Haines, Vice President

Approved as to Form:


Joe Bennett, District Attorney


Ron Ricker, Secretary

Report of New Retail Service Connections

For rates effective January 1, 2019

Form revised October 17, 2018

For Taps Connected during month of: _____

Wholesale Customer Name: Water District ____ or City of ____

Address:

Contact:

Phone:

Meter Size	# New	ERU's per Connection		New ERU's	Facilities Charge
1 inch and smaller		@ 1.12	=	-	-
1-1/2 inch		@ 5.00	=	-	-
2 inch		@ 8.00	=	-	-
3 inch		@ 22.00	=	-	-
4 inch		@ 31.00	=	-	-
6 inch		@ 66.00	=	-	-
8 inch		@ 112.00	=	-	-
10 inch		@ 169.00	=	-	-
12 inch and larger		@ 238.00	=	-	-
Total New Equivalent Residential Units:				-	-

Meter Size	# Upsizes	Net ERU's per Connection		New ERU's	Facilities Charge
1 inch & smaller to 1-1/2 inch		@ 3.88	=	-	-
1 inch & smaller to 2 inch		@ 6.88	=	-	-
1-1/2 inch to 2 inch		@ 3.00	=	-	-
_____ to _____		@	=	-	-
_____ to _____		@	=	-	-
Total Upsized Equivalent Residential Units:				-	-

Total Facilities Charge @ \$965/ERU: \$ -

Make checks payable to: **Seattle Public Utilities**

Please send this report with your payment to:

City of Seattle Treasury
PO Box 94647
Seattle, WA 98124-4647

<div>North City</div> <div>WATER DISTRICT</div>		Water Rates & Charges						
2019 - Budget								
Meter Size		Base Rate		Water Usage Charge			CIC & ERU	
Rate Code	Single Family Residential or Open Air Condominium			Usage	Usage	Usage	CIC	ERU
	BI-MONTHLY			0 to 10 CCF	11 to 24 CCF	25 and > CCF	per Dwelling	per Dwelling
158	5/8 / 3/4	\$	51.47	\$ 3.12	\$ 4.79	\$ 6.45	\$ 3.46	\$ 4.47
101	1"		98.55	3.12	4.79	6.45	\$ 3.46	\$ 4.47
115	1 1/2"		173.85	3.12	4.79	6.45	\$ 3.46	\$ 4.47
102	2"		271.54	3.12	4.79	6.45	\$ 3.46	\$ 4.47
Rate Code	1" Flow-Through Residential Meters (domestic and fire protection)			Usage	Usage	Usage		
	Billed Bi-Monthly			0 to 10 CCF	11 to 24 CCF	25 > CCF		
159	1"	\$	51.47	\$ 3.12	\$ 4.79	\$ 6.45		
Rate Code	Multifamily Residential			Usage	Water Use		CIC	ERU
	BI-MONTHLY			Threshold	Charge		per ERU	by Sq Ft
558	5/8 / 3/4	\$	51.47	0 and > CCF	\$ 3.82		\$ 3.46	\$ 4.47
501/521	1"		98.55	0 and > CCF	3.82		\$ 3.46	\$ 4.47
515/525	1 1/2"		173.85	0 and > CCF	3.82		\$ 3.46	\$ 4.47
502/522	2"		271.54	0 and > CCF	3.82		\$ 3.46	\$ 4.47
503/523	3"		593.34	0 and > CCF	3.82		\$ 3.46	\$ 4.47
Rate Code	Number of Dwellings	Multifamily Residential		Usage	Water Use		CIC	ERU
		BI-MONTHLY/MONTHLY		Threshold	Charge		per ERU	by Sq Ft
504/524	4"	882.92	441.46	0 and > CCF	\$ 3.82		\$ 3.46	\$ 4.47
506/526	6"	1,671.47	835.74	0 and > CCF	3.82		\$ 3.46	\$ 4.47
Rate Code	Non Residential - Commercial			Usage	Water Use		CIC	ERU
	BI-MONTHLY			Threshold	Charge		per ERU	by Sq Ft
458	5/8 / 3/4	\$	51.47	0 and > CCF	\$ 4.53		\$ 3.46	\$ 4.47
401	1"		98.55	0 and > CCF	4.53		\$ 3.46	\$ 4.47
415	1 1/2"		173.85	0 and > CCF	4.53		\$ 3.46	\$ 4.47
402	2"		271.54	0 and > CCF	4.53		\$ 3.46	\$ 4.47
403	3"		593.34	0 and > CCF	4.53		\$ 3.46	\$ 4.47
404	4"		882.92	0 and > CCF	4.53		\$ 3.46	\$ 4.47
406	6"		1,671.47	0 and > CCF	4.53		\$ 3.46	\$ 4.47
408	8"		2,612.98	0 and > CCF	4.53		\$ 3.46	\$ 4.47
Rate Code	Non Residential - Municipal			Usage	Water Use		CIC	ERU
	BI-MONTHLY/MONTHLY			Threshold	Charge		per ERU	by Sq Ft
118	5/8 / 3/4	51.47	\$ 25.74	0 and > CCF	\$ 4.53		\$ 3.46	\$ 4.47
111	1"	98.55	49.28	0 and > CCF	4.53		\$ 3.46	\$ 4.47
119	1 1/2"	173.85	86.93	0 and > CCF	4.53		\$ 3.46	\$ 4.47
112	2"	271.54	135.77	0 and > CCF	4.53		\$ 3.46	\$ 4.47
113	3"	593.34	296.67	0 and > CCF	4.53		\$ 3.46	\$ 4.47
114	4"	882.92	441.46	0 and > CCF	4.53		\$ 3.46	\$ 4.47
Rate Code	Non Residential - Wholesale			Usage	Water Use	Rate Code	CIC	ERU
	BI-MONTHLY/MONTHLY			Threshold	Charge		per ERU	by Sq Ft
626	6"	\$ 1,671.47	835.74	0 and > CCF	4.53	606	\$ 3.46	\$ 4.47
628	8"	\$ 2,612.98	1,306.49	0 and > CCF	4.53	608	\$ 3.46	\$ 4.47
Rate Code	LIFE SAVING MEDICAL TREATMENT			Usage	Usage	Usage	CIC	ERU
	Single Family Residential or Open Air Condominium			0-10 CCF	11-24 CCF	25 and > CCF	per dwelling	per Dwelling
	BI-MONTHLY							
358	5/8 / 3/4	\$	51.47	\$ 3.12	\$ 4.79	\$ 6.45	\$ 3.46	\$ 4.47
301	1"		98.55	3.12	4.79	6.45	\$ 3.46	\$ 4.47
315	1 1/2"		173.85	3.12	4.79	6.45	\$ 3.46	\$ 4.47
302	2"		271.54	3.12	4.79	6.45	\$ 3.46	\$ 4.47
Rate Code	Fire Sprinkler Service							
	BI-MONTHLY/MONTHLY							
F10	1.0"	\$	27.98	\$				
F15	1.5"		32.74					
F20	2"		45.76					
F30	3"		141.76					
F40	4"		177.32					
F60	6"		260.28					
F80	8"		355.08					
Rate Code	Irrigation			Usage	Water Use		CIC	
	BI-MONTHLY/MONTHLY			Threshold	Charge		per ERU	
258/258	5/8 / 3/4	\$	72.04	0 and > CCF	\$ 6.45		\$ 3.46	
211/211	1"	150.04	75.02	0 and > CCF	6.45		\$ 3.46	
215/215	1 1/2"	276.76	138.38	0 and > CCF	6.45		\$ 3.46	
202/202	2"	436.22	218.11	0 and > CCF	6.45		\$ 3.46	
203/203	3"	922.70	461.35	0 and > CCF	6.45		\$ 3.46	
204/204	4"	1,397.54	698.77	0 and > CCF	6.45		\$ 3.46	
206/206	6"	2,700.72	1,350.36	0 and > CCF	6.45		\$ 3.46	
208/208	8"	4,259.78	2,129.89	0 and > CCF	6.45		\$ 3.46	
There is a 6% City Franchise Fee added to the customers total billing.								

**APPENDIX 3A (INTERIM):
DISTRICT FEES, CHARGES, AND PENALTIES
EFFECTIVE AS OF 12-20-2018**

A. North City Water District Code Title 3 (Rates and Charges)

1. Total Low Density Capacity Charge - \$4,786 per Meter Equivalent
2. Total Low Density Fire Charge - \$724 per Meter
3. Total High Density Capacity Charge - \$4,786 per Meter Equivalent
4. Total High Density Fire Charge - \$1.22 per Square Foot

[Source: Res. 2017.07.13]

5. Installation Charges

Meter Size and Type	Meter Located along Minor and Collector Arterials, Non Arterial Streets, and Neighborhood Connectors	Meter Located along on a Principal Arterial or Major Highway
Five-eighths inch domestic meter	\$4,916.00	Actual cost of installation
One-inch domestic meter	\$5,061.00	Actual cost of installation
One-inch fire service using a separate trench	\$5,061.00	Actual cost of installation
Five-eighths inch or one-inch meter that is a second service using the same trench	\$1,511.00	Actual cost of installation
Meter greater than one-inch	Actual cost of installation	Actual cost of installation
Permit fees within the Right of Way	Actual cost of permit	Actual cost of permit

[Source: Res. 2016.06.19; and 2018.12.41]

6. Miscellaneous Services – Administrative Fees

Account transfer fee	\$10
NSF check fee	\$35
Leak Adjustment fee	\$10
Tenant billing (one time fee per owner)	\$25
Final bill reading fee	\$25
Delinquent service termination dispatch fee (1)	\$50
Delinquent service reactivation charge – during work hours	0
Delinquent service reactivation charge – after work hours	\$250

Emergency site visit – during work hours (2)	No charge
Emergency site visit – after hours	\$250
Unauthorized reactivation of delinquent terminated service	
Tampering/unauthorized reactivation of meter	\$200
Tampering so as to require repair/reinstallation	\$200 plus costs
Duplicate bill charge (bill sent to site and to owner)	\$1.25
Copy/Print charges	
First printed page	\$1.00
Each additional page	\$0.10

- (1) This fee cannot be waived after 8:00 am on the morning of service terminations. This fee will also be charged if crew members must return to a property which received after-hours reactivation and payment was not received for such reactivation.
- (2) Limit one free emergency visit per site free during normal water operations crew working hours. Additional site visits may be charged \$50 per site visit.

[Source: Res. 2012.12.90]

7. Miscellaneous Services – Operations Charges (hourly)

Labor	\$76.50
Equipment	
Backhoe	\$60
Dump Truck	\$110
Compressor	\$33
Vans (12' and 14')	\$22
Pick up trucks	\$22
Grumman vans	\$43

[Source: Res. 2008.08.24]

Vac-Con Truck	\$245
---------------	-------

[Source: Res. 2009.04.22]

8. Permit Fee and Performance Bond – Fees Charged to Applicant

The cost of all permit fees and performance bond fees shall be passed through and charged to the applicant requesting such permits.

[Source: Res. 2008.08.24]

9. Pressure/Flow Test Fees:

Payable at District's actual cost.

10. Meter Test:

Property owners may request that a meter be tested for accuracy. Costs to test the meter shall be paid based upon the results of the testing. If the test results indicate that the meter

is not accurate, (running fast), the District will adjust the billing appropriately and install a new meter at District's expense. If the test results indicate that the meter is registering accurately or slowly, the requestor will be billed for the cost of testing the meter and/or the replacement of the meter at current costs.

[Source: Res. 2008.08.24]

B. North City Water District Code Title 4 (Construction) Fees and Charges

[None]

C. North City Water District Code Title 5 (Development) Fees and Charges

1. Installation Charges – Fee:

- a. For a five-eighths inch and domestic meter: four thousand nine hundred and sixteen dollars (\$4,916);
- b. For a one-inch domestic meter: five thousand sixty-one dollars (\$5,061);
- c. For a one-inch fire service using a separate trench: five thousand sixty-one dollars (\$5,061);
- d. For a five-eighths inch or a one inch meter that is a second service using the same trench: one thousand five hundred eleven dollars (\$1,511);
- e. For a meter greater than one-inch: the actual cost of installation.
- f. Permit fees for installation within the right of way: the actual cost of the permit

[Source: Res. 2009.07.35; and 2018.12.41]

Fire Flow Analysis – Fee

2. \$650 (\$600 for consultant fee; \$50 for District cost of administration)

[Source: Res. 2018.12.39]

3. Fire Flow Analysis – Refund, when applicable

[None]

4. Water System Extension Agreements – Fees and Charges

Fee or Charge	Amount
Base Charge	\$860
Hydraulic Modeling (Additional) ¹	District current cost
Connection Charges*	
District's Plan Review (_____ hours at \$76.50/hour)* ²	\$76.50/hour
District's Inspection (_____ hours at \$76.50/hour)*	\$76.50/hour
Chemicals	\$100.00
Test Pump	\$250.00
Injection Pump	\$250.00
Permit fees*	Pass-through charge
Pressure Test & Chlorination (_____ hours at \$76.50/hour)*	\$76.50
As-built Review (_____ hours at \$76.50/hour)*	\$76.50
Consultant's Plan Review (_____ hours at \$150/hour)*	\$150/hour
Consultant's Inspection (_____ hours at \$150/hour)*	\$150/hour
Legal (6 hours at \$275/hour)*	\$275/hour
SPU Facilities Charge	Pass-through charge – see Attachment B
2" Meter + Radio	District current cost
1" Meter + Radio	District current cost
5/8" x 3/4" Meter + Radio	District current cost

¹ The Developer should consult with the District regarding whether additional hydraulic modeling is required.

* Each asterisk (*) in this table denotes an estimated fee or charge, subject to revision to reflect the actual fee and charge.

[Source: Res. 2018.03.09; 2018.03.10; and 2018.12.41]

D. North City Water District Code Title 6 (Facilities) Fees and Charges

1. Penalties for Customer Violations of the District's Cross Connection Control Program

The schedule of fines for periods of noncompliance with the District's emergency water restrictions shall be as follows:

1 st , 2 nd violation	warning
3 rd violation	\$100 per day

1 The Developer should consult with the District regarding any project requiring extensive hydraulic modeling.

2 Each asterisk (*) in this table denotes an *estimated* fee or charge, subject to revision to reflect the *actual* fee or charge.

Appendix 3A (Interim) – DISTRICT FEES AND CHARGES

For Board Consideration: December 18, 2018

4th violation Shutoff

2. Penalties for Back-Flow Assembly Tester Violations of the District's Cross Connection Control Program

Each violation Shutoff

3. Hydrant Use – Advance deposit for Fire Hydrant Meter Rental

\$1,600 (\$1,500 for security deposit; \$50 for backflow assembly testing fee; \$50 for permit fee)

[Source: Res. 2009.04.20]

4. Hydrant Use – Daily rental charge

\$30 per day

[Source: Res. 2009.04.20]

5. Hydrant Use – Penalty for Unauthorized Use

Each violation 110% of the Daily Rental Charge for Hydrant
Use, per day

6. Hydrant Use – Penalty for Failure to Pay Daily Rental Charge

10% of the Daily Rental Charge for Hydrant Use

[Source: Res. 2009.04.20]

**SHORELINE WATER DISTRICT
RESOLUTION 2012.12.89**

**A RESOLUTION DESCRIBING THE SEATTLE PUBLIC UTILITY (SPU) PASS-
THROUGH SUPPLY FACILITIES CHARGE AND ADOPTING SPU'S
CALCULATION OF THAT CHARGE**

Background

1. Shoreline Water District, together with other public water purveyors, is a member of the Seattle Water Supply Operating Board (Operating Board).

2. On November 18, 2001, the District signed a 60 year agreement with Seattle Public Utilities (SPU) for providing wholesale water. The agreement provides for, among other things, the imposition by SPU of Supply Facility Charges. The Supply Facility Charge is a charge on the number of Equivalent Residential Units (ERUs) added determined by the number of meters installed. The charge is imposed by SPU but collected by the utility as a pass-through to SPU.

3. Section IV.E. Paragraph 50 of the agreement waives Supply FC through December 31, 2011, because the District's water purchases did not exceed its old water allowance under the prior 1982 Water Purveyor Contract. Other Operating Board members signed the same agreement with SPU with the same provisions regarding Supply Facility Charges, including the December 31, 2011 waiver period.

4. Because the December 31, 2011 waiver period has ended, SPU has taken the position that the District (and other purveyors falling within the waiver protection) must now collect the Supply Facility Charge and remit the amounts collected to SPU.

5. At multiple Operating Board meetings in 2011 and 2012, SPU discussed issues associated with its Supply Facility Charge, including how and when the charge would be assessed and the amount of the charge. SPU's position on these details varied over a period of months.

6. As of the date of this resolution, SPU had set the Supply Facility Charge rate at \$783 per ERU.

7. Between January 1, 2012 and December 31, 2012, for the purposes of its Supply Facility Charge, SPU defines the number of ERUs per connection based on meter size as follows:

Meter Size	ERUs per connection
$\frac{3}{4}$ inch and smaller	1.00
1 inch	2.00

1-1/2 inch	5.00
2 inch	8.00
3 inch	22.00
4 inch	31.00
6 inch	66.00
8 inch	112.00
10 inch	169.00
12 inch and larger	238.00

8. *Effective January 1, 2013*, for the purposes of its Supply Facility Charge, SPU defines the number of ERUs per connection based on meter size as follows:

Meter Size	ERUs per connection
1 inch and smaller	1.12
1-1/2 inch	5.00
2 inch	8.00
3 inch	22.00
4 inch	31.00
6 inch	66.00
8 inch	112.00
10 inch	169.00
12 inch and larger	238.00

9. For the purposes of its Supply Facility Charge, SPU has also defined the number of ERUs when a customer redevelops property and increases meter size as follows:

Meter Sizes	Net ERUs per connection
1 inch and smaller increased to 1-1/2 inch	3.88
1 inch and smaller increased to 2 inch	6.88
1-1/2 inch increased to 2 inch	3.00

10. **Attachment 1** is SPU's "Report of New Retail Service Connections" form forwarded by SPU to the District for use in calculating and collecting the Supply Facility Charge from District customers and for remittance to the City of Seattle Treasury.

11. District staff recommends that the SPU Facility Charge calculations be adopted by resolution for ease of reference by District staff and its customers.


Action

BE IT RESOLVED THAT:

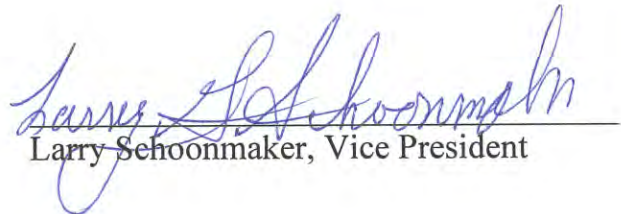
12. The Board of Commissioners adopts the pass-through SPU Facility Charge calculations, as established by SPU, described above, and shown in **Attachment 1**.

ADOPTED by the Board of Commissioners of Shoreline Water District at a public meeting on the 4th day of December, 2012.

ATTEST:



Ron Ricker, President

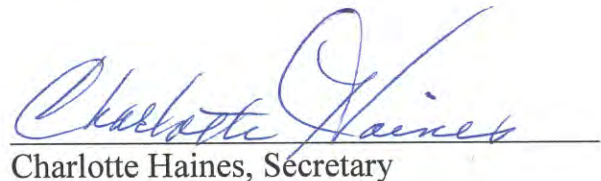


Larry Schoonmaker, Vice President

Approved as to Form:



Andrew Maron, District Attorney



Charlotte Haines, Secretary

Report of New Retail Service Connections

For Taps Connected during month of: _____

Wholesale Customer Name: Water District ____ or City of ____

Address:

Contact:

Phone:

Meter Size	# New	ERU's per Connection		New ERU's	Facilities Charge
1 inch and smaller		@ 1.12	=	-	-
1-1/2 inch		@ 5.00	=	-	-
2 inch		@ 8.00	=	-	-
3 inch		@ 22.00	=	-	-
4 inch		@ 31.00	=	-	-
6 inch		@ 66.00	=	-	-
8 inch		@ 112.00	=	-	-
10 inch		@ 169.00	=	-	-
12 inch and larger		@ 238.00	=	-	-
Total New Equivalent Residential Units:				-	-

Meter Size	# Upsizes	Net ERU's per Connection		New ERU's	Facilities Charge
1 inch & smaller to 1-1/2 inch		@ 3.88	=	-	-
1 inch & smaller to 2 inch		@ 6.88	=	-	-
1-1/2 inch to 2 inch		@ 3.00	=	-	-
_____ to _____		@	=	-	-
_____ to _____		@	=	-	-
Total Upsized Equivalent Residential Units:				-	-

Total Facilities Charge @ \$783/ERU: \$ -

Make checks payable to: **Seattle Public Utilities**

Please send this report with your payment to:

**City of Seattle Treasury
PO Box 94647
Seattle, WA 98124-4647**

NORTH CITY WATER DISTRICT

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NORTH CITY WATER DISTRICT

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**NORTH CITY WATER DISTRICT
RESOLUTION 2020.03.13**

A RESOLUTION ADOPTING THE 2020 WATER SYSTEM PLAN

Background

1. The District adopted its current Comprehensive Water System Plan (WSP) in January 2012, revised May 2013. The WSP was approved by King County on December 19, 2013 and the Department of Health on January 13, 2014.

2. The District hired CHS Engineers in December 2017 to prepare a new WSP. BHC Consultants was also hired at that time to update the hydraulic model to include the system improvements since it was last updated in 2010. CHS Engineers and BHC Consultants have completed their work as documented in a new WSP, the 2020 Water System Plan, dated March 2020.

3. The City of Shoreline has adopted a land use plan that will allow a substantial increase of development density and population over time within the District's corporate boundaries and retail water service area which will have an impact on the District's water system. The potential impact of increased development density has been considered in completion of the 2020 WSP.

4. In preparation of the 2020 WSP, the District requested both of the Cities of Lake Forest Park and Shoreline complete Local Government Consistency Checklists in January 2020. The District did not receive any response from either city, therefore, the District has signed the local government consistency checklist for both cities, as provided for in WAC 246-290-108.

5. The District also updated its technical specifications and standard details. With this update, the District will be requesting a waiver from the State Department of Health for distribution system improvements review

6. The District previously updated and adopted its Water Use Efficiency Program (Resolution 2019.07.26) and the adopted program is included in Appendix B of the 2020 WSP.

7. The Board reviewed the draft 2020 WSP over three separate meetings: January 7, 28 and February 25, 2020. Review comments from those meetings have been incorporated in the final document.

8. A SEPA checklist was completed for the 2020 WSP on February 20, 2020 and a DNS signed on February 21, 2020. Notice of a public hearing was published in both the Seattle Times and the Daily Journal of Commerce on March 3 and 9. 1 individuals were in at the public hearing held today, March 17 at 3:00 pm.

9. District staff are recommending the North City Water District 2020 Water System Plan, dated March 2020, be adopted and submitted to King County the Department of Health and the cities of Shoreline and Lake Forest Park for approval.

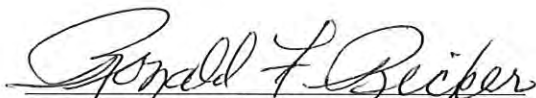
Action

IT IS RESOLVED THAT:

10. The Board adopts the 2020 Water System Plan, dated March 2020, prepared by CHS Engineers and authorizes its submittal to the agencies with approval authority.

ADOPTED by the Board of Commissioners of North City Water District at a regular open public meeting on this 17th day of March, 2020.

ATTEST:


Ron Ricker, President


Patricia Hale, Vice President

Approved as to Form:

Joe Bennett, District Attorney


Charlotte Haines, Secretary

Local Government Consistency Determination Form

Water System Name: North City Water District PWS ID: 39600E

Planning/Engineering Document Title: 2020 Water System Plan Plan Date: March 2020

Local Government with Jurisdiction Conducting Review: City of Lake Forest Park
consistency statement not received and provided by North City Water District

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	For use by local government
	Identify the page(s) in submittal	Yes or Not Applicable
a) The water system service area is consistent with the adopted <u>land use and zoning</u> within the service area.	<u>Section 2</u>	<u>Yes</u>
b) The <u>growth projection</u> 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.	<u>Section 2</u>	<u>Yes</u>
c) For <u>cities and towns that provide water service</u> : All water service area policies of the city or town described in the plan conform to all relevant <u>utility service extension ordinances</u> .	<u>N/A</u>	
d) <u>Service area policies</u> 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.	<u>Section 1</u>	<u>Yes</u>
e) <u>Other relevant elements</u> 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.	<u>Sections 3, 5 & 6</u>	<u>Yes</u>

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.

Diane Pottinger
Signature

3/14/2020
Date

DIANE POTTINGER, PE; DISTRICT MANAGER
Printed Name, Title, & Jurisdiction NORTH CITY WATER DISTRICT

Local Government Consistency Determination Form

Water System Name: North City Water District PWS ID: 39609E

Planning/Engineering Document Title: 2020 Water System Plan Plan Date: March 2020

Local Government with Jurisdiction Conducting Review: City of Shoreline
consistency statement not received and provided by North City Water District

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	For use by local government
	Identify the page(s) in submittal	Yes or Not Applicable
a) The water system service area is consistent with the adopted <u>land use and zoning</u> within the service area.	<u>Section 2</u>	<u>Yes</u>
b) The <u>growth projection</u> 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.	<u>Section 2</u>	<u>Yes</u>
c) For <u>cities and towns that provide water service</u> : All water service area policies of the city or town described in the plan conform to all relevant <u>utility service extension ordinances</u> .	<u>N/A</u>	
d) <u>Service area policies</u> 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.	<u>Section 1</u>	<u>Yes</u>
e) <u>Other relevant elements</u> 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.	<u>Sections 3, 5, 6</u>	<u>Yes</u>

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.

M. Diane Pottinger
Signature

3/16/2020
Date

DIANE POTTINGER, PE; DISTRICT MANAGER
Printed Name, Title, & Jurisdiction NORTH CITY WATER DISTRICT

Rodney Langer

From: Nora Gierloff <ngierloff@shorelinewa.gov>
Sent: Tuesday, March 10, 2020 3:28 PM
To: Rodney Langer
Subject: North City Water System Plan

Hi Rodney,

I have reviewed the Water System Plan and have a few questions/comments:

- Section 1.3, Purpose and Objectives of the Study: Consider including something about planning to accommodate projected growth based on cities' land use vision and comprehensive plans.
- Expand on the policy of "growth pays for growth" such as including a discussion of limitations of this policy or exceptions/instances in which the District needs to provide capital improvements to the system.
- Table 1-1: Are the light rail station subareas included as part of the "Special Study Areas?" If not, consider including them in the special study area (each has an adopted subarea plan) or identifying them in the table.
- P. 2-10: Is the existing system adequate to accommodate future growth? Is "growth paying for growth" policy going to be sustainable as the subareas transition or will there eventually be a need for large-scale capacity improvements taken on by the District?
- Table 2-1: Is the land use breakdown based on existing land use? It would be helpful to label the table accordingly. If the table represents existing land use, it would be a helpful side-by-side comparison to see the future land use comparison (e.g. how much land area is devoted to future mixed use, high density residential, etc.).
- Section 2.6: The City of Shoreline's station subarea plans/EIS's contain growth projections for the subareas. Consider incorporating these projections into District projections to account for pre-2015 growth projections which lack growth assumptions in and around the light rail station areas.



Nora Gierloff, AICP
Planning Manager
Planning & Community Development
(206) 801-2551



January 10, 2020

Mr. Steve Bennet
City of Lake Forest Park Planning Director
17425 Ballinger Way NE
Lake Forest Park, WA 98155

**Subject: North City Water District Water - System Plan
Request for Local Government Consistency Review**

Dear Mr. Bennet:

We are writing on behalf of North City Water District. We are in the process of preparing their 2020 Water System Plan and have completed the basic planning and forecasting portion of the plan.

We are requesting completion of review of the current draft plan to the extent necessary (Sections 1 through 4) to favorably complete the attached Local Government Consistency Review Checklist, as required by WAC 246-290-108. We have partially completed the form to facilitate your efficient review.

The District is preparing to complete the full plan in the first quarter of 2020 and we anticipate submitting the full plan for the City's review thereafter.

Please call if you have any questions.

Sincerely,
CHS Engineers, LLC

A handwritten signature in blue ink that reads "Rodney Langer".

Rodney Langer, P.E.
Principal

Enclosure

cc: Diane Pottinger, North City Water District

Local Government Consistency Determination Form

Water System Name: North City Water District PWS ID: 39600E

Planning/Engineering Document Title: Comprehensive Water System Plan Plan Date: January 2020

Local Government with Jurisdiction Conducting Review: City of Lake Forest Park

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	For use by local government
	Identify the page(s) in submittal	Yes or Not Applicable
a) The water system service area is consistent with the adopted <u>land use and zoning</u> within the service area.	See Note A	
b) The <u>growth projection</u> 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.	See Note B	
c) For <u>cities and towns that provide water service</u> : All water service area policies of the city or town described in the plan conform to all relevant <u>utility service extension ordinances</u> .	See Note C	
d) <u>Service area policies</u> 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.	See Note D	
e) <u>Other relevant elements</u> 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.	See Note E	

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 _____

Date _____

**Notes for
Department of Health Local Government Consistency Determination Forms**

Water System Name: North City Water District
PWS ID: 39600E
Planning Document: Comprehensive Water System Plan
Plan Date: January 2020
Local Governments: City of Lake Forest Park, City of Shoreline, King County

Notes:

- A. Service Area and Land Use and Zoning:
 - a. 1-4
 - b. 2-1 through 2-2
 - c. 2-9 through 2-13
- B. Growth Projection:
 - a. Section 2
- C. Municipal Service Area Policies
 - a. 1-4 through 1-15
 - b. 3-1 through 3-2
- D. Service Area Policies
 - a. 1-4 through 1-15
 - b. 3-1 through 3-2
- E. Other
 - a. Coordinated Water system Plan
 - i. 1-16
 - ii. 1-20
 - iii. 2-1
 - b. Reclaimed Water Plan
 - i. 3-3



January 10, 2020

Ms. Rachael Markle
City of Shoreline Planning & Community Development Director
Shoreline City Hall - 3rd Floor
17500 Midvale Ave N
Shoreline, WA 98133

**Subject: North City Water District - Water System Plan
Request for Local Government Consistency Review**

Dear Ms. Markle:

We are writing on behalf of North City Water District. We are in the process of preparing their 2020 Water System Plan and have completed the basic planning and forecasting portion of the plan.

We are requesting completion of review of the current draft plan to the extent necessary (Sections 1 through 4) to favorably complete the attached Local Government Consistency Review Checklist, as required by WAC 246-290-108. We have partially completed the form to facilitate your efficient review.

The District is preparing to complete the full plan in the first quarter of 2020 and we anticipate submitting the full plan for the City's review thereafter.

Please call if you have any questions.

Sincerely,
CHS Engineers, LLC

A handwritten signature in blue ink that reads "Rodney Langer".

Rodney Langer, P.E.
Principal

Enclosure

cc: Diane Pottinger, North City Water District

Local Government Consistency Determination Form

Water System Name: North City Water District PWS ID: 39600E

Planning/Engineering Document Title: Comprehensive Water System Plan Plan Date: January 2020

Local Government with Jurisdiction Conducting Review: City of Shoreline

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	For use by local government
	Identify the page(s) in submittal	Yes or Not Applicable
a) The water system service area is consistent with the adopted <u>land use and zoning</u> within the service area.	See Note A	
b) The <u>growth projection</u> 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.	See Note B	
c) For <u>cities and towns that provide water service</u> : All water service area policies of the city or town described in the plan conform to all relevant <u>utility service extension ordinances</u> .	See Note C	
d) <u>Service area policies</u> 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.	See Note D	
e) <u>Other relevant elements</u> 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.	See Note E	

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

Date

**Notes for
Department of Health Local Government Consistency Determination Forms**

Water System Name: North City Water District
PWS ID: 39600E
Planning Document: Comprehensive Water System Plan
Plan Date: January 2020
Local Governments: City of Lake Forest Park, City of Shoreline, King County

Notes:

- A. Service Area and Land Use and Zoning:
 - a. 1-4
 - b. 2-1 through 2-2
 - c. 2-9 through 2-13
- B. Growth Projection:
 - a. Section 2
- C. Municipal Service Area Policies
 - a. 1-4 through 1-15
 - b. 3-1 through 3-2
- D. Service Area Policies
 - a. 1-4 through 1-15
 - b. 3-1 through 3-2
- E. Other
 - a. Coordinated Water system Plan
 - i. 1-16
 - ii. 1-20
 - iii. 2-1
 - b. Reclaimed Water Plan
 - i. 3-3

APPENDIX K – STANDARD DETAILS AND TECHNICAL SPECIFICATIONS

NORTH CITY WATER DISTRICT

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Standard Details

Adopted January 2020

P: 206.362.8100
F: 206.361.0629

1519 NE 177th St
Shoreline, WA 98155

STANDARD DETAILS

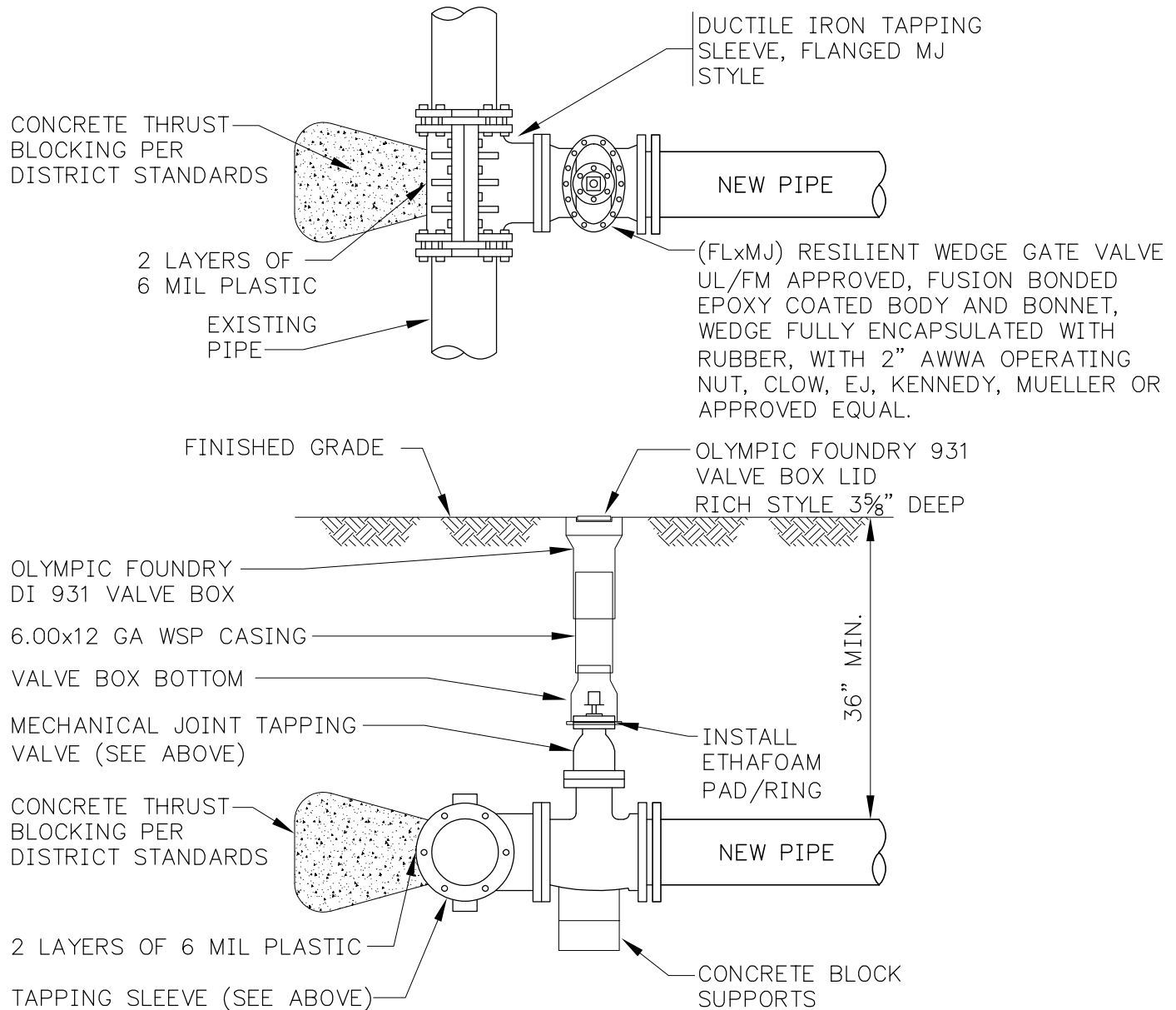
<u>Title</u>	<u>File</u>	<u>Revised</u>	<u>Page</u>
1. Wet Tap Detail	SD#1	01/20	2
2. Fire Hydrant Straight Installation	SD#2	01/20	3
3. Fire Hydrant Offset Installation	SD#3	01/20	4
4. Fire Hydrant Bend Installation	SD#4	01/20	5
5. Flanged Fire Hydrant Assembly	SD#5	01/20	6
6. Existing 1" and Smaller Service Reconnection	SD#6	01/20	7
7. 5/8"x3/4" Service with Meter Setting	SD#7	01/20	8
8. 1" Service with Meter Setting	SD#8	01/20	9
9. 1.5" Service with Meter Setting	SD#9	01/20	10
10. 2" Service with Meter Setting	SD#10	01/20	11
11. 3" and 4" Water Service	SD#11	01/20	12
12. Typical Trench Section	SD#12	01/20	13
13. Trench Surface Restoration	SD#13	01/20	14
14. 2" and Smaller Reduced Pressure Backflow Assembly	SD#14	01/20	15
15. 2.5" and Larger Reduced Pressure Backflow Assembly	SD#15	01/20	16
16. Double Check Valve Assembly 2" and smaller	SD#16	01/20	17
17. Residential PRV	SD#17	01/20	18
18. Double Check Detector Assembly	SD#18	01/20	19
19. Intentionally Left Blank	N/A	N/A	N/A
20. 1" and 2" Testing Trees	SD#20	01/20	20
21. 1" Air Valve	SD#21	01/20	21
22. 2" Air valve	SD#22	01/20	22
23. Concrete Thrust Blocking	SD#23	01/20	23
24. Valves and Restraint Requirements	SD#24	01/20	24
25. Intentionally Left Blank	N/A	N/A	N/A
26. Intentionally Left Blank	N/A	N/A	N/A
27. Valve Operating Nut Extension	SD#27	01/20	26
28. Meter Installation and Location	SD#28	01/20	27
29. Water and Sewer Separation	SD#29	01/20	28
30. Typical Casing Profile	SD#30	01/20	29
31. PVBA/SVBA Backflow Preventers	SD#31	01/20	30
32. Bolt, Nut, Gasket, Pig Specs.	SD#32	01/20	31

Notes:

1) All Materials shall be Domestic made.

*With exception of 931 valve box, lid and bottom.

2) All brass shall be domestic and conform to the low lead rule.



NOTES:

1. PRIOR TO BORING:
 - A. TAPPING SLEEVE AND VALVE SHALL BE STERILIZED WITH 12.5% CHLORINE PER SPECIFICATIONS.
 - B. TAPPING SLEEVE AND VALVE SHALL BE AIR TESTED.
2. BOLTS AND NUTS TO BE USA MADE WITH TRIPAC T2000 BLUE COATING.

REVISED: 01/20

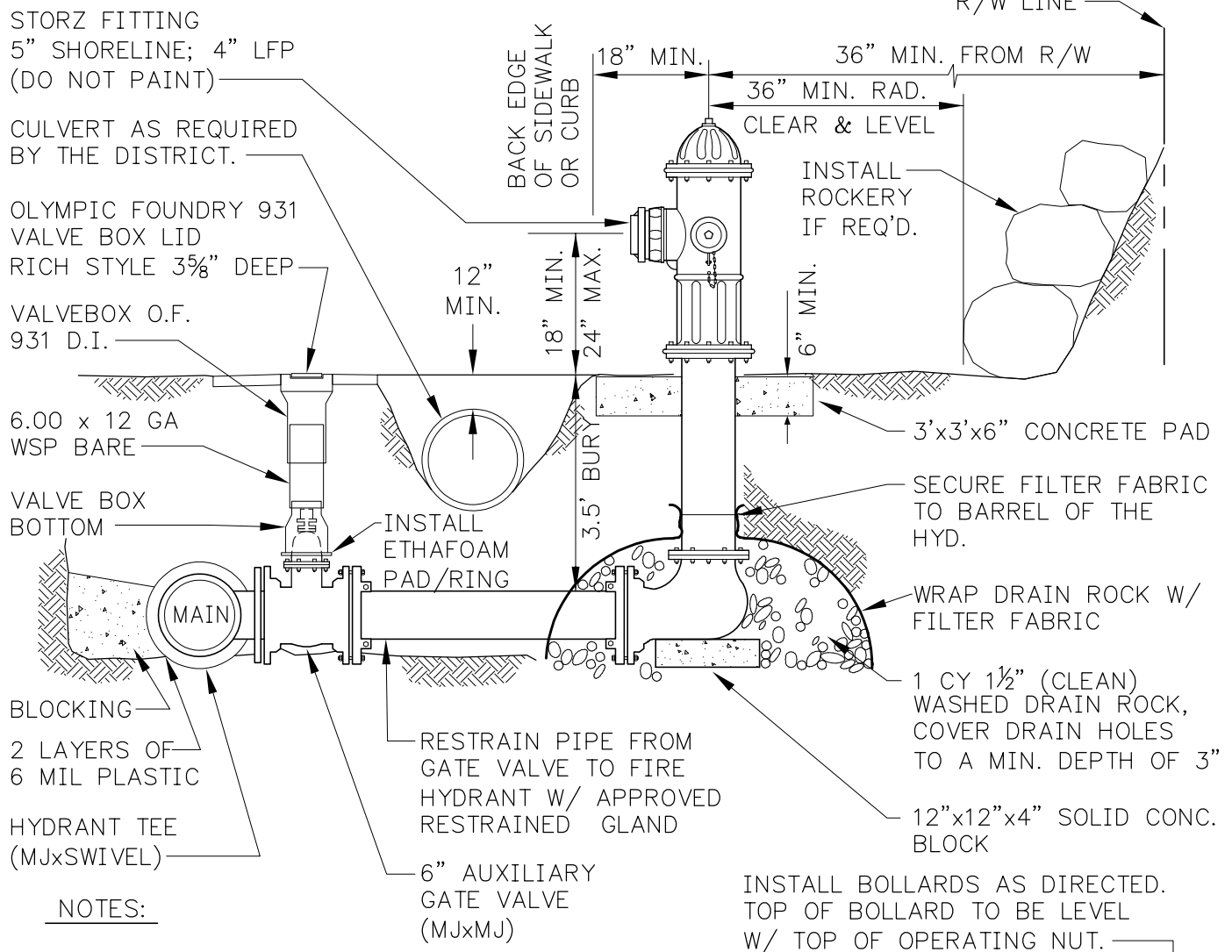
NCWD STANDARD DETAIL

NO. 1



WET TAP





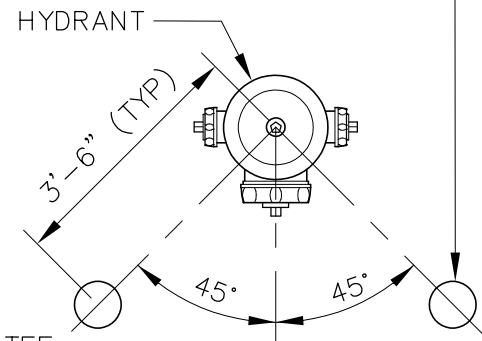
1. BOLTS AND NUTS TO BE USA MADE W/ TRIPAC T2000 BLUE COATING.

2. PROVIDE LEVEL ACCESS TO FIRE HYDRANT.

3. FIRE HYDRANTS & BOLLARDS TO BE PAINTED WITH (2) COATS KELLY MOORE SAFETY YELLOW ACRYLIC GLOSS ENAMEL LUXLITE Q.D. ALKYD GLOSS ENAMEL #5880-563 DTM OR PPG PITT-TECH 90-330 SAFETY YELLOW.

4. DETAIL ABOVE SHOWS NEW CONSTRUCTION HYDRANT TEE.

5. ALLOWABLE HYDRANTS: MUELLER A-423; AMERICAN DARLING B-62-B, KENNEDY K81D AND EJ 5CD250.



REVISED: 01/20

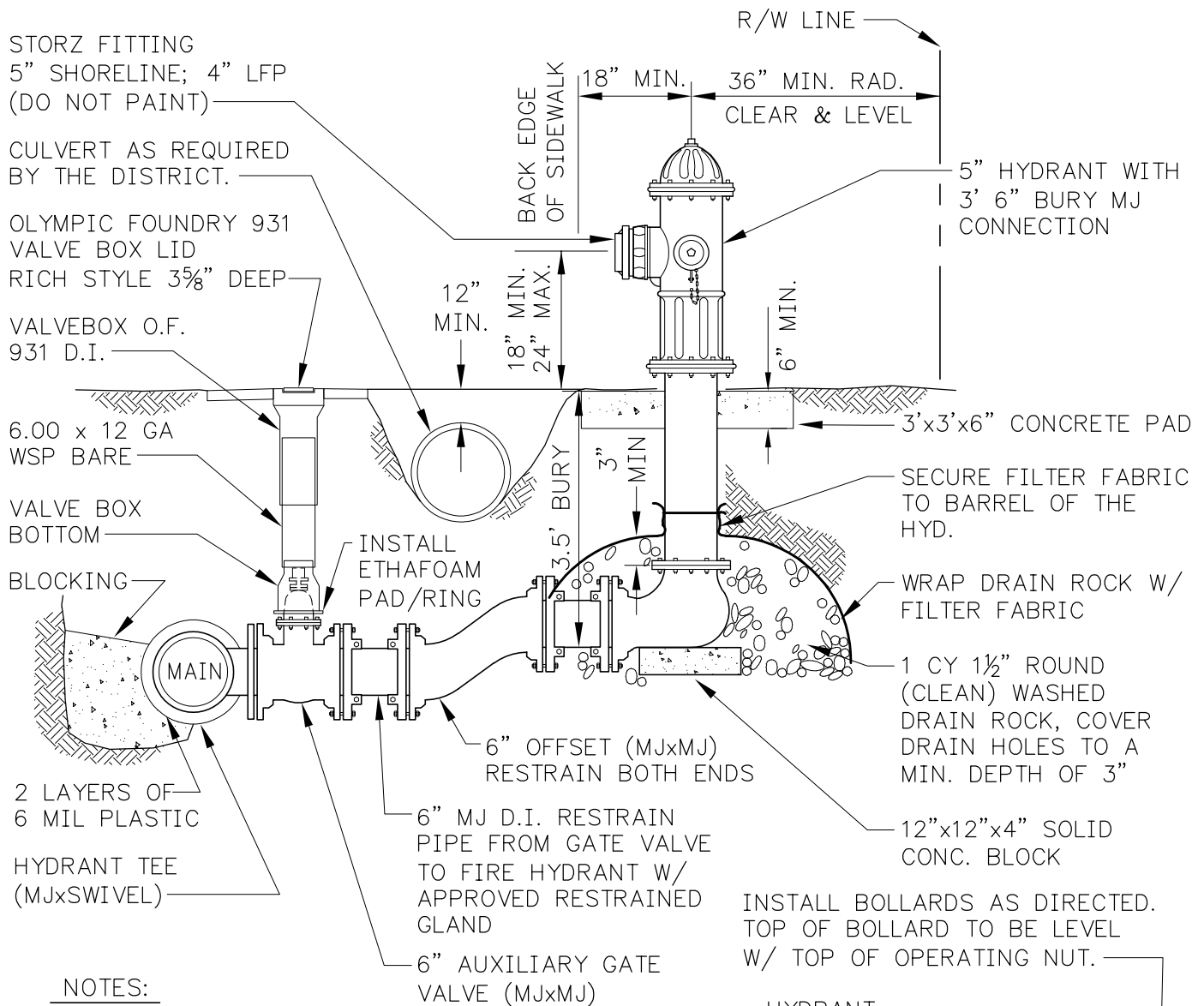
NCWD STANDARD DETAIL

NO. 2

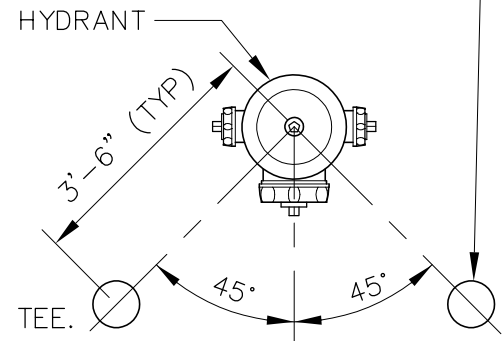


FIRE HYDRANT STRAIGHT INSTALLATION



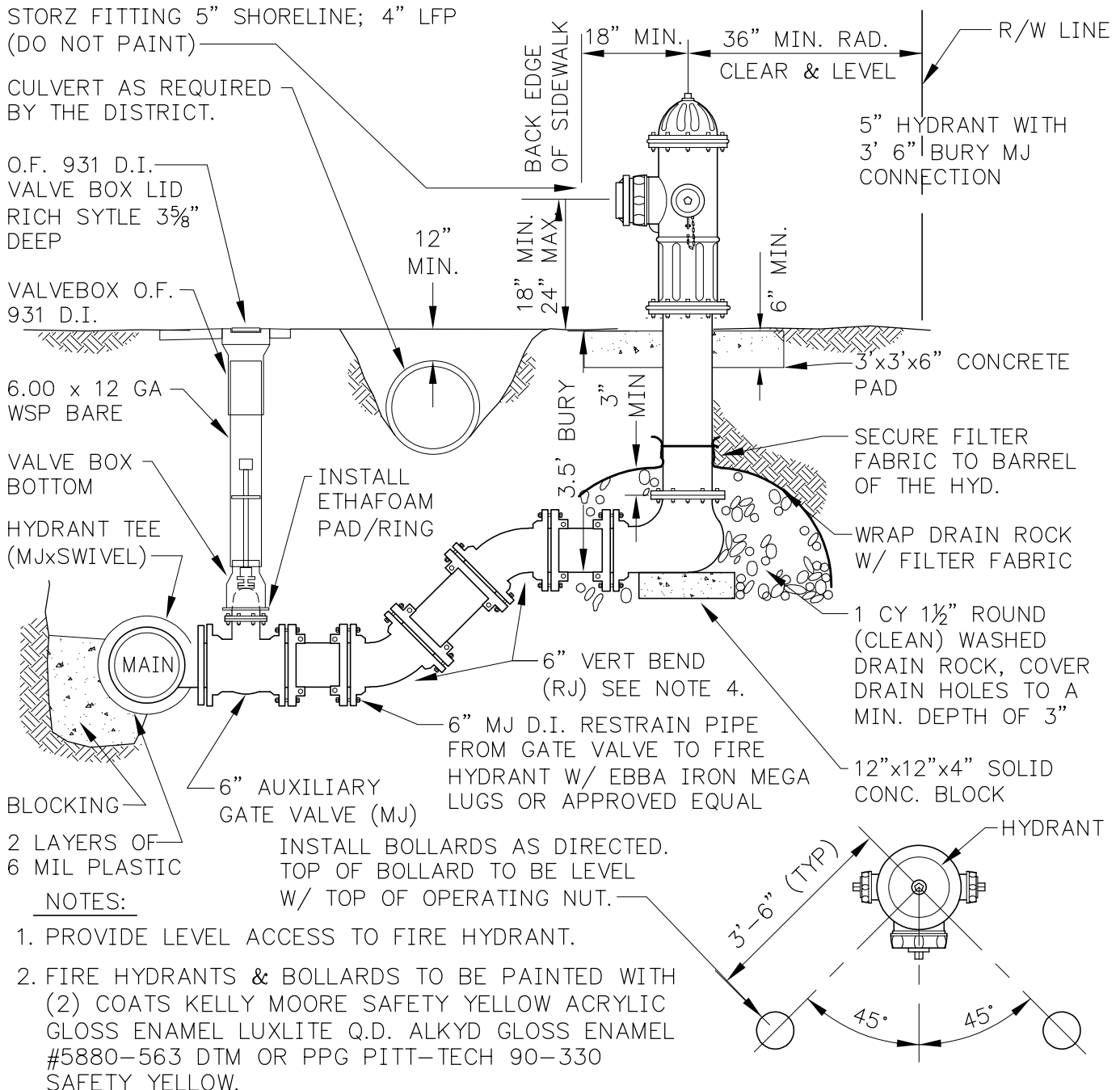
NOTES:

1. PROVIDE LEVEL ACCESS TO FIRE HYDRANT.
2. FIRE HYDRANTS & BOLLARDS TO BE PAINTED WITH (2) COATS KELLY MOORE SAFETY YELLOW ACRYLIC GLOSS ENAMEL LUXLITE Q.D. ALKYD GLOSS ENAMEL #5880-563 DTM OR PPG PITT-TECH 90-330 SAFETY YELLOW.
3. DETAIL ABOVE SHOWS NEW CONSTRUCTION HYDRANT TEE.
4. ALLOWABLE HYDRANTS: MUELLER A-423; AMERICAN DARLING B-62-B, KENNEDY K81D AND EJ 5CD250.
5. BOLTS AND NUTS TO BE USA MADE WITH TRIPAC T2000 BLUE COATING.



REVISED: 01/20

NCWD STANDARD DETAIL**NO. 3****FIRE HYDRANT OFFSET INSTALLATION**



NOTES:

1. PROVIDE LEVEL ACCESS TO FIRE HYDRANT.
2. FIRE HYDRANTS & BOLLARDS TO BE PAINTED WITH (2) COATS KELLY MOORE SAFETY YELLOW ACRYLIC GLOSS ENAMEL LUXLITE Q.D. ALKYD GLOSS ENAMEL #5880-563 DTM OR PPG PITT-TECH 90-330 SAFETY YELLOW.
3. DETAIL ABOVE SHOWS NEW CONSTRUCTION HYDRANT TEE.
4. ALLOWABLE HYDRANTS: MUELLER A-423; AMERICAN DARLING B-62-B; KENNEDY K81D AND EJ 5CD250.
5. MAX. BURY DEPTH FOR FIRE HYDRANTS SHALL BE 3 $\frac{1}{2}$ '. FOR DEEPER INSTALLATIONS INSTALL A 3 $\frac{1}{2}$ ' FIRE HYDRANT WITH VERTICAL BENDS AS SHOWN. 45° MAX. VERTICAL BEND.
6. BOLTS AND NUTS TO BE USA MADE WITH TRIPAC T2000 BLUE COATING.

REVISED: 01/20

NCWD STANDARD DETAIL

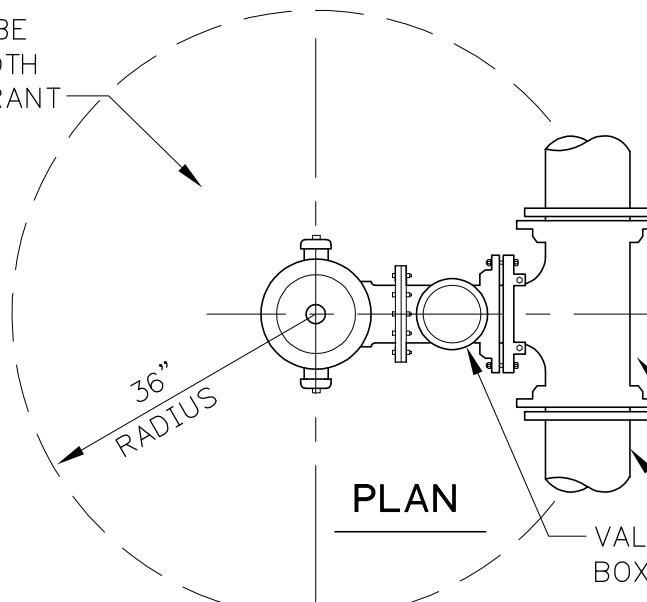
NO. 4



FIRE HYDRANT BEND INSTALLATION



SURFACE TO BE
GRADED SMOOTH
AROUND HYDRANT



NOTES:

1. ALLOWABLE HYDRANTS:
MUELLER A-423;
AMERICAN DARLING B-62-B;
KENNEDY K81D AND EJ
5CD250.

2. PAINT FIRE HYDRANTS PER
STANDARD DETAILS 1-4

3. BOLTS AND NUTS TO BE USA
MADE WITH TRIPAC T2000
BLUE COATING

HYDRANT TEE
(MJxSWIVEL)

WATER MAIN

VALVE
BOX

PROPERTY
LINE

36" MIN.
(UNLESS
DIRECTED
OTHERWISE)

36" MIN.
(6' MIN. FROM
TRAVEL LANE)

4'x4'x6" CONCRETE
PAD

SLOPE

STORZ FITTING
5" SHORELINE; 4" LFP
(DO NOT PAINT)

O.F. 931 D.I. VALVE BOX
LID RICH STYLE 3 $\frac{5}{8}$ " DEEP

FACE OF CURB

SPOOL LENGTH TO
SUIT TRENCH DEPTH

VALVEBOX O.F. 931 D.I.

6.00 x 12 GA WSP BARE

VALVE BOX BOTTOM

INSTALL ETHAFOAM
PAD/RING

FILTER FABRIC
1 CY 1 $\frac{1}{2}$ " ROUND
(CLEAN) WASHED
DRAIN ROCK, COVER
DRAIN HOLES TO A
MIN. DEPTH OF 3"

TEE

WATER MAIN

6" GATE VALVE (FLxMJ)

SOLID CONCRETE BEARING
BLOCK 12"x12"x4" MIN. SIZE

ELEVATION

REVISED: 01/20

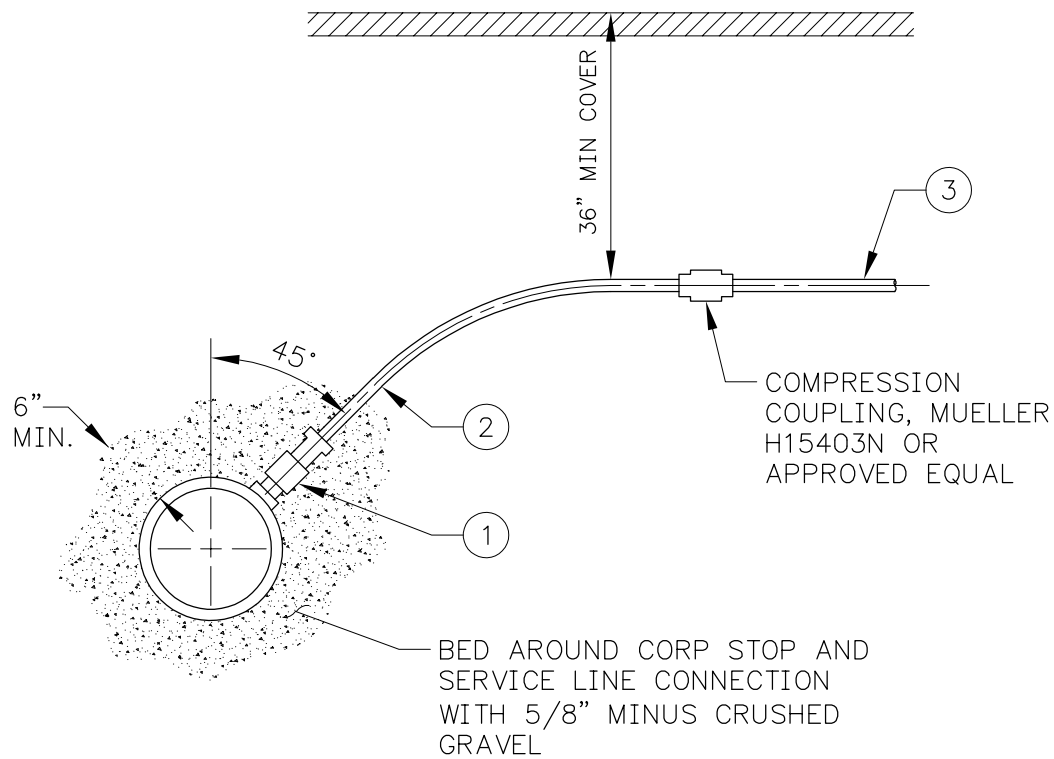
NCWD STANDARD DETAIL

NO. 5



FLG FIRE HYDRANT ASSEMBLY





NOTES:

- ① 1" CORP STOP. AWWA CCTH INLET BY COMPRESSION FITTING FOR COPPER PIPE.
- ② NEW SERVICE LINE EXTENSION – SOFT COPPER 1" TYPE K.
- ③ EXISTING SERVICE LINE IS ASSUMED TO BE COPPER. FIELD VERIFY BEFORE CONSTRUCTION.

REVISED: 01/20

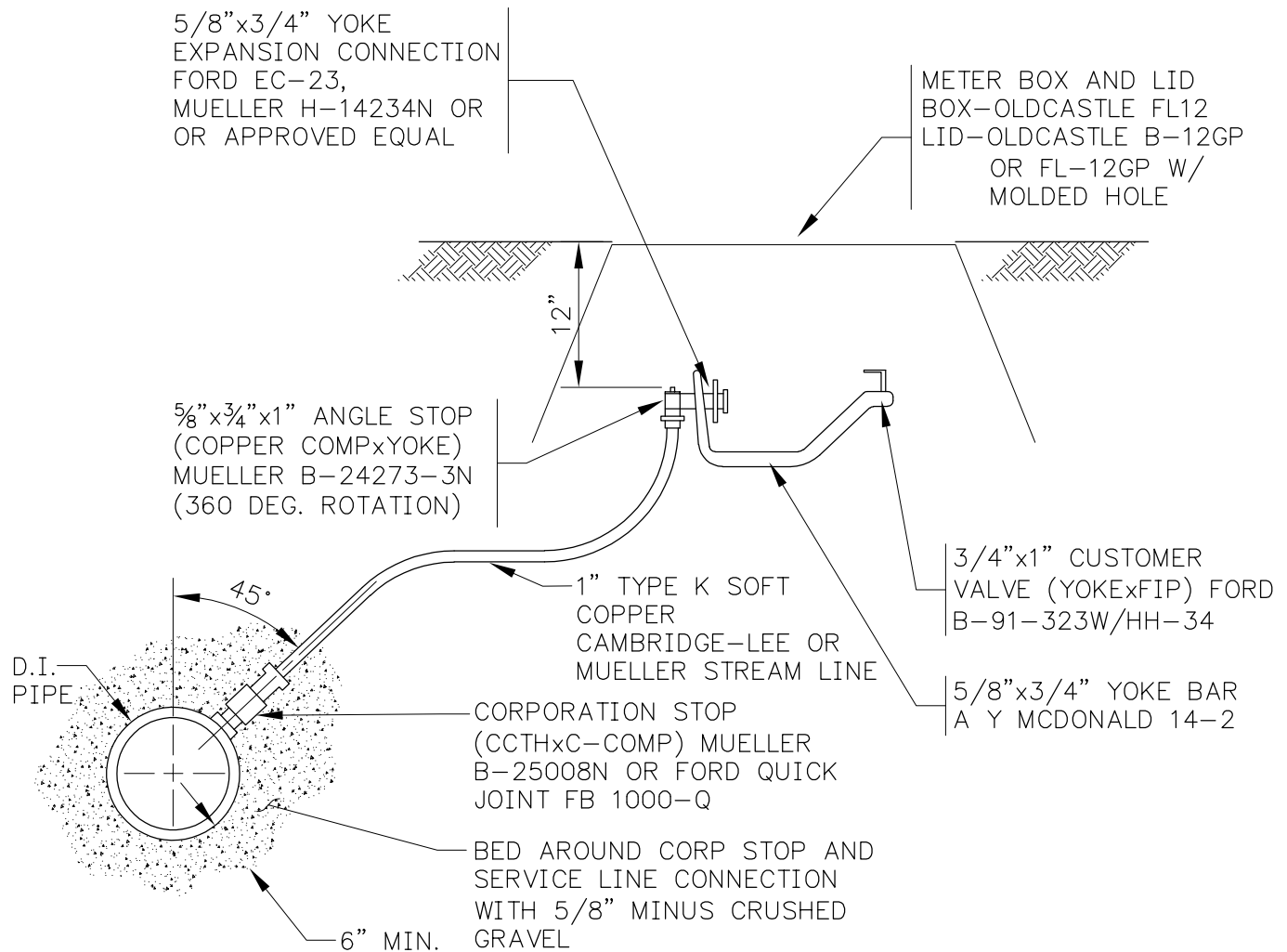
NCWD STANDARD DETAIL

NO. 6



**EXISTING 1" AND SMALLER
SERVICE RECONNECTION**





NOTES:

1. FOR RELOCATED SERVICES: CONTRACTOR SHALL PROVIDE ALL MATERIALS SHOWN ON DETAIL UNLESS OTHERWISE SPECIFIED. NCWD WILL RELOCATE METER. CONTRACTOR TO RECONNECT CUSTOMER'S SERVICE LINE.
2. FOR EXISTING SERVICES TO BE RECONNECTED TO NEW MAIN: INSTALL CORPORATION STOP.
3. ALL BRASS PARTS SHALL BE DOMESTIC AND CONFORM TO THE LOW LEAD RULE.

REVISED: 01/20

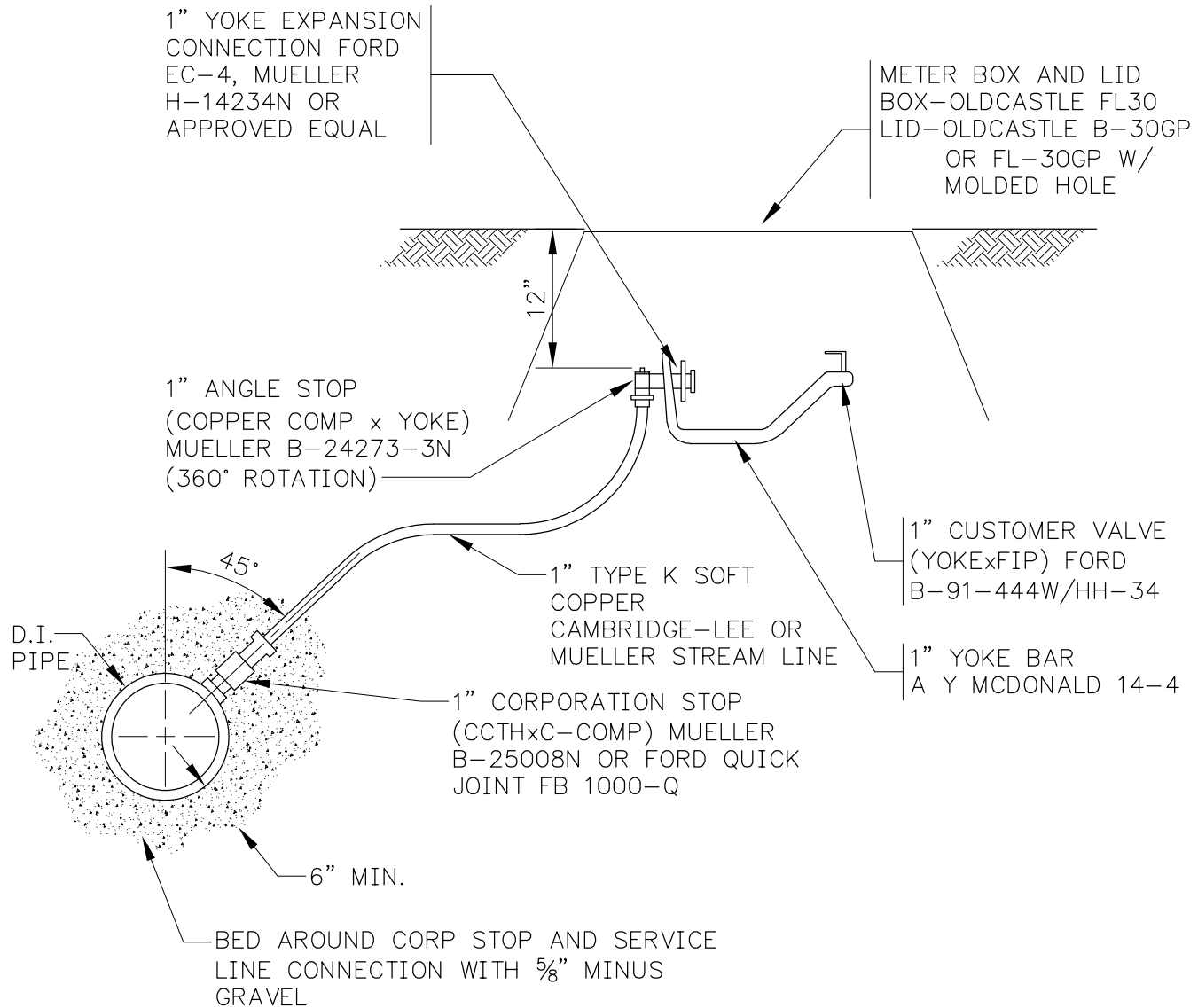
NCWD STANDARD DETAIL

NO. 7



5/8" X 3/4" SERVICE WITH METER SETTING





NOTES:

1. FURNISH AND INSTALL COPPER SERVICE LINE. FURNISH AND INSTALL CORPORATION AND ANGLE STOPS. FURNISH AND INSTALL YOKE BAR, CUSTOMER VALVE, METER BOX, AND LID. PROVIDE EXCAVATION AND BACKFILL.
2. FOR EXISTING SERVICES TO BE RECONNECTED TO NEW MAIN: INSTALL CORPORATION STOP.
3. ALL BRASS PARTS SHALL BE DOMESTIC AND CONFORM TO THE LOW LEAD RULE.

REVISED: 01/20

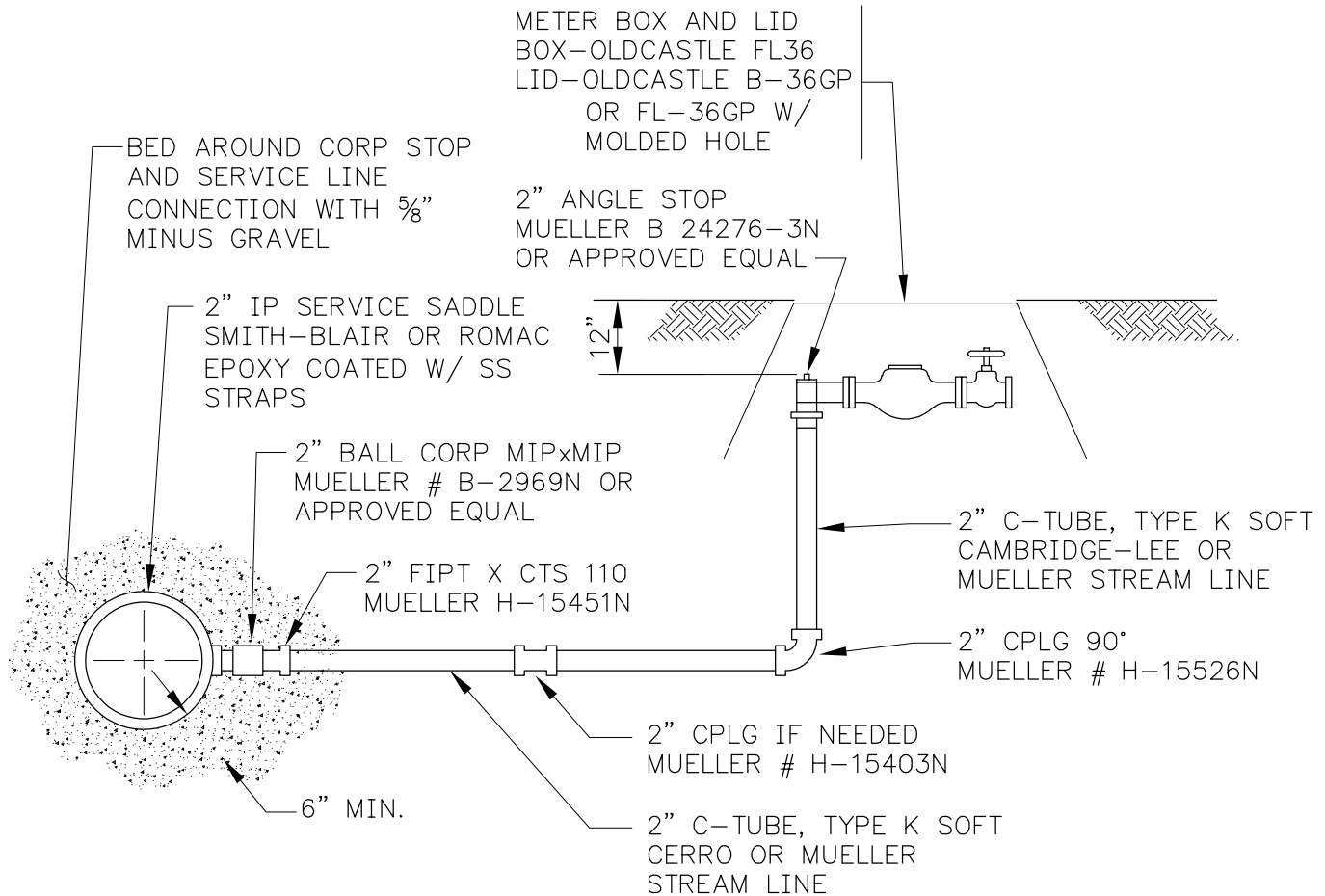
NCWD STANDARD DETAIL

NO. 8



1" SERVICE WITH METER SETTING





NOTES:

1. FURNISH AND INSTALL COPPER SERVICE LINE. FURNISH AND INSTALL CORPORATION AND ANGLE STOPS. FURNISH AND INSTALL METER BOX AND LID. PROVIDE EXCAVATION AND BACKFILL.
2. FOR EXISTING SERVICES TO BE RECONNECTED TO NEW MAIN: INSTALL CORPORATION STOP.
3. ALL BRASS PARTS SHALL BE DOMESTIC AND CONFORM TO THE LOW LEAD RULE.
4. CONTRACTOR TO INSTALL ANGLE VALVE AND METER BOX W/ LID. DISTRICT TO PROVIDE METER, A67 ADAPTERS AND CUSTOMER VALVE.

REVISED: 01/20

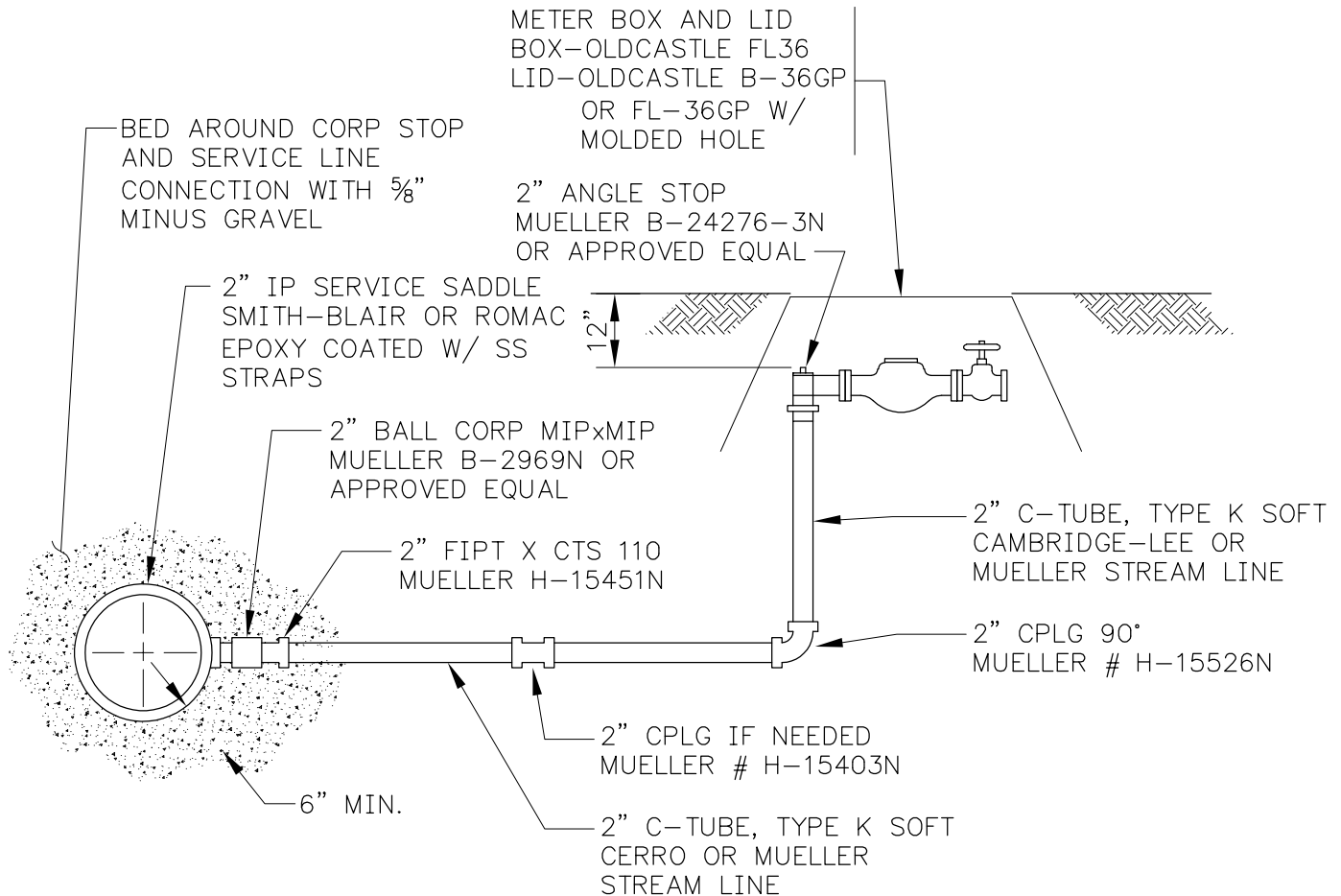
NCWD STANDARD DETAIL

NO. 9



1-1/2" SERVICE WITH METER SETTING

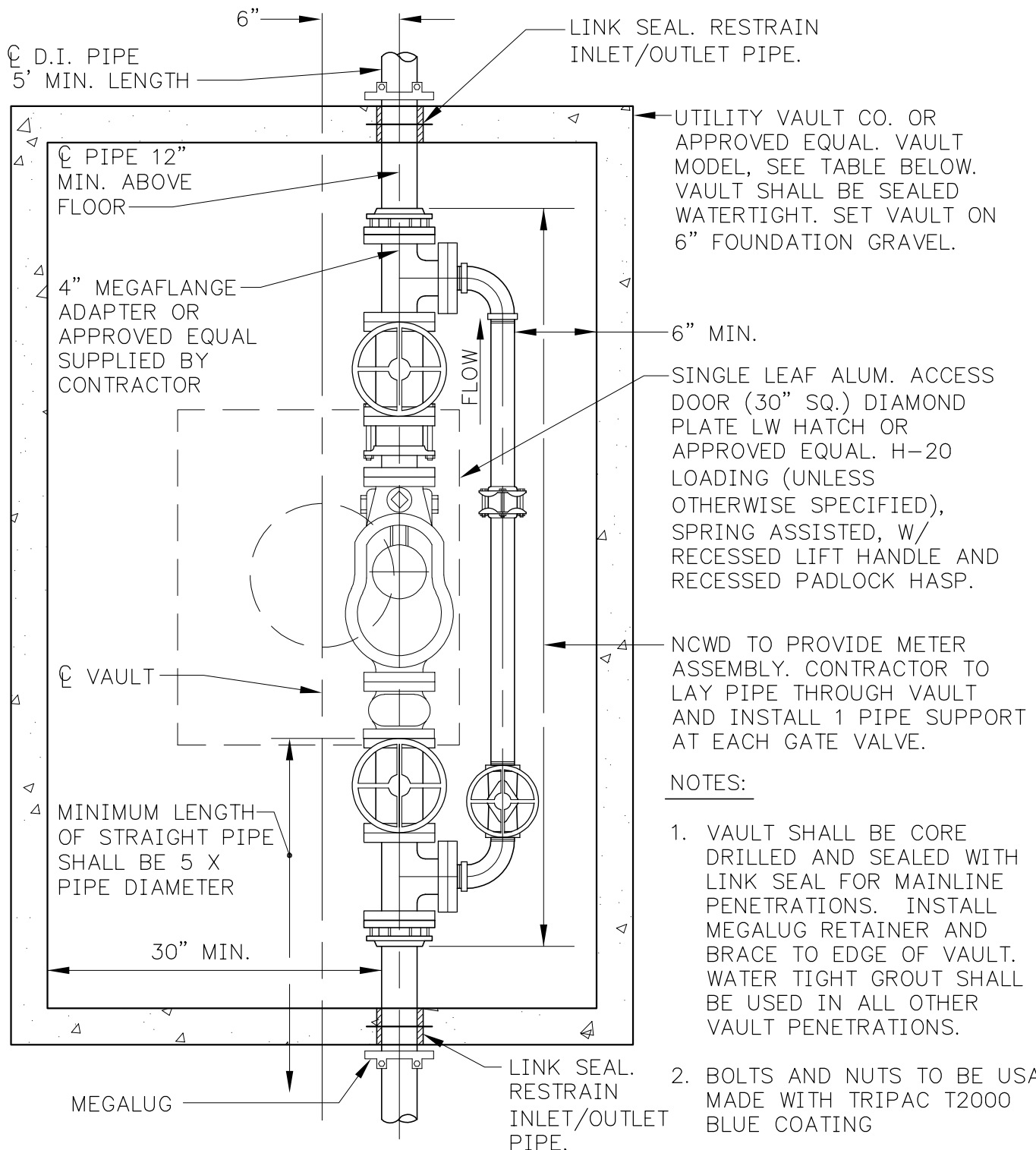


NOTES:

1. FURNISH AND INSTALL COPPER SERVICE LINE. FURNISH AND INSTALL CORPORATION AND ANGLE STOPS. FURNISH AND INSTALL METER BOX AND LID. PROVIDE EXCAVATION AND BACKFILL.
2. FOR EXISTING SERVICES TO BE RECONNECTED TO NEW MAIN: INSTALL CORPORATION STOP.
3. ALL BRASS PARTS SHALL BE DOMESTIC AND CONFORM TO THE LOW LEAD RULE.
4. CONTRACTOR TO INSTALL ANGLE VALVE AND METER BOX W/ LID. DISTRICT TO PROVIDE METER, A67 ADAPTERS AND CUSTOMER VALVE.

REVISED: 01/20

NCWD STANDARD DETAIL**NO. 10****2" SERVICE WITH METER SETTING**



SIZE	MIN. VAULT SIZE (INSIDE)			UTIL. VAULT CO. MODEL
	W	L	H	
3"/4"	4'-6"	6'-11"	2'-8"	675 WA

REVISED: 01/20

NCWD STANDARD DETAIL**NO. 11****3" AND 4" WATER SERVICE**

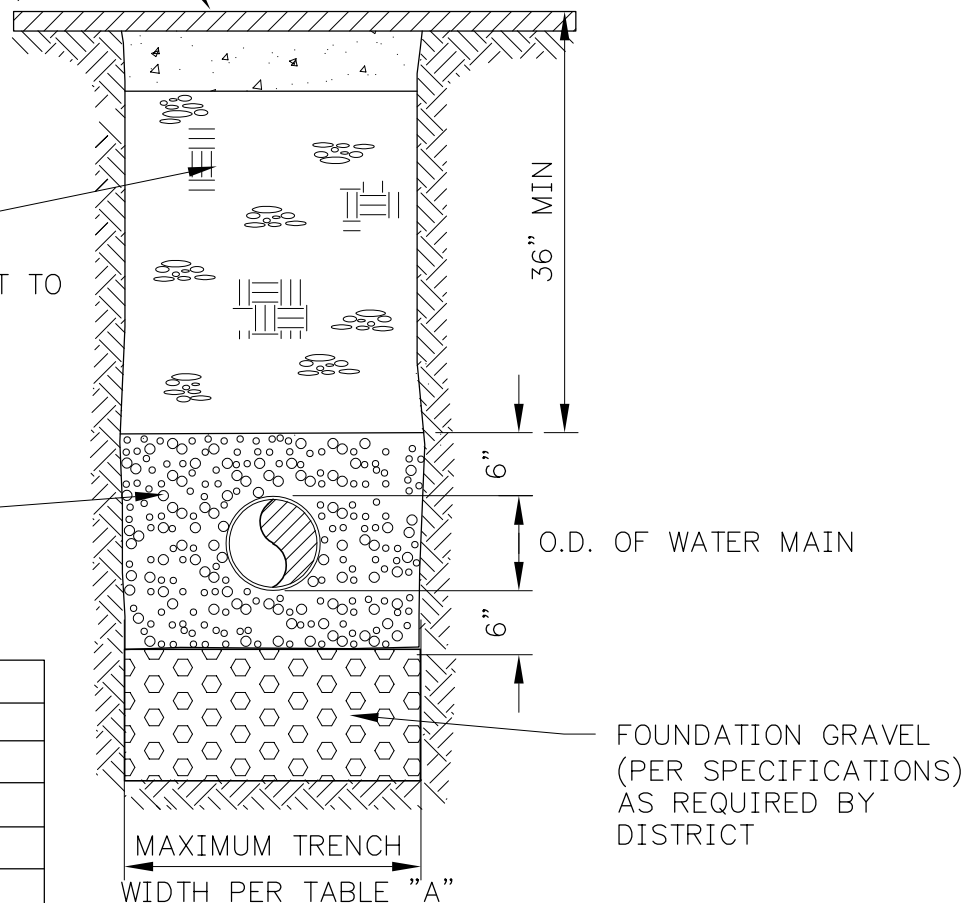
SURFACE RESTORATION IN ACCORDANCE WITH LOCAL JURISDICTIONAL REQUIREMENTS. MINIMUM REQUIREMENTS SHOWN IN TRENCH RESTORATION DETAIL.

BACKFILL PER JURISDICTIONAL REQUIREMENTS. COMPACT TO MIN. 95% MAX. DENSITY

BEDDING GRAVEL

TABLE "A"

6" PIPE	2'-6"
8" PIPE	2'-6"
10" PIPE	3'-0"
12" PIPE	3'-0"
15",16" PIPE	3'-6"
18" PIPE	4'-0"
24" PIPE	4'-0"



TRENCH SECTION

NOTES:

1. FILL AREAS SHALL BE FILLED AND COMPACTED PRIOR TO INSTALLATION OF WATER MAINS. 95% COMPACTION PER ASTM D-1557 REQUIRED IN FILL AREAS. REPORTS REQUIRED PRIOR TO TRENCHING.
2. BEDDING SHALL BE $\frac{5}{8}$ " MINUS SURFACING.

REVISED: 01/20

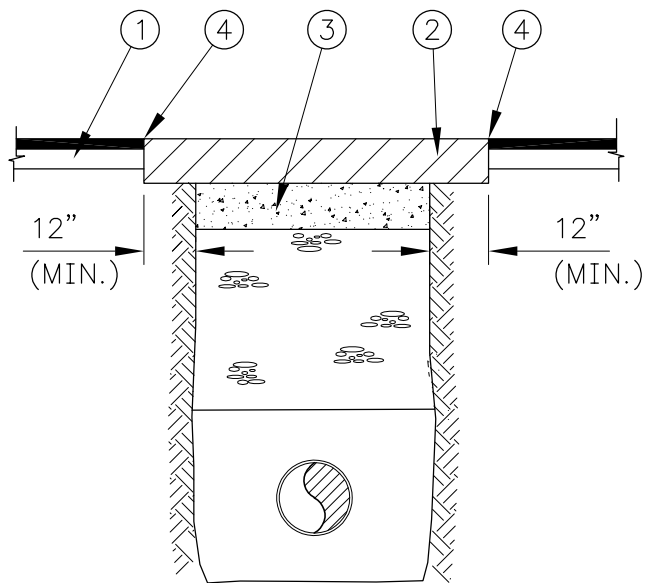
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NO. 12

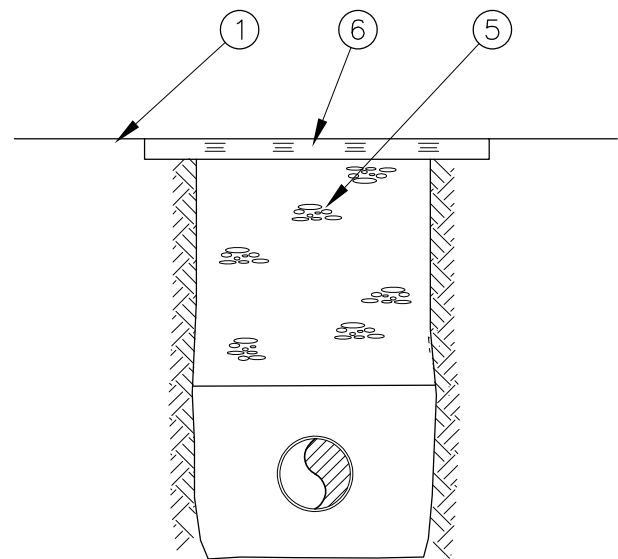


TYPICAL TRENCH SECTION





ASPHALT PAVEMENT RESTORATION



SHOULDER AND EASEMENT RESTORATION

NOTES:

- ① EXISTING SURFACE
- ② MATCH EXISTING ASPHALT DEPTH
- ③ CRUSHED GRAVEL PER LOCAL JURISDICTIONAL REQUIREMENTS.
- ④ SAW CUT. TACK EDGES WITH EMULSIFIED ASPHALT SEAM SEAL, AR4000.
- ⑤ TRENCH BACKFILL
- ⑥ RESTORE EXISTING SURFACE. TOP SOIL, SOD, 5/8" MINUS CRUSHED GRAVEL (2" MIN.) OR AS NOTED ON THE PLANS.

NOTE:

1. THESE STANDARDS ARE THE MINIMUM ALLOWABLE. LOCAL JURISDICTIONAL REQUIREMENTS SHALL OVERRIDE WHERE APPLICABLE.
2. SEE TYPICAL TRENCH SECTION DETAIL 12.

REVISED: 01/20

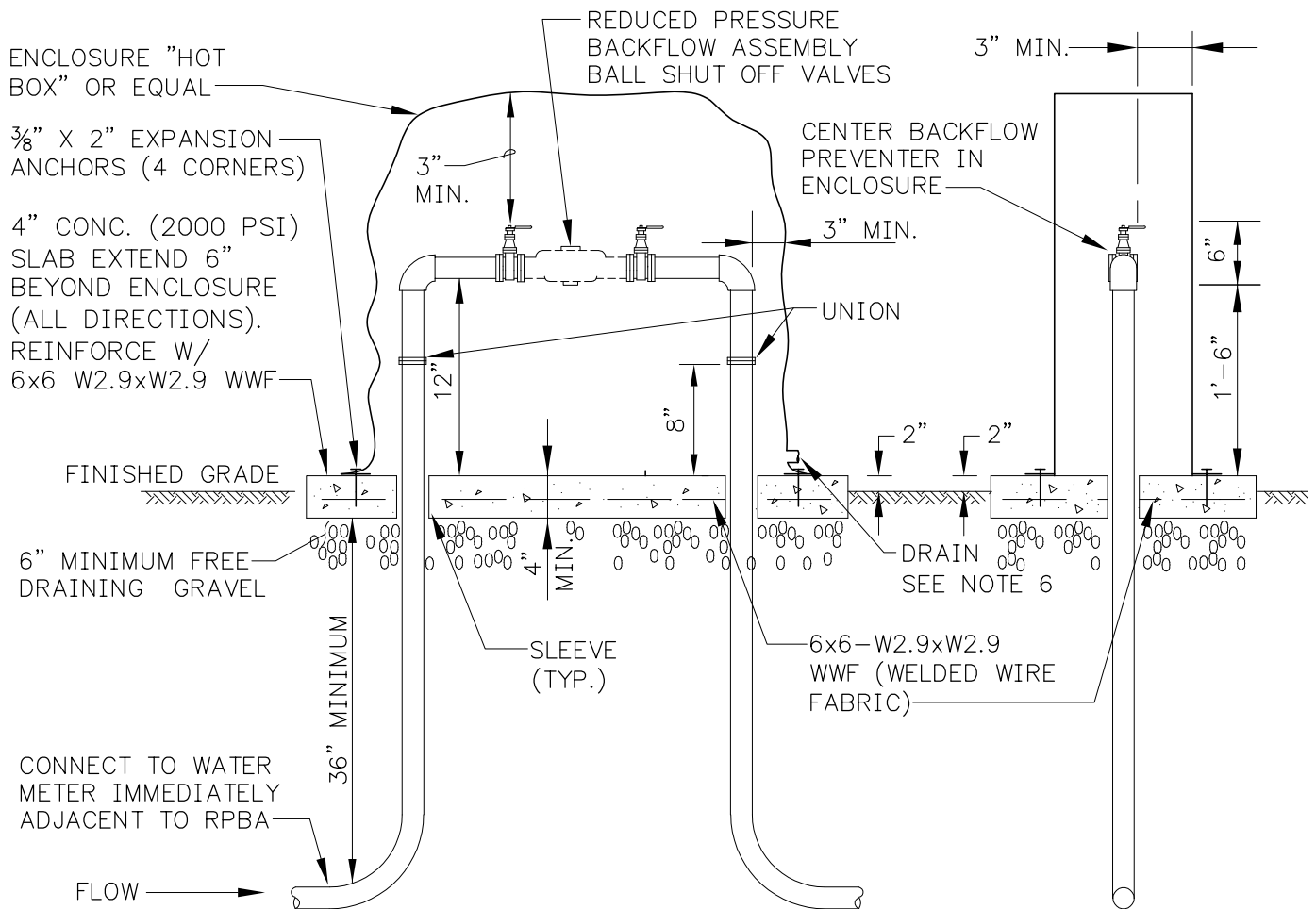
NCWD STANDARD DETAIL

NO. 13



TRENCH SURFACE RESTORATION





NOTES:

1. PROVIDE DISTRICT APPROVED SUPPORT FOR DEVICES LARGER THAN 1" DIAMETER.
2. OWNER SHALL FURNISH, INSTALL, TEST AND MAINTAIN THE RPBA AND ALL PIPING AND APPURTENANCES SHOWN ON THIS PLAN.
3. DISTRICT WILL PROVIDE INSPECTION OF THE RPBA PRIOR TO ESTABLISHMENT OF WATER SERVICE.
4. REDUCED PRESSURE BACKFLOW ASSEMBLIES SHALL BE STATE APPROVED DEVICES.
5. SUBSEQUENT ANNUAL TESTING AND REPORTING OF RPBA REQUIRED BY OWNER.
6. DRAIN SHALL BE SIZED IN ACCORDANCE WITH AWWA CROSS CONNECTION CONTROL MANUAL
7. THE BACKFLOW ASSEMBLY SHALL BE STATE APPROVED. WITHIN 7 DAYS OF INSTALLATION THE DEVICE SHALL BE TESTED BY A CERTIFIED BACKFLOW ASSEMBLY TESTER. TEST RESULTS SHALL BE SENT TO NORTH CITY WATER DISTRICT. BACKFLOW ASSEMBLY SHALL BE INSTALLED IN THE APPROVED ORIENTATION AS PER THE USC APPROVED LIST.

REVISED: 01/20

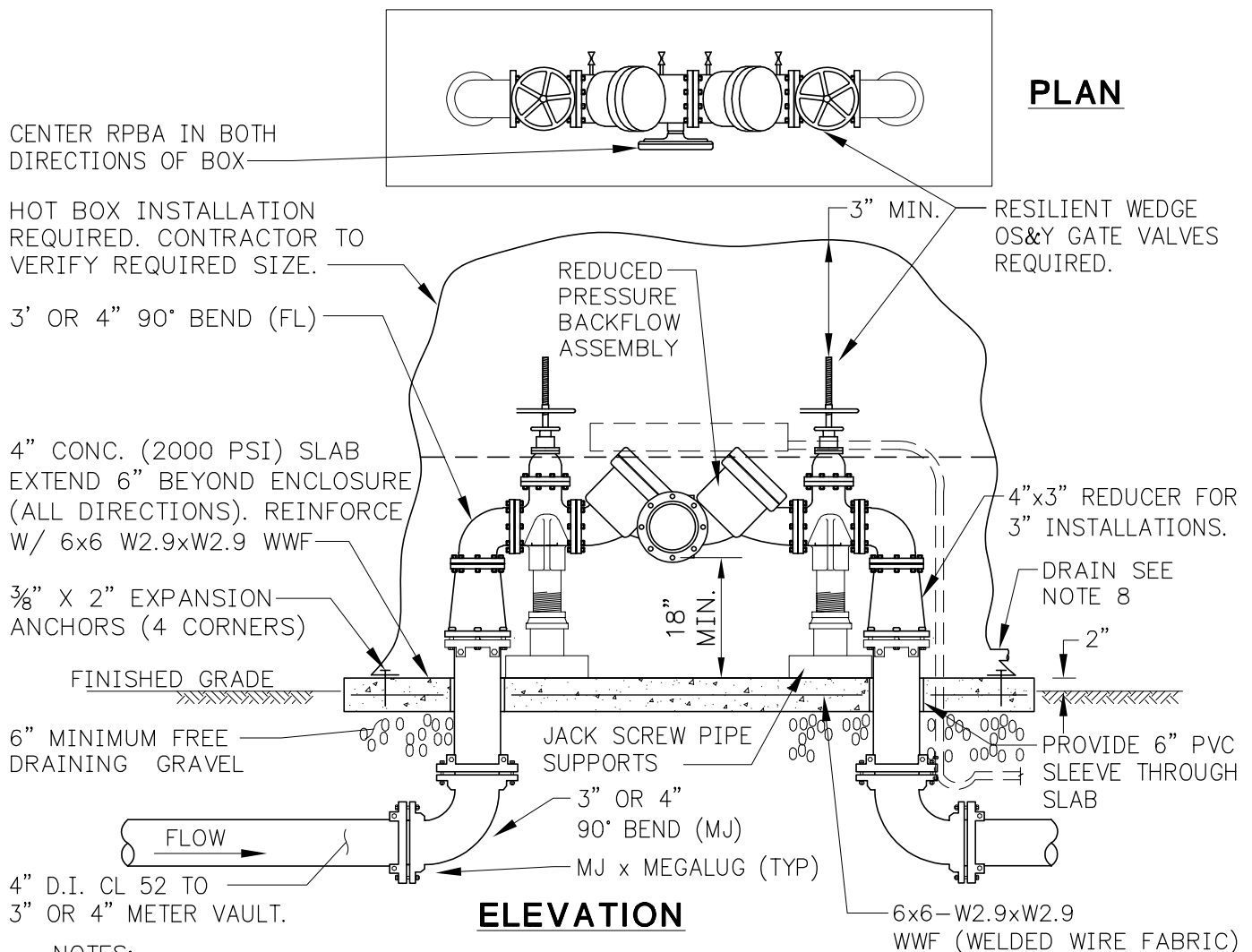
NCWD STANDARD DETAIL

NO. 14



**2" AND SMALLER
REDUCED PRESSURE
BACKFLOW ASSEMBLY**





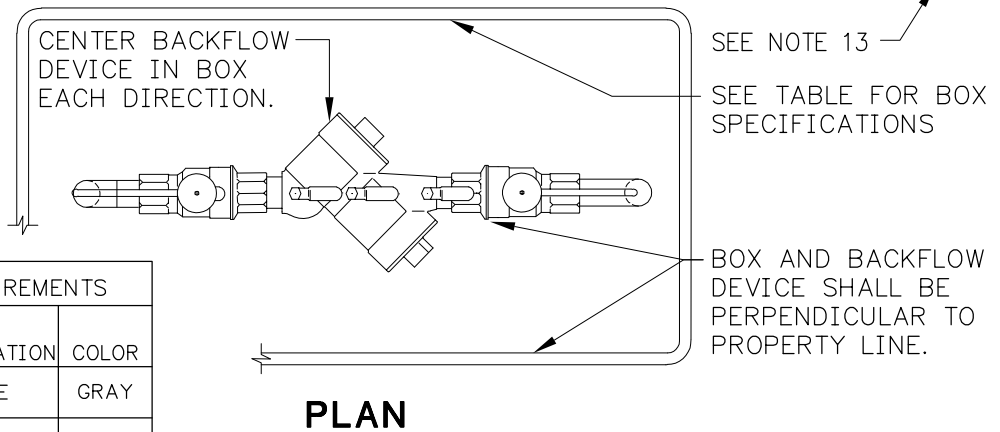
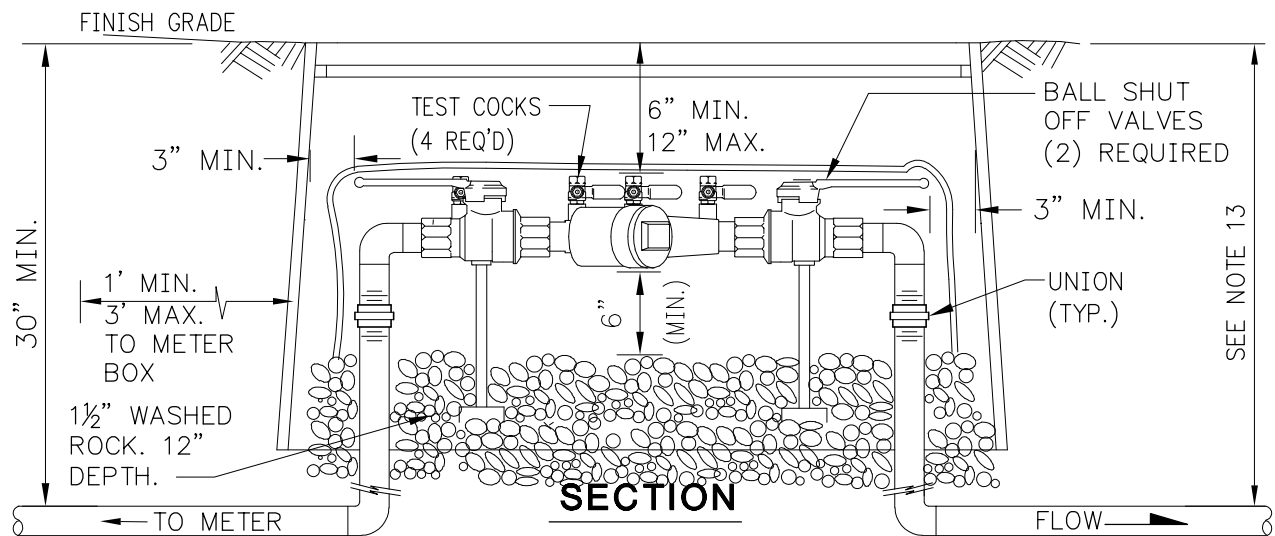
1. APPROVED REDUCED PRESSURE BACKFLOW ASSEMBLY TO LAY HORIZONTAL ONLY.
2. DESIGNED FOR BACK SIPHONAGE AND BACK PRESSURE.
3. THE WATERLINE SHALL BE DISINFECTED, FLUSHED, AND PRESSURE TESTED PRIOR TO INSTALLING THE BACKFLOW ASSEMBLY. THE BACKFLOW ASSEMBLY SHALL BE PROTECTED FROM FREEZING AND FLOODING.
4. ALL FITTINGS SHALL BE FLANGED OR RESTRAINED.
5. LOCATION SHALL BE AS SHOWN ON THE DRAWINGS OR DIRECTED BY THE DISTRICT.
6. THE HOT BOX SHALL HAVE A MIN. CLEAR DISTANCE OF 3' FROM ALL OTHER STRUCTURES.
7. THE BACKFLOW ASSEMBLY SHALL BE STATE APPROVED. WITHIN 7 DAYS OF INSTALLATION THE DEVICE SHALL BE TESTED BY A CERTIFIED BACKFLOW ASSEMBLY TESTER. TEST RESULTS SHALL BE SENT TO NORTH CITY WATER DISTRICT. BACKFLOW ASSEMBLY SHALL BE INSTALLED IN THE APPROVED ORIENTATION AS PER THE USC APPROVED LIST.
8. DRAIN SHALL BE SIZED IN ACCORDANCE WITH AWWA CROSS CONNECTION CONTROL MANUAL
9. BOLTS AND NUTS TO BE USA MADE WITH TRIPAC T2000 BLUE COATING.

REVISED: 01/20

NCWD STANDARD DETAIL**NO. 15**

**2.5" AND LARGER
REDUCED PRESSURE
BACKFLOW ASSEMBLY**





WATER BOX REQUIREMENTS			
SIZE	CARSON INDUSTRIES MODEL NO.	APPLICATION	COLOR
1" / 1½"	1324-3B	FIRE	GRAY
1" / 1½"	1324-3B	IRRIGATION	GREEN
2"	1730-3B	FIRE	GRAY
2"	1730 -3B	IRRIGATION	GREEN

NOTES:

- CLEARANCES SHOWN ABOVE MUST BE MET OR BOX WILL NEED TO BE UP-SIZED.
- BOXES & LIDS SHALL BE EQUIPPED WITH THE BOLT DOWN FEATURE. DO NOT INSTALL READER FLAP.
- APPROVED DOUBLE CHECK VALVE ASSEMBLY TO BE INSTALLED HORIZONTAL WITH GROUND.
- DESIGNED FOR BACK SIPHONAGE, BACK PRESSURE AND LOW HEALTH HAZARDS.
- TEST COCKS TO EITHER FACE OUTWARDS OR UPWARDS FROM ASSEMBLY.
- THE DCVA MAY BE INSTALLED BELOW GROUND PROVIDED ALL OF THE CLEARANCES ARE MET.
- DO NOT INSTALL IN AN AREA SUBJECT TO FLOODING.
- DCVA MUST BE ACCESSIBLE.
- DCVA MUST BE PROTECTED FROM FREEZING CONDITIONS.
- THE BACKFLOW ASSEMBLY SHALL BE STATE APPROVED. WITHIN 7 DAYS OF INSTALLATION THE DEVICE SHALL BE TESTED BY A CERTIFIED BACKFLOW ASSEMBLY TESTER. TEST RESULTS SHALL BE SENT TO NORTH CITY WATER DISTRICT. BACKFLOW ASSEMBLY SHALL BE INSTALLED IN THE APPROVED ORIENTATION AS PER THE USC APPROVED LIST.
- FLUSH LINES PRIOR TO INSTALLATION OF BACKFLOW PREVENTER.
- COVER & TYPE OF PIPE FOR FIRELINES SHALL BE AS REQUIRED BY THE JURISDICTIONAL FIRE DISTRICT.

REVISED: 01/20

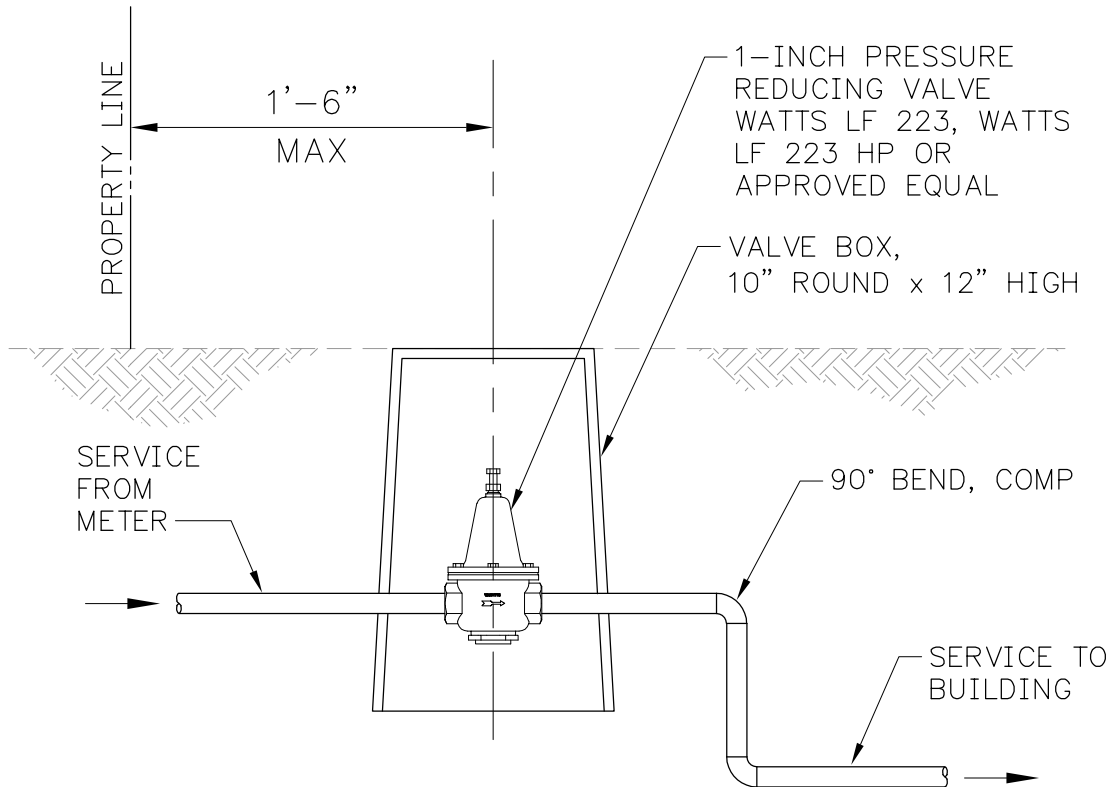
NCWD STANDARD DETAIL

NO. 16



DOUBLE CHECK VALVE ASSEMBLY 2" AND SMALLER





REVISED: 01/20

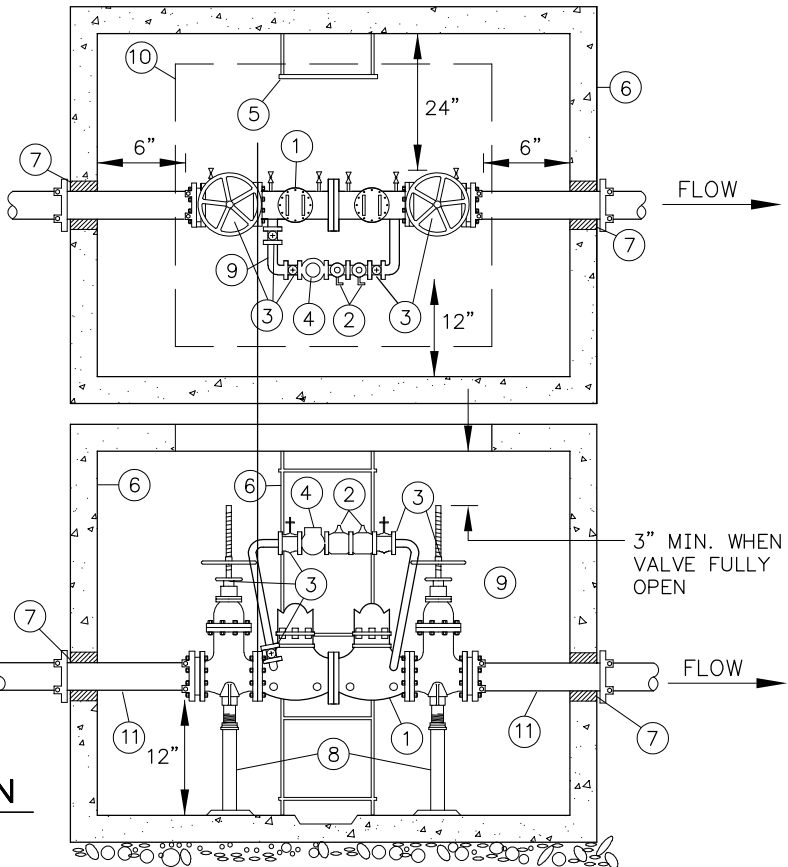
NCWD STANDARD DETAIL**NO. 17****RESIDENTIAL PRV**

NOTES:

1. DISTRICT WILL DETERMINE IF REDUCED PRESSURE PRINCIPAL DEVICE IS REQUIRED.
2. ASSEMBLY TO BE MAINTAINED BY PROPERTY OWNER/CUSTOMER & ANNUAL CERTIFICATION REQUIRED.
3. FIRELINE SHALL NOT BE PUT INTO SERVICE UNTIL THE BACKFLOW PREVENTION ASSEMBLY IS APPROVED BY DISTRICT. CERTIFICATION FOLLOWING INSTALLATION REQUIRED.
4. TEE & GATE VALVE REQUIRED ON MAIN.
5. ALL CLEARANCES SHOWN ARE MINIMUM.
6. UL/FM METER REQUIRED IF POTABLE SERVICE ALSO PROVIDED FROM FIRE PROTECTION SERVICE LINE.
7. BOLTS AND NUTS TO BE USA MADE WITH TRIPAC T2000 BLUE COATING.

PLAN

FLOW →

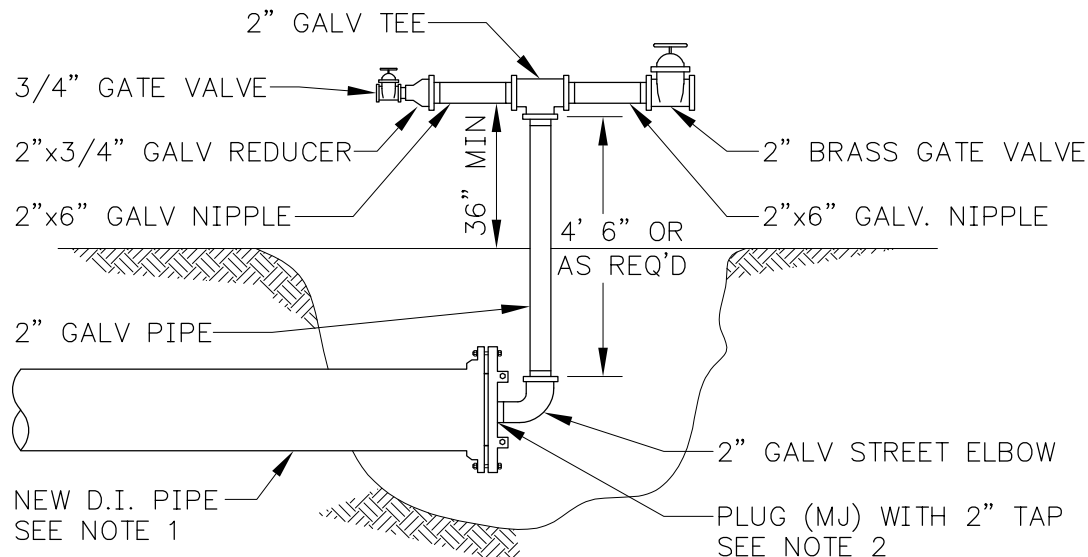
**ELEVATION****KEY NOTES:**

- ① STATE APPROVED DOUBLE CHECK VALVE ASSEMBLY, COMPLETE W/ (4) RESILIENT SEATED TEST COCKS, & BRASS OR COPPER DETECTOR BY-PASS.
- ② STATE APPROVED 3/4" DOUBLE CHECK VALVE ASSEMBLY, COMPLETE W/ (4) RESILIENT SEATED TEST COCKS.
- ③ THE DEVICES MUST BE EQUIPPED WITH (2) RESILIENT WEDGE O.S.&Y. SHUT OFF GATE VALVES WITH HAND WHEELS. GATE VALVES SHALL CONFORM TO AWWA C-509 OR C515.
- ④ 5/8"x3/4" METER (CUBIC FEET READING)-SENSUS METER W/ TRPL.
- ⑤ ONE GALVANIZED STEEL LADDER TO BE SECURED TO VAULT FROM DOOR EDGE TO FLOOR.
- ⑥ CONCRETE VAULT W/ A MIN. 3'x6' DOUBLE LEAF ALUM. DIAMOND PLATE DOOR RATED FOR H2O LOADING, MARKED "WATER". DOORS SHALL BE LW HATCH OR EQUAL W/ SPRING LIFT & RECESSED PADLOCK HASP. PAINTED ALUM. SIGN TO BE MOUNTED ON UNDERSIDE OF HATCH "CONFINED SPACE. ENTRY BY PERMIT ONLY". VAULT SHALL BE EQUAL TO UTILITY VAULT CO. MODEL LISTED IN TABLE.
- ⑦ VAULT SHALL BE CORE DRILLED AND SEALED WITH LINK SEAL FOR MAINLINE PENETRATIONS. INSTALL MEGALUG RETAINER AND BRACE TO EDGE OF VAULT. WATER TIGHT GROUT SHALL BE USED IN ALL OTHER VAULT PENETRATIONS
- ⑧ TWO ADJUSTABLE PIPE STANDS REQUIRED.
- ⑨ ALL PLUMBING FOR BY-PASS TO BE COPPER OR BRASS.
- ⑩ ACCESS TO BE CENTERED OVER METER.
- ⑪ CLASS 52 DUCTILE IRON PIPE REQUIRED. SIZE AS REQUIRED.

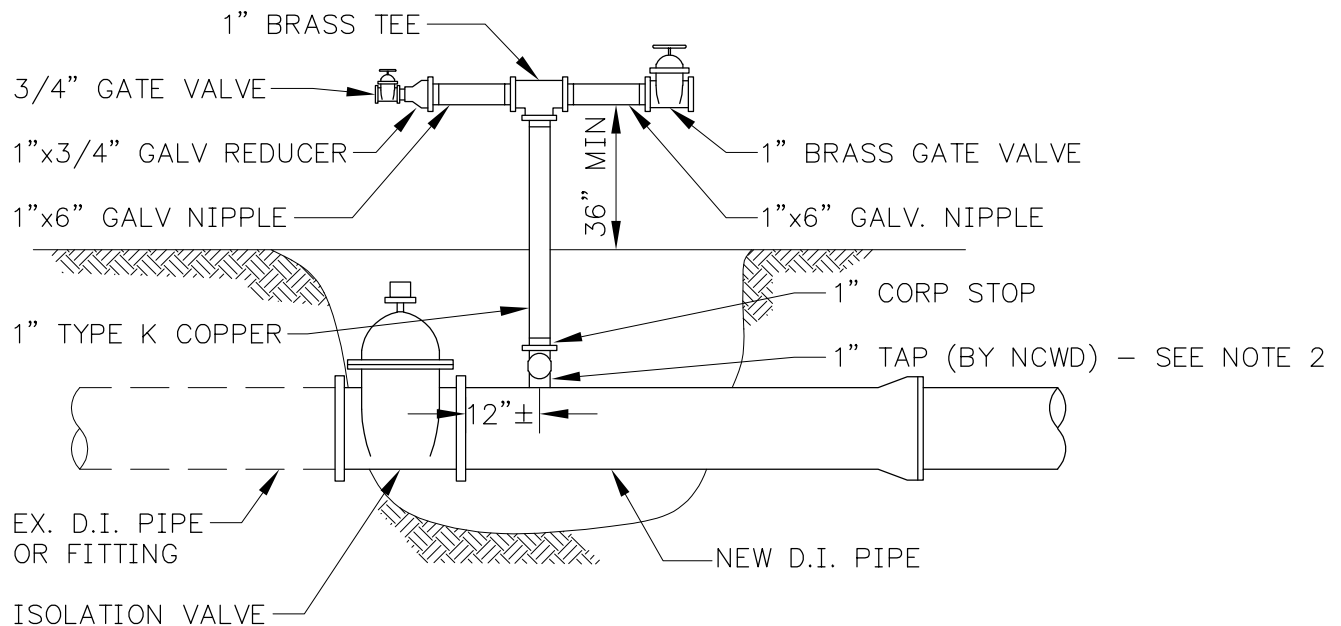
SIZE	MIN. VAULT SIZE (INSIDE)			UTIL. VAULT CO. MODEL
	W	L	H	
3"	5'-6"	7'-0"	4'-5"	675-WA
4"	5'-6"	7'-0"	4'-5"	675-WA
6"	5'-6"	7'-0"	4'-5"	675-WA
8"	5'-0"	10'-6"	6'-0"	5106-LA
10"	5'-0"	10'-6"	6'-0"	5106-LA

REVISED: 01/20

NCWD STANDARD DETAIL**NO. 18****DOUBLE CHECK DETECTOR ASSEMBLY**



2" SAMPLE TREE



1" DISINFECTION TREE

NOTES:

1. AT A MINIMUM, RESTRAIN THE LAST THREE FULL PIPE LENGTHS FOR 4", 6", AND 8" PIPE. RESTRAIN THE LAST FIVE FULL PIPE LENGTHS FOR 12" PIPE.
2. UPON COMPLETION OF REQUIRED TESTS AND AFTER CONFIRMATION OF SAMPLE RESULTS, CONTRACTOR TO REMOVE TREE ASSEMBLY IN PRESENCE OF NCWD INSPECTOR. NCWD TO PROVIDE EITHER 2" BRASS OR 1" BRASS PLUG.
3. BACKFILL WITH GRAVEL BEDDING IN PIPE ZONE AND CRUSHED SURFACING TOP COURSE IN REMAINING TRENCH.

REVISED: 01/20

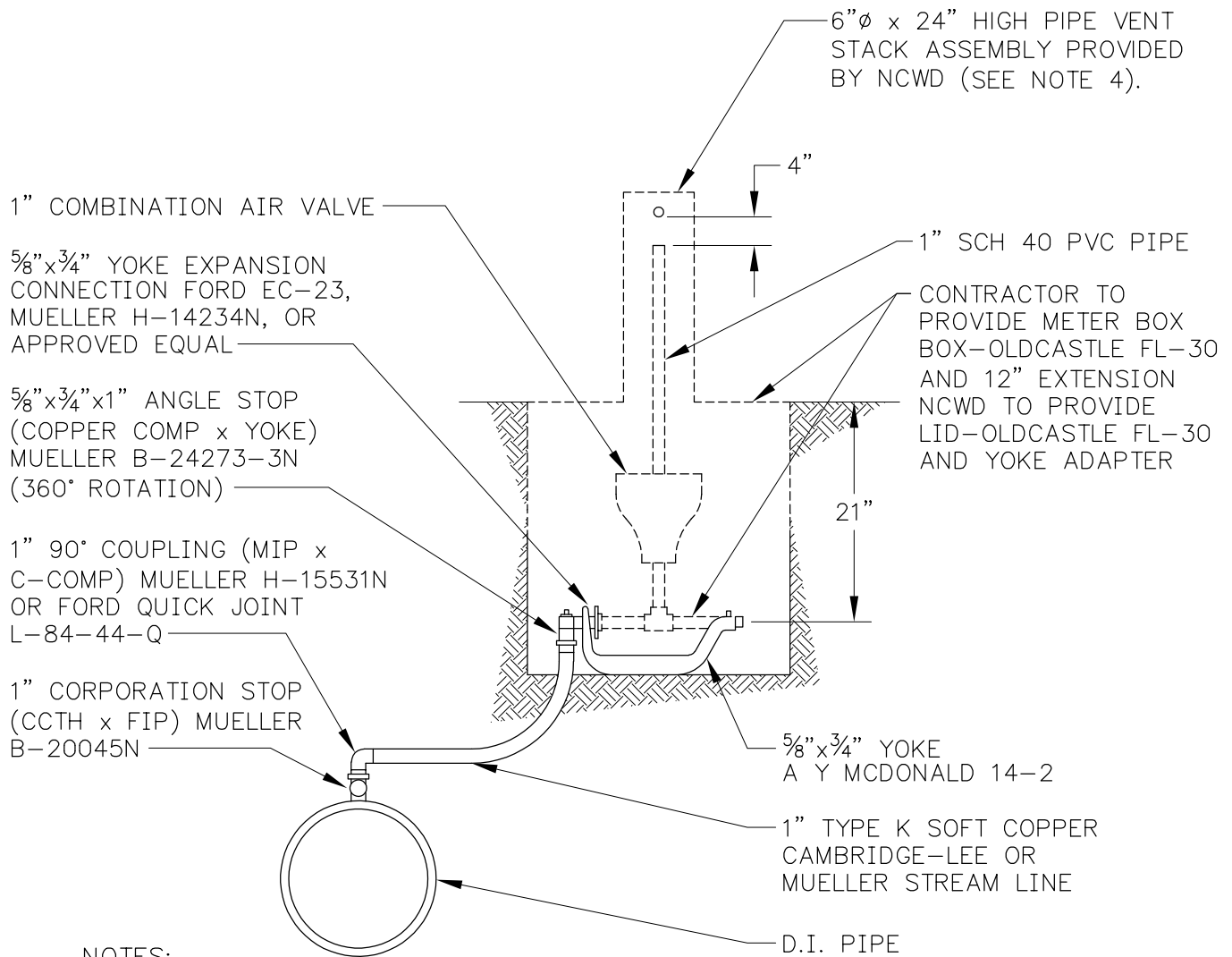
NCWD STANDARD DETAIL

NO. 20



1" AND 2" TESTING TREES

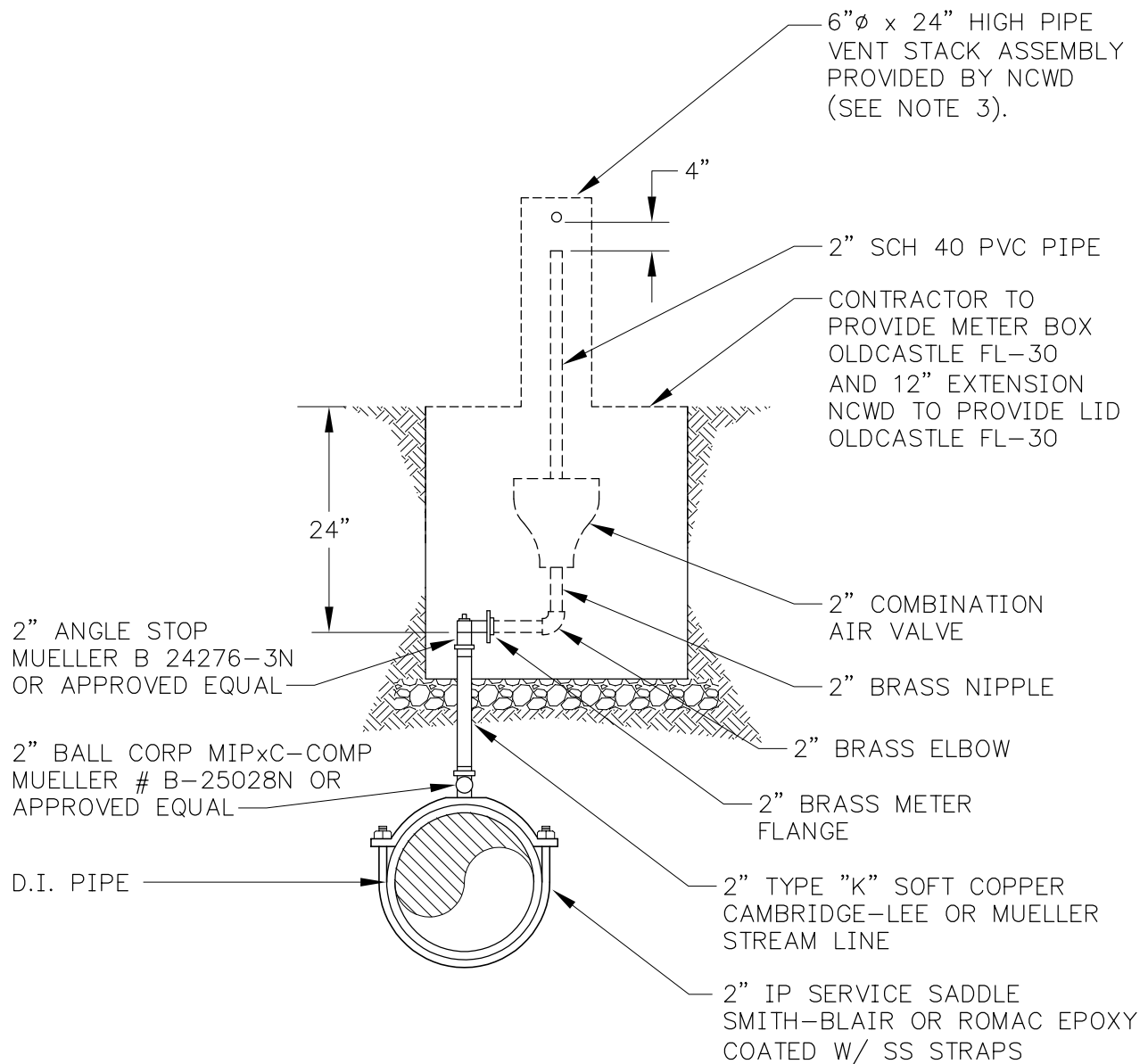


NOTES:

1. 1" COPPER PIPE SHALL BE INSTALLED WITH GRADE ALWAYS RISING TOWARD THE ANGLE STOP FROM THE CORP STOP.
2. ALL BRASS PARTS SHALL BE DOMESTIC AND CONFORM TO THE LOW LEAD RULE.
3. CRISPIN A111145 UL10, VAL-MATIC 201.C.2 SV OR APPROVED EQUAL.
4. STACK ASSEMBLY INCLUDES A 1" SCH. PVC PIPE TOPPED WITH FOUR (4) - 3/4" DIA. HOLES, COVERED WITH #18 MESH. THE 6" X 24" PIPE INCLUDES TWO (2) - 1 7/16" DIA. HOLES COVERED WITH #8 MESH.

REVISED: 01/20

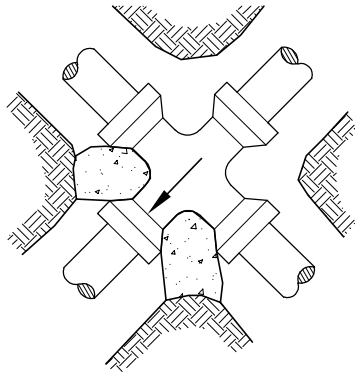
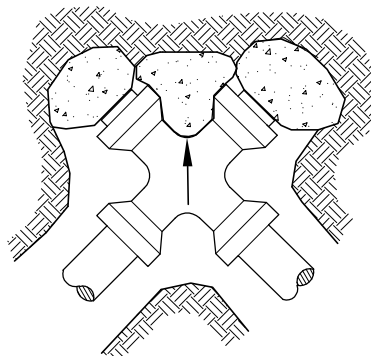
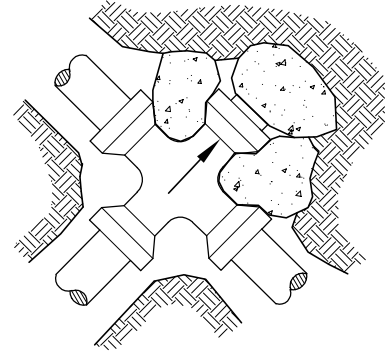
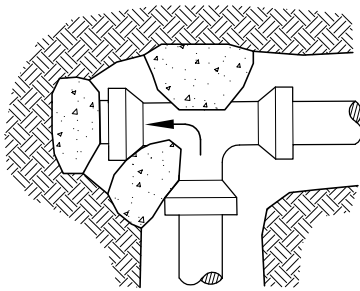
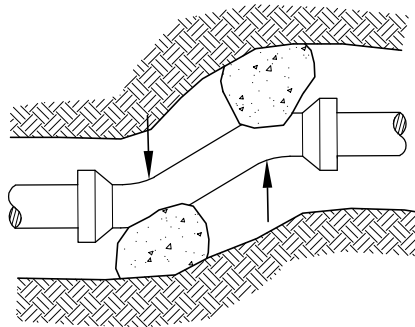
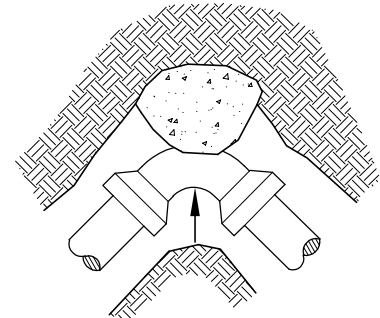
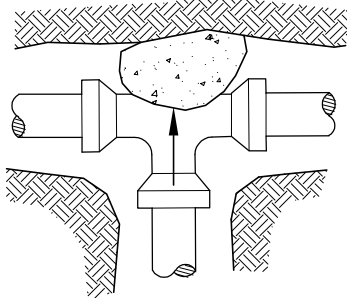
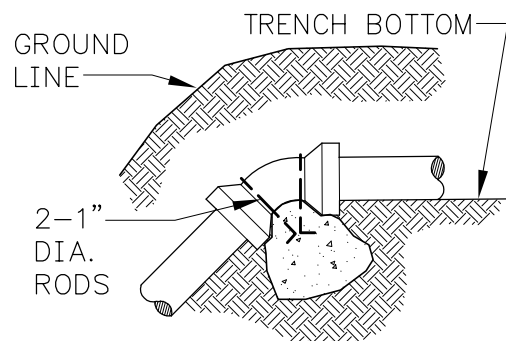
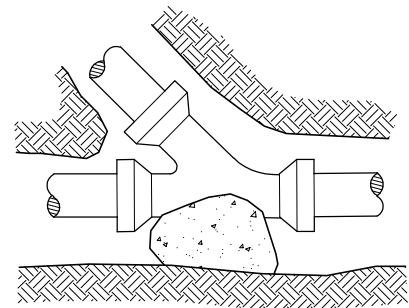
NCWD STANDARD DETAIL**NO. 21****1" AIR VALVE**

**NOTES:**

1. ALL BRASS PARTS SHALL BE DOMESTIC AND CONFORM TO THE LOW LEAD RULE.
2. CRISPIN A111145 UL10, VAL-MATIC 201.C.2 SV OR APPROVED EQUAL.
3. STACK ASSEMBLY INCLUDES A 2" SCH. PVC PIPE TOPPED WITH FOUR (4) - $\frac{3}{4}$ " DIA. HOLES, COVERED WITH #18 MESH. THE 6" X 24" PIPE INCLUDES TWO (2) - $1\frac{7}{8}$ " DIA. HOLES COVERED WITH #8 MESH.

REVISED: 01/20

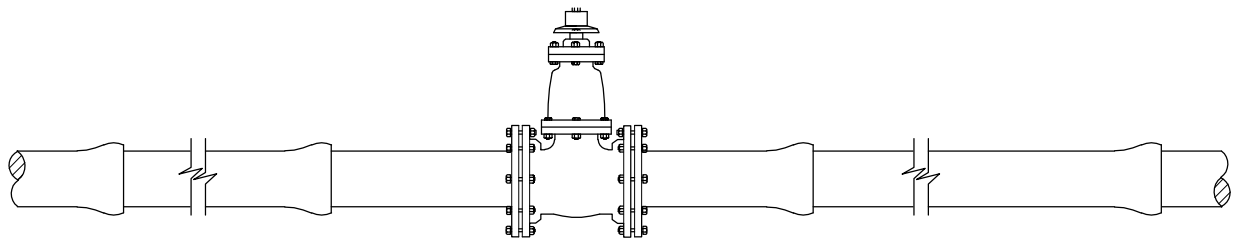
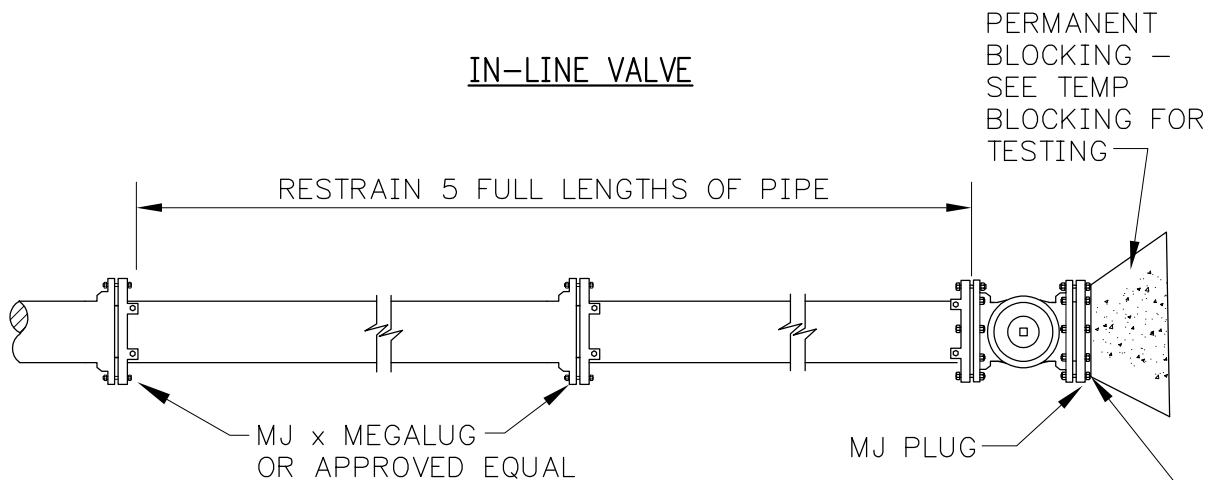
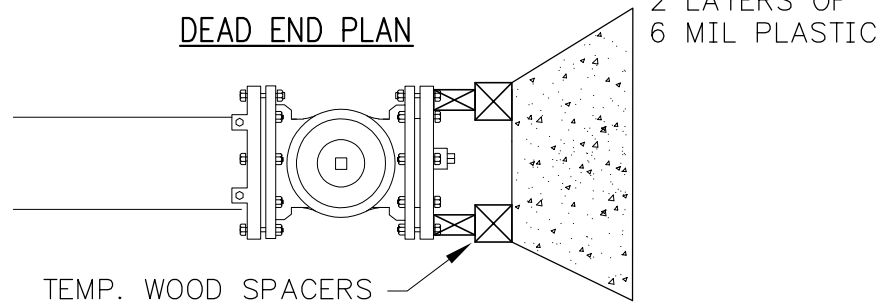
NCWD STANDARD DETAIL**NO. 22****2" AIR VALVE**

**UNBALANCED CROSS****PLUGGED CROSS****PLUGGED CROSS****PLUGGED TEE****OFFSET****HORIZONTAL BEND****TEE****VERTICAL BEND****"Y" BRANCH****NOTES:**

1. SIZE OF BLOCK TO BE DETERMINED BY THE CONTRACTOR, TO BE ADEQUATE FOR SOIL CONDITIONS AND PRESSURE INVOLVED.
2. ALL BLOCKING TO BE ON UNDISTURBED MATERIAL.
3. PLUGS TO BE BLOCKED IF NOT SECURED BY BOLTING OR ADEQUATE STRAPS.

REVISED: 01/20

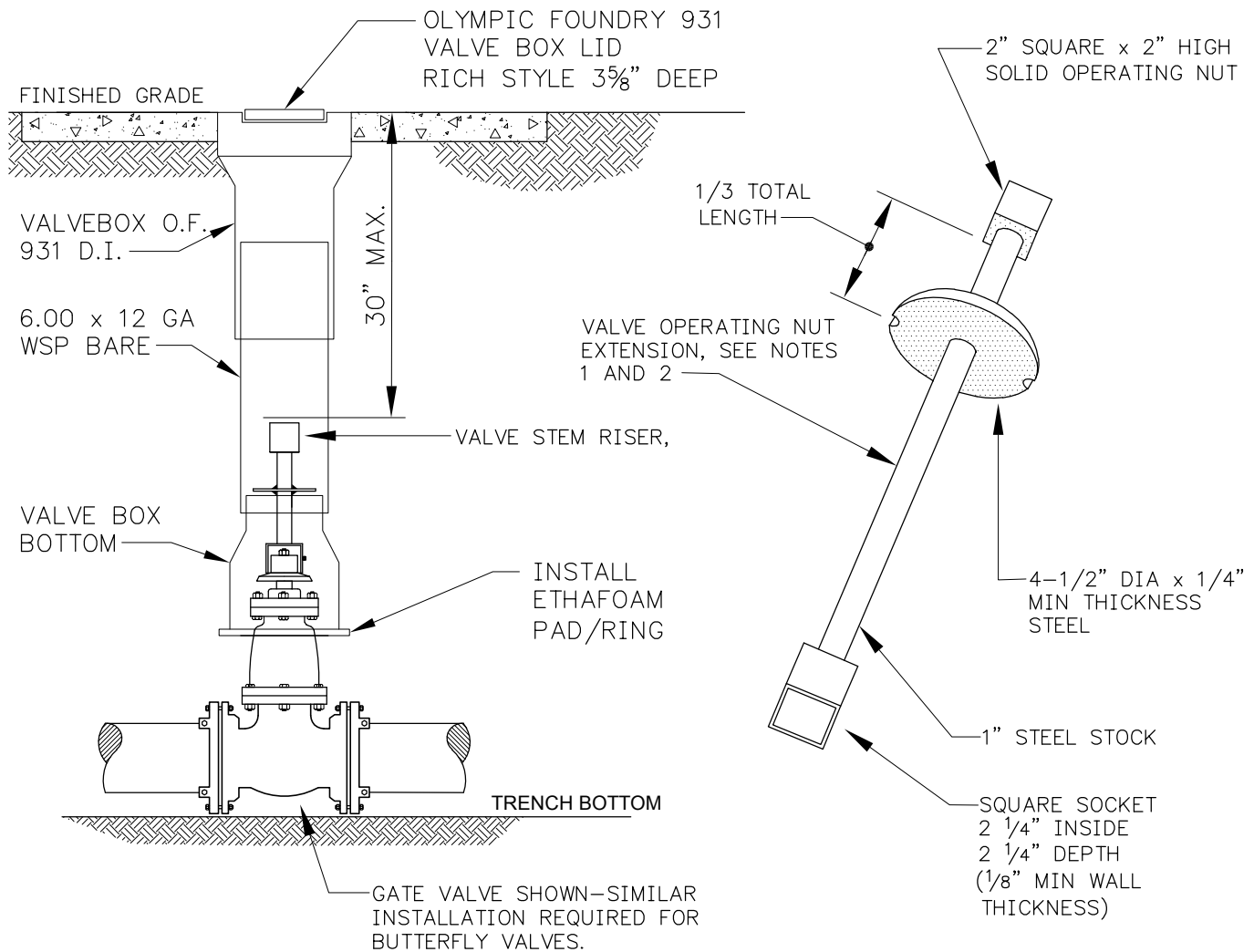
NCWD STANDARD DETAIL**NO. 23**

IN-LINE VALVEDEAD END PLANTEMPORARY BLOCKINGNOTES:

1. THRUST BLOCKING REQUIRED – SEE NCWD STANDARD THRUST REQUIREMENTS DETAIL.
2. ADDITIONAL RESTRAINT IS REQUIRED ON DEAD ENDS WITH POOR GROUND CONDITIONS.
3. MEGALUGS (EBAA IRON OR APPROVED EQUAL) SHALL BE INSTALLED ON ALL INDICATED MECHANICAL JOINTS.
4. SEE STANDARD PLAN FOR BEND BLOCKING REQUIREMENTS.
5. RESILIENT SEAT GATE VALVE TO BE CLOW, M&H, KENNEDY AND MUELLER OR APPROVED EQUAL.
6. BOLTS AND NUTS SHALL BE USA MADE WITH TRI-PAC 2000 BLUE COATING.

REVISED: 01/20

NCWD STANDARD DETAIL**NO. 24****VALVES AND RESTRAINT REQUIREMENTS**



NOTES:

1. VALVE OPERATING NUT EXTENSIONS ARE REQUIRED WHEN THE VALVE NUT IS MORE THAN 30 INCHES BELOW FINISHED GRADE. EXTENSIONS ARE TO BE A MINIMUM OF ONE (1) FOOT LONG. ONLY ONE EXTENSION WILL BE ALLOWED PER VALVE.
2. ALL VALVE OPERATING NUT EXTENSIONS ARE TO BE MADE OF STEEL, SIZED AS NOTED.

REVISED: 01/20

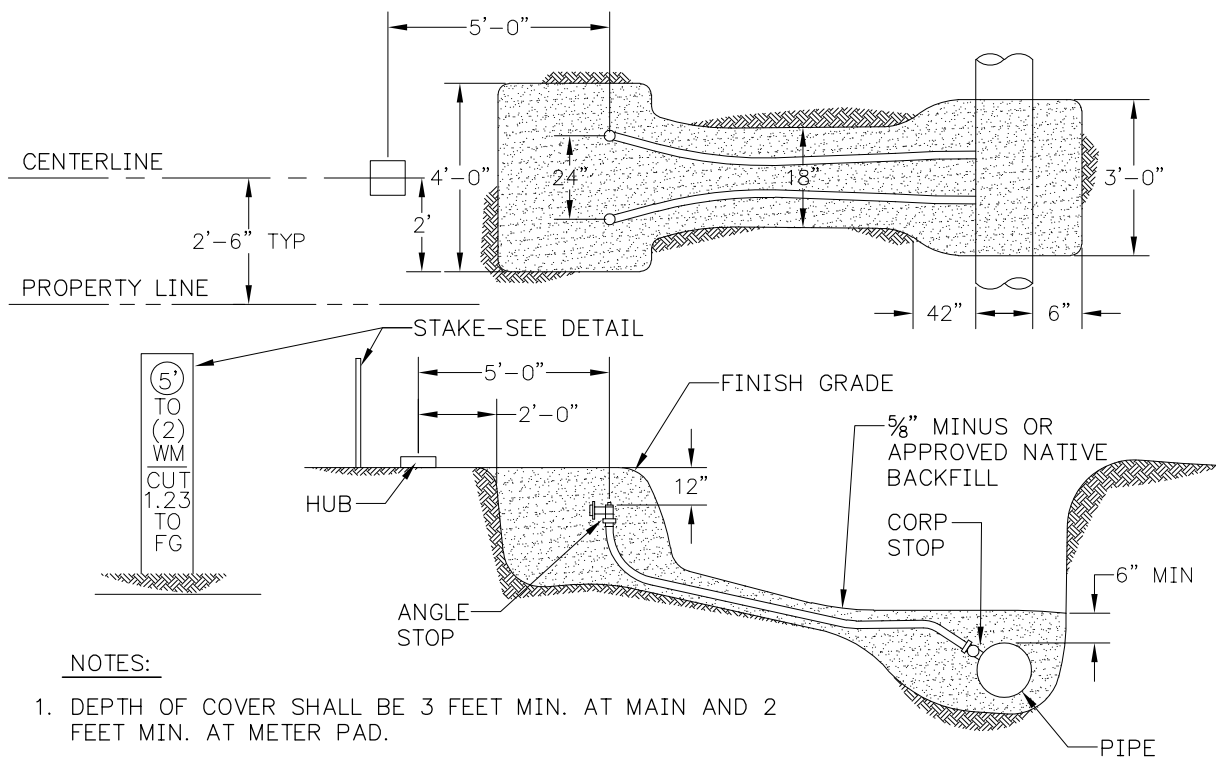
NCWD STANDARD DETAIL

NO. 27

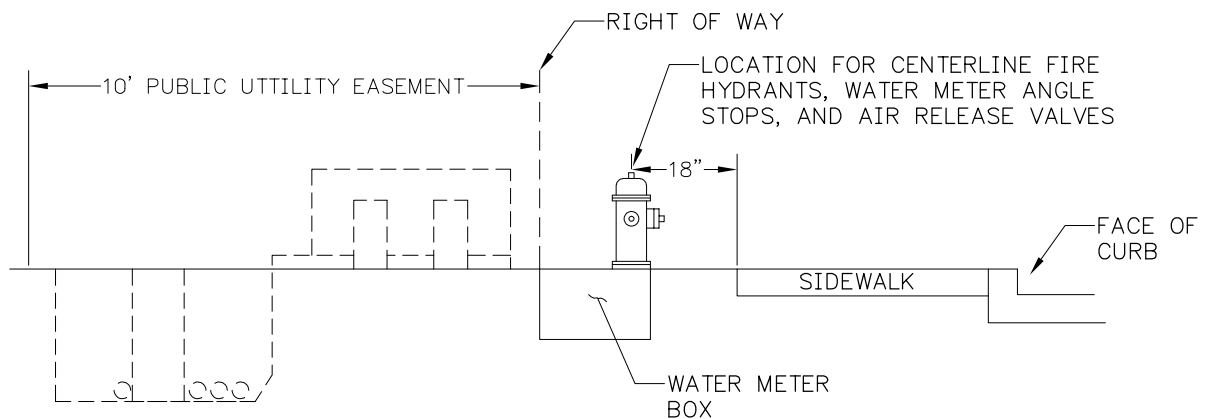


VALVE OPERATING NUT EXTENSION



**NOTES:**

1. DEPTH OF COVER SHALL BE 3 FEET MIN. AT MAIN AND 2 FEET MIN. AT METER PAD.
2. WATER METER STAKE INFORMATION SHALL INCLUDE 1) OFFSET DISTANCE, 2) NUMBER OF SERVICE METERS, AND 3) CUT OR FILL TO FINISH GRADE.

**NOTES:**

1. IF RIGHT-OF-WAY/STREET WIDTHS PRECLUDE FIRE HYDRANTS, WATER METERS, AND AIR RELEASE VALVES FROM BEING WITHIN RIGHT-OF-WAY, THEN DESIGN ENGINEER/SURVEYOR/ DEVELOPER SHALL CONFIRM LOCATIONS WITH NCWD.

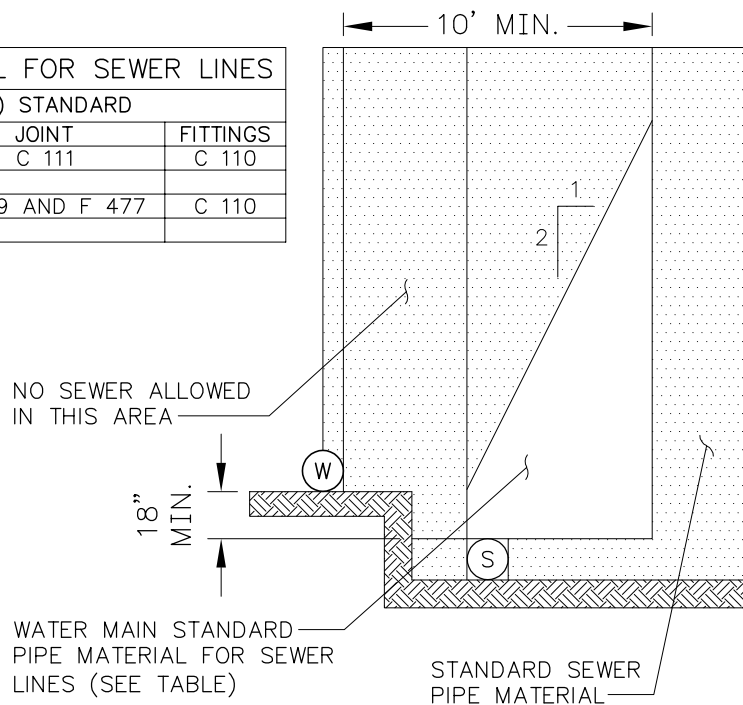
REVISED: 01/20

NCWD STANDARD DETAIL**NO. 28****METER INSTALLATION AND LOCATION**

WATER MAIN STANDARD PIPE MATERIAL FOR SEWER LINES

TYPE OF PIPE	AWWA (ASTM) STANDARD		
	PIPE	JOINT	FITTINGS
CI AND DI PIPE	C 151 AND C 104	C 111	C 110
POLYVINYL-CHLORIDE	C900	D3139 AND F 477	C 110

"CRITERIA FOR SEWAGE WORKS DESIGN"
REFER DOE LATEST EDITION C1-9.1



HORIZONTAL SEPARATION NOTES (FOR PARALLEL CONSTRUCTION)

THE PARALLEL SEPARATION DETAIL ON THIS SHEET REFERS TO GRAVITY SEWERS ONLY W/ A MIN. DISTANCE OF 10'. PRESSURE SEWERS SHALL ONLY BE CONSTRUCTED UNDER WATER MAINS WITH A MINIMUM CLEARANCE OF 18" FROM THE BOTTOM OF THE WATER MAIN TO THE TOP OF THE PRESSURE SEWER LINE.

VERTICAL SEPARATION NOTES (FOR PERPENDICULAR CONSTRUCTION)

SEWER LINES CROSSING WATER LINES SHALL BE LAID BELOW THE WATER LINES TO PROVIDE A SEPARATION OF AT LEAST 18" BETWEEN THE INVERT OF THE WATER PIPE AND THE CROWN OF THE SEWER, WHENEVER POSSIBLE. WHEN LOCAL CONDITIONS PREVENT THIS VERTICAL SEPARATION, THE FOLLOWING CONSTRUCTION SHALL BE USED:

A. GRAVITY SEWERS PASSING OVER OR UNDER WATER LINES SHALL BE:

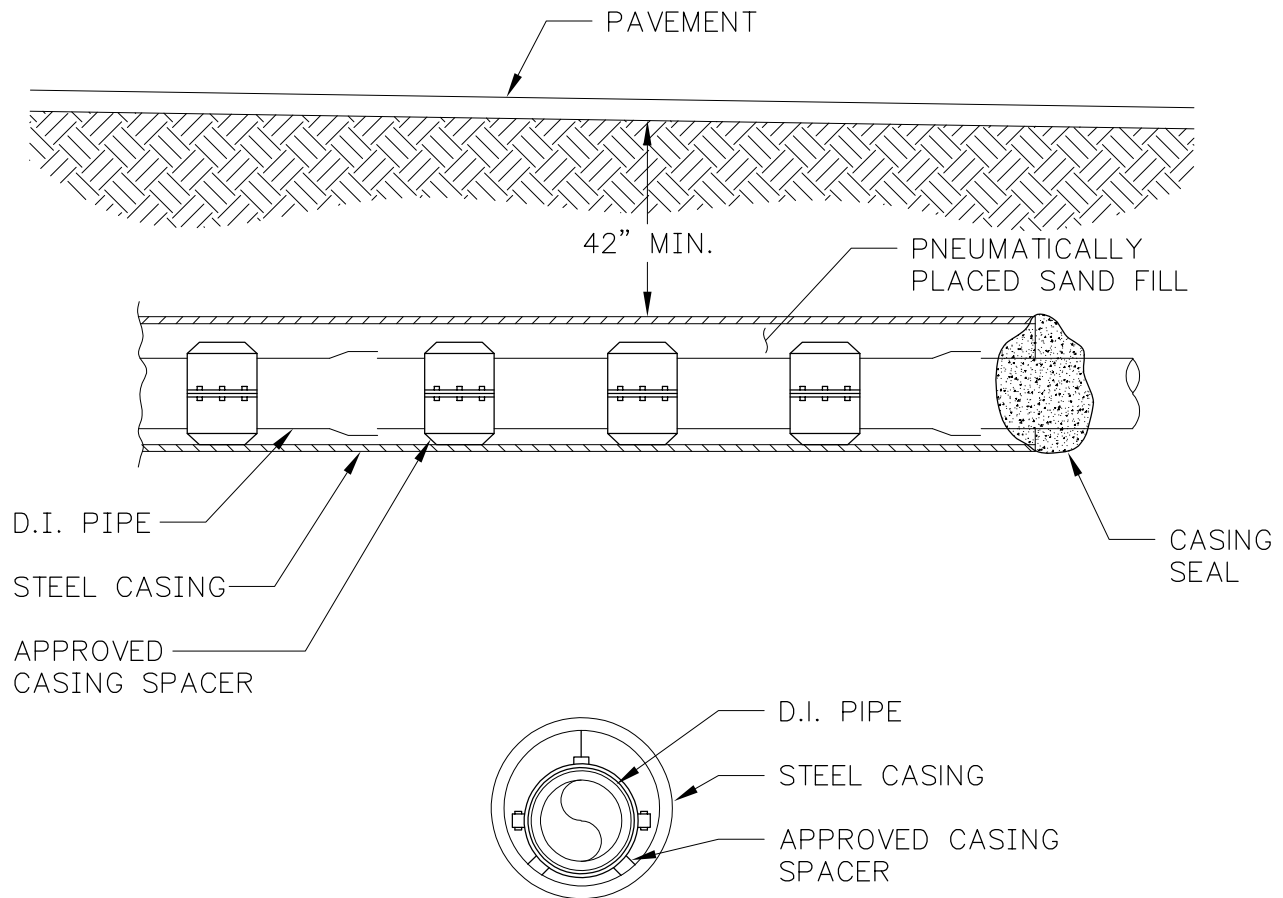
1. CONSTRUCTED OF WATER MAIN STANDARD PIPE MATERIAL AS SHOWN IN THE TABLE. THE ONE SEGMENT OF THE MAXIMUM STANDARD LENGTH OF PIPE (BUT NO LESS THAN 18' LONG) SHALL BE USED WITH THE PIPES CENTERED TO MAXIMIZE JOINT SEPARATION.
2. STANDARD GRAVITY SEWER MATERIAL ENCASED IN CONCRETE OR IN A ¼" THICK CONTINUOUS STEEL CASING WITH ALL VOIDS PRESSURE - GROUTED WITH SAND - CEMENT GROUT. THE LENGTH OF SEWER PIPE SHALL BE CENTERED AT THE POINT OF CROSSING SO THE JOINTS WILL BE EQUI-DISTANT AND AS FAR AS POSSIBLE FROM THE WATER LINE. THE SEWER PIPE SHALL BE THE LONGEST STANDARD LENGTH AVAILABLE FROM THE MANUFACTURER.

B. WATER LINES PASSING UNDER GRAVITY SEWER, IN ADDITION, SHALL BE PROTECTED BY PROVIDING:

1. A VERTICAL SEPARATION OF AT LEAST 18 INCHES BETWEEN THE INVERT OF THE SEWER AND THE CROWN OF THE WATER LINE;
 2. ADEQUATE STRUCTURAL SUPPORT FOR THE SEWERS TO PREVENT EXCESSIVE DEFLECTION OF JOINTS AND SETTLING ON AND BREAKING OF THE WATER LINES.
- C. PRESSURE SEWERS SHALL ONLY BE CONSTRUCTED UNDER WATER LINES AND DUCTILE IRON PIPE OR STANDARD SEWER PIPE IN A STEEL CASING FOR A MINIMUM DISTANCE OF AT LEAST TEN (10) FEET ON EACH SIDE OF THE CROSSING.

REVISED: 01/20

NCWD STANDARD DETAIL**NO. 29****WATER AND SEWER SEPARATION**



NOTES:

1. CASING SIZE AND MINIMUM THICKNESS OF CASING SHALL BE AS SHOWN ON THE CONTRACT DRAWINGS. HOWEVER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR SELECTING THE THICKNESS CONSISTENT WITH HIS OPERATION.
2. SEAL CASING BOTH ENDS.

REVISED: 01/20

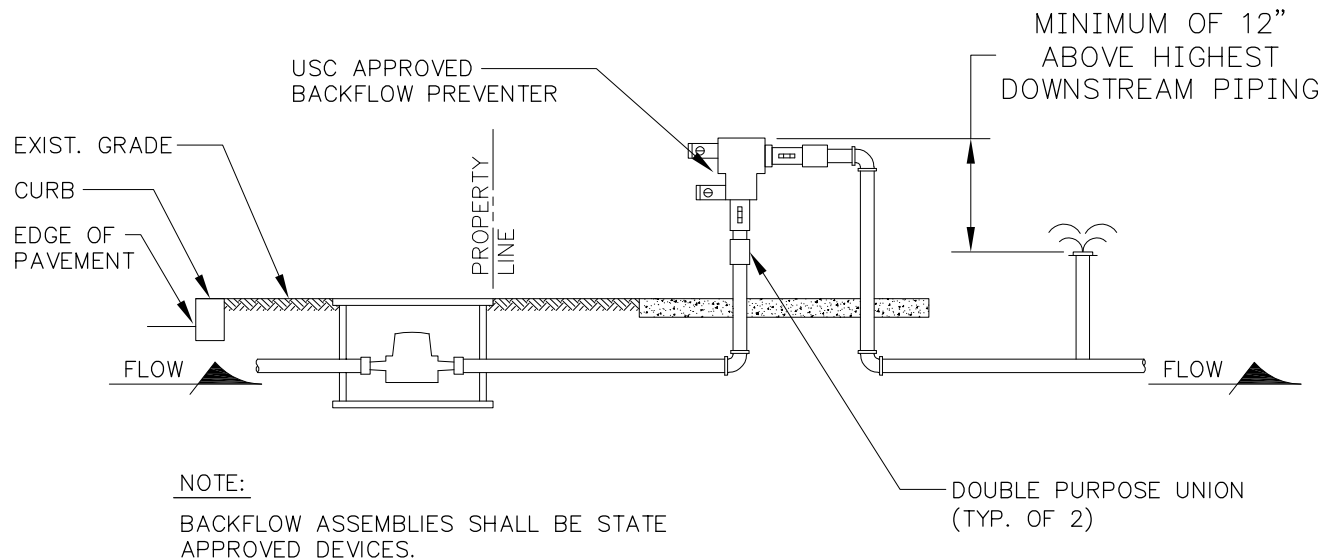
NCWD STANDARD DETAIL

NO. 30



TYPICAL CASING PROFILE





NOTES:

1. THE BACKFLOW ASSEMBLY SHALL BE STATE APPROVED. WITHIN 7 DAYS OF INSTALLATION THE DEVICE SHALL BE TESTED BY A CERTIFIED BACKFLOW ASSEMBLY TESTER. TEST RESULTS SHALL BE SENT TO NORTH CITY WATER DISTRICT. BACKFLOW ASSEMBLY SHALL BE INSTALLED IN THE APPROVED ORIENTATION AS PER THE USC APPROVED LIST.

PRESSURE VACUUM BREAKER ASSEMBLY (PVBA) OR
SPILL-RESISTANT PRESSURE VACUUM BREAKER
ASSEMBLY (SVBA) INSTALLATION

REVISED: 01/20

NCWD STANDARD DETAIL

NO. 31





**PVBA/SVBA
BACKFLOW PREVENTERS**



NOTES:

1. ALL BOLTS AND NUTS SHALL BE USA MADE WITH TRIPAC T2000 BLUE COATING.
2. GASKETS SHALL BE RUBBER FLANGE TYE RING STYLE DROP IN AS MANUFACTURED BY US PIPE AND FOUNDRY.
3. POLY PIGS SHALL BE BARE TYPE 5-7 LBS/CUFT DENSITY. AS PER A-6 IN THE TECHNICAL SPECS.

REVISED: 01/20	NCWD STANDARD DETAIL	NO. 32
	BOLT, NUT, GASKET, PIG SPECS	

TECH. SPECS / MATERIALS

February 2020

A-1 GENERAL

Developer/Contractor shall furnish all materials necessary for construction of the water system. North City Water District will provide and install all meters upon acceptance of the water system.

Any products used to coat, line, seal, or patch surfaces that contact water (i.e. paint, pipe liners, interior tank coatings, etc.) or any products that come in contact with water in the distribution system (i.e. pipes, fittings, valves, etc.) must comply with ANSI/NSF Standard 61 Drinking Water System Components.

In addition, all products used in the construction of the water system must be pre-approved by the District and shall be manufactured in the United States of America. The District reserves the right to approve or disapprove the use of foreign made materials.

Reference herein is made to standards, tests, methods and specifications of research and technical organizations as follows:

ASTM American Society for Testing Materials
AWWA American Water Works Association
ANSI American National Standards Institute

Reference to ASTM, AWWA or ANSI shall be understood to mean, in all cases, the standard or specification of latest revision unless otherwise stated in the Detail specifications.

A-2 DUCTILE-IRON PIPE: **All Pipe in the District will be RJ Class 52 Ductile Iron**

A-2.1 Mechanical Joint Pipe:

Mechanical joint ductile iron pipe shall conform to AWWA C151 and shall be thickness Class 52. The pipe shall be standard thickness cement-mortar lined conforming to the requirements of AWWA C104 and shall be as manufactured by US Pipe & Foundry Company, American Pipe, Griffin Pipe Products, Pacific States Cast Iron Pipe Company or approved equal. Each length shall be plainly marked with the manufacturer's identification, year cast, class of pipe, and weight. Joints shall conform to AWWA C111. Joint accessories shall be furnished with the pipe. **Bolts and nuts shall be coated with TRI PAC T2000 Blue Coating System. Pipe with diameters of 12-inches and smaller shall have a wall thickness of Class 52.** Pipe with diameters of 13-inches and larger shall have a wall thickness of Class 50.

A-2.2 Push-on Joint Pipe:

Push-on ductile iron pipe shall conform to AWWA C151 and shall be thickness Class 52. The pipe shall be cement-mortar lined conforming to the requirements of AWWA C104 and shall be as manufactured by US Pipe & Foundry Company, Griffin Pipe Products, American Pipe, Pacific States Cast Iron Pipe Company or approved equal. Joints shall conform to AWWA C111, and shall be "Tyton" joint as manufactured by US Pipe & Foundry Company and by Pacific States Cast Iron Pipe Company or approved equal. The rubber ring gasket shall be suitable for the specified pipe sizes and pressures, and shall be furnished with the pipe. A non-toxic vegetable soap lubricant shall be supplied in sufficient quantities for installing the pipe furnished. Fastite as manufactured by the American Pipe may be substituted for "Tyton" joint pipe. Pipe with diameters of 12-inches and smaller shall have a wall thickness of Class 52. Pipe with diameters of 13-inches and larger shall have a wall thickness of Class 50.

A-2.3 Flanged Joint Pipe:

Flanged ductile iron pipe shall conform to AWWA C115 and shall have a minimum thickness Class 52. The pipe shall be cement-mortar lined conforming to the requirements of AWWA C104 and shall be as manufactured by US Pipe & Foundry Company and by Pacific States Cast Iron Pipe Company or approved equal. Bolts, gaskets, and installation shall be in accordance with the Appendix of AWWA C115. Bolts and nuts shall be coated with TRI PAC T2000 Blue Coating System. Flanges shall be ductile iron. Pipe with diameters of 12-inches and smaller shall have a wall thickness of Class 52. Pipe with diameters of 13-inches and larger shall have a wall thickness of Class 50.

A-2.4 Restrained Joint Pipe:

Restrained joint ductile iron pipe shall conform to AWWA C151 and shall be thickness Class 52. The pipe shall be cement-mortar lined conforming to the requirements of AWWA C104 and shall be as manufactured by US Pipe & Foundry Company and by Pacific States Cast Iron Pipe Company or approved equal. The pipe shall be furnished with spigot ends and push-on joint bells suitable for transmitting the thrust created by a dead-end condition based on pipe diameter and a pressure of 150 psi. Restrained push-on joints shall be TR-Flex joint as manufactured by the US Pipe & Foundry Company, Thrust-Lock as manufactured by Pacific States Cast Iron Pipe Company, or approved equal. All restraint ears, locking rings, etc. shall be installed. Restrained mechanical joints shall use joint restraint glands as specified in Section A-5 of these Specifications. The use of

restrained joint gaskets will not be allowed by the District. Pipe with diameters of 12-inches and smaller shall have a wall thickness of Class 52. Pipe with diameters of 14-inches and larger shall have a wall thickness of Class 50.

A-3 DUCTILE-IRON FITTINGS

A-3.1 Flanged Fittings:

Flanged ductile iron fittings shall conform to AWWA C153 and C110. Flanges shall have bolt circles and bolt holes matching those of ANSI B16.1. Unless otherwise noted, the pressure rating of fittings shall be 250 psi. Flange thickness shall be uniform on full circumference of flange and thickness as specified in AWWA C153, Table 12. Bolts for joining cast iron flanges shall be carbon steel of at least Grade 5 with American Standard Regular hexagon heads and the nuts shall be of steel with American Standard Regular hexagon dimensions, all as specified in American Standard for Wrench Head Bolts and Nuts (ASME B18.1). Bolts and nuts shall be coated with TRI PAC T2000 Blue Coating System. All bolts and nuts shall be threaded in accordance with American Standard for Screw Threads (ASME B1.1.), Coarse Thread Series, Class 2A and 2B fit. Gaskets shall be rubber Flange-Tyte (Ring Style) as manufactured by the US Pipe & Foundry Company or approved equal. Cement-mortar lining is required on all fittings. Fittings shall be as manufactured by Tyler, US Pipe & Foundry Company, American, Griffin Pipe Products or an approved equal.

A-3.2 Mechanical Joint Fittings:

Mechanical joint ductile iron compact fittings shall conform to AWWA C153 and C110. Joints shall conform to AWWA C111. Joint accessories shall be furnished with the fittings. Fittings must be cement-mortar lined in accordance to AWWA C104. Fittings shall be as manufactured by Tyler, US Pipe, American, Griffin Pipe Products or an approved equal.

A-4 COUPLINGS

All couplings shall meet current AWWA Standards. Solid sleeve pipe couplings shall be long pattern sleeves constructed of ductile iron with a minimum pressure rating of 250 psi working pressure. All center and end rings shall be ductile iron on 4" and larger pipe and meet acceptable ASTM Standards except where specifically stated otherwise. Followers shall be ductile iron ASTM A536 and gaskets shall be made of materials compounded for water service. Nuts and bolts shall be corrosion resistant, high strength, low-alloy steel with heavy hex nuts, meeting requirements of AWWA C111 (ANSI-A21.11). Couplings shall be as manufactured by Smith Blair, Romac 501, Ford, or approved equal.

A-5 JOINT RESTRAINT GLANDS

Joint restraint glands used for thrust anchorage in place of regular cast iron mechanical joint glands shall be ductile iron mechanical joint Megalug, as manufactured by EBAA Iron, Roma Grip by Romac, Ford 1400 Series Restraint Gland, or approved equal. The minimum number of set screws by size of gland shall be as follows:

4-inch - 2	10-inch - 6	16-inch - 12	24-inch - 16
6-inch - 3	12-inch - 8	18-inch - 12	
8-inch - 4	14-inch - 10	20-inch - 14	

A-6 POLY PIGS

"Poly Pigs" shall be constructed of flexible open cell polyurethane foam. They shall be able to pass through reductions of up to 60% of cross sectional area of nominal pipe. They shall have the ability to negotiate short radius bends, 90° elbows, tees, crosses, wyes, gate valves, ball valves, multi-dimensional piping and reduced port values. "Poly Pigs" shall be a municipal series, bare type, 5-7 lbs per cubic foot density, and generally be for a light cleaning or gauging application.

A-7 LOCATOR TAPE AND TRACER WIRE

A-7.1 Detectable Locator Tape:

Locator tape shall consist of a minimum 4.0 mil thickness, inert polyethylene plastic which is impervious to all known alkalis, acids, chemical reagents and solvents likely to be encountered in the soil, with a minimum 1/3-mil metallic foil. The tape shall be at least three inches (3-inch) in width and shall be solid blue with identifying print in black letters. The tape shall have printed thereon the following or similar as commercially available:

"CAUTION - BURIED WATERLINE BELOW"

The identifying lettering shall be minimum 1-inch high and repeated continuously the full length of the tap. In no instance shall the spacing of the individual segment of the identifying message be greater than eighteen inches (18-inch).

Detectable locator tape shall be installed 24-inches above the pipe it identifies. The backfill shall be sufficiently leveled so that the tape will be installed on a flat surface. The tape shall be centered in the trench and laid flat with printed side up. Caution shall be exercised to avoid displacement of tape and to ensure its integrity. The remainder of the trench is then backfilled in accordance with applicable specifications.

A-7.2 Tracer Wire:

All non-metallic water main and water services shall have tracer wire installed above the pipe. Tracer wire shall consist of jacketed 12 gauge solid copper wire. Tracer wire shall be continuous from valve box to valve box and along water services from the main to the meter box. Enough slack shall be provided in each valve box or meter box to allow the wire to be extended above the ground surface. All wires shall be tested for continuity following installation and backfill.

The District may require the use of Tracer wire in other situations such as the installation of transmission mains.

A-8 GATE VALVES & TAPPING VALVES

Gate valves shall be 4-inch to 12-inch and shall conform to AWWA C509. The valves shall be epoxy coated, ductile iron-bodied, resilient-seated with a full rubber encapsulated wedge and floating stem nut. Valves shall be non-rising stem with flanged ends or mechanical joint as shown. The operating stem shall be bronze with O-ring stem seals. The valve shall open when turned counter-clockwise and shall be equipped with a 2-inch-square operating nut. Valves installed above ground shall be equipped with a hand-wheel. All valves with mechanical joint connection shall be furnished with ductile iron nuts, bolts, glands and gaskets for mechanical joint connections. All valves shall have the manufacturer and date cast on the body. Resilient seated gate valves shall be Kennedy, Clow, M&H, Mueller, or approved equal.

A-9 BUTTERFLY VALVES

Butterfly valves shall be used for valves 14-inches and larger. Butterfly Valves shall be short bodied flanged or wafer type or mechanical joint ends when placed underground. They shall be epoxy coated and lined, rubber seated type and shall conform to AWWA C504, Class 150B, unless otherwise approved and noted. Butterfly valves shall be furnished with iron bodies. Flanges shall be drilled in accordance with ANSI-125 lb. standard. Mechanical joint ends shall conform to AWWA C111. Butterfly valves shall be suitable for direct burial and shall have direct burial, totally enclosed, integral manual operators which shall be fully gasketed and grease-packed and designed to withstand submersion in water to a pressure of 10 psi. The valves shall open with a counter-clockwise rotation of a 2-inch nut.

THE MINIMUM NUMBER OF TURNS FROM CLOSED TO OPEN POSITION SHALL BE NOT LESS THAN TWO TURNS PER INCH OF VALVE SIZE.

Only the following valves will be accepted: M & H, Kennedy, Pratt and Mueller

A-10 TAPPING SLEEVES

Tapping sleeves shall be used for all cast iron pipe. Ductile iron pipe sizes 4-inch through 12-inch, FTS Tapping saddles will be allowed. Sleeves shall be U.S. Pipe T-28 Dual compression seal, Kennedy Valve Manufacturing Co. MJ tapping sleeve, Mueller Tapping Sleeve, ROMAC FTS-420, Smith Blair 622, JCM 412, and Tyler. All tapping sleeves shall have a test plug.

When tapping an existing cast iron waterline, the tapping sleeve shall be mechanical joint type manufactured by the Mueller C., M&H, Clow, Smith Blair 623 or approved equal.

All connections to a cement-lined and coated pipe will be made by North City Water District with cooperation and assistance from the Developer/Contractor on excavation, backfill, temporary plating, and traffic control. See North City Water District Standard Detail No. 1.

Developer/Contractors making hot taps onto existing District lines shall hire a District approved Contractor to perform the tap.

The hot tapping Contractor shall;

- (1) Specialize in hot tapping as a core business and shall have been in business and providing hot taps for a minimum of ten (10) years.
- (2) Be fully experienced and properly qualified, licensed, equipped, organized and financed.
- (3) Have successfully completed at least ten (10) hot tapping projects on 8-inch and larger water mains within the last two years.

The following Contractors are approved by the District.

- (1) Superior Tapping, Legacy Tapping or approved equal.

In addition, the foreman supervising the work in the field shall have at least five (5) years experience with supervising this type of work, including operating hot tapping equipment.

Information verifying the hot tapping Contractor's qualifications and experience shall be submitted to the District prior to the commencement of the work.

A-11 VALVE BOXES

Valve boxes shall be the three-piece sliding adjustable type consisting of a lid, box section, and steel casing extension. Valve box and lid shall be made of ductile iron and shall be No. 931 as manufactured by Olympic Foundry. The valve box lid shall be labeled "Water" and shall fit the valve box snugly and shall not rock on its seat (3-5/8"). The steel well casing shall be of 12-gauge wall thickness, with outside diameter of 6 inches WSP bare or approved equal. The steel well casing shall be within 6" of finished grade. See North City Water District Standard Detail No. 27.

A-12 VALVE STEM EXTENSIONS

Provide stem extension for all valves with operating nut more than 4-feet below grade to raise operating nut to within 36 to 24-inches of the ground surface. Stem extension shall be a minimum of 1 foot long with standard 2-inch square by 2-inch high operating nut and self centering rockplate support. See North City Water District Standard Detail No. 27.

A-13 FIRE HYDRANTS

A-13.1 Fire Hydrant Assemblies:

Fire hydrant assemblies shall include the fire hydrant, auxiliary gate valve, valve box, and materials for anchorage such as mechanical joint restraint glands, and shall be as follows or as otherwise specified in the North City Water District's Standard Details

A-13.2 Fire Hydrants:

Fire hydrants shall be of the compression type conforming to AWWA C502 and shall have 5-inch valve opening with 6-inch mechanical joint and connection. The hydrant shall have a 1¼-inch operating nut, shall open when turned counter-clockwise and shall have two 2½-inch hose nozzles and one pumper connection. The nozzles and operating nut shall be National Standard.

The pumper nozzle shall be 5¼-inch size with national standard thread and shall be equipped with a 5" Storz adapter for Shoreline or a 4-inch Storz adapter for Lake Forest Park. The Storz fitting shall be installed after pressure testing of the system. The two 2½-inch nozzles shall be fitted with cast iron threaded caps with operating nuts of the same design and proportions as the hydrant operating nut. Caps shall be threaded to fit the corresponding nozzles and shall be fitted with suitable neoprene gaskets for positive water tightness under test pressures

All hydrants shall have corrosion resistance protection on the interior of the hydrant shoe; coating shall conform to AWWA C550. The exterior of all hydrants shall be

painted per the requirements of Item A-15. The depth of bury of the hydrants shall be such that when the hydrant is set at the grade indicated on the plans that the ground line marked on the hydrant shall be at the sidewalk or ground surface. Mechanical joint and flanged ends shall have full wall ductile iron thickness elbow that is equal to the AWWA C-509 flange standard.

Hydrants shall be manufactured by American Darling Manufacturing Company (B-62-B), Kennedy K-81 D, Mueller Company (A-423), and EJ 5CD 250.

A-13.3 Fire Hydrants Auxiliary Valves:

The fire hydrant auxiliary valves shall have mechanical joint ends and shall be gate valves conforming to Item A-8. The auxiliary valve shall be located adjacent to the hydrant branch tee which shall have a swivel branch.

A-13.3 Valve Box for Fire Hydrant Auxiliary Valves:

The valve boxes for the fire hydrant auxiliary valves shall conform to Item A-11.

A-14 FIRE HYDRANT GUARD POSTS

When required, fire hydrant guard posts shall be 6.00" X 12 Gauge Steel casing posts filled with concrete six feet long.

A-15 PAINT FOR FIRE HYDRANT AND POSTS

Fire hydrants, hydrant valve lids, and bollards shall be painted with (2) coats of Kelly Moore Safety Yellow Luxlite Q.D. Alkyd Gloss Enamel #5880-563 or Pitt-Tech 90-330 Safety Yellow.

A-16 AIR AND VACUUM RELIEF ASSEMBLIES

The materials for the air and vacuum relief assemblies shall be as illustrated in the North City Water District's Standard Details No. 21 and 22. Air relief valves shall be designed to operate with potable water under pressure to allow entrapped air to escape from the pipeline. Body and cover shall be cast iron conforming to ASTM A126, Class 30. Floats and internal parts shall be stainless steel conforming to ASTM A240 and designed to withstand 1,000 psi pressure. Seats shall be Buna N rubber and internal parts shall be stainless steel.

Valves shall be designed to withstand 300 psi pressure with normal operating pressure under 100 psi and shall be manufactured by Crispin A111145 UL10, Val-Matic 201C.2 SV or an Approved equivalent.

Vaults for air and vacuum relief valves shall be (2) Old Castle FL-30 meter boxes stacked with Old Castle FL-30 lid per the North City Water District's Standard Detail No. 21 and 22.

A-17 5/8 x 3/4-INCH CUSTOMER SERVICE CONNECTION

The materials for 5/8 x 3/4-inch service connection installations shall be as shown on the North City Water District's Standard Detail No. 7 and as further described herein. **All Brass shall be LOW LEAD.**

A-17.1 Copper Tubing:

Copper tubing shall be 1-inch Type "K" soft, domestic made with a minimum pressure rating of 150 psi and conform to AWWA C-800-05 Appendix A specifications.

A-17.2 Corporation Stop:

The corporation stop shall be 1-inch Corporation Stop (CCTH x C-Comp) as manufactured by Mueller (B-25008N) or Ford Quick Joint (FB1000-Q.)

A-17.3 Angle Meter Valve:

The meter valve shall be 5/8 x 3/4 x 1-inch (C-comp x Yoke) as manufactured by Mueller (B-24273-3N) with 360 Degree Rotation.

A-17.4 Meter Yoke:

Meter Yoke shall be 5/8 x 3/4-inch Yoke Bar as manufactured by A Y McDonald (14-2.)

A-17.5 Meter Yoke Expansion Connection:

Meter Yoke expansion connection shall be as manufactured by Ford (EC-23), Mueller (H-14234N) or A Y McDonald (14-2E.)

A-17.6 Customer Valve:

The customer valve shall be 3/4 x 1-inch (Yoke x FIP) as manufactured by Ford (B-91-324W / HH-34.)

A-17.7 Meter Box and Lid:

Meter boxes shall be as manufactured by Old Castle Products (FL12) with Old Castle (B-12GP) or (FL 12 GP) lid.

A-18 1-INCH CUSTOMER SERVICE CONNECTION

The materials for 1-inch service connection installations shall be as shown on the North City Water District's Standard Detail No. 8 and as further described herein. All Brass shall be LOW LEAD.

A-18.1 Copper Tubing:

Copper tubing shall be 1-inch Type "K" soft, domestic made with a minimum pressure rating of 150 psi and conform to AWWA C-800-05 Appendix A specifications.

A-18.2 Corporation Stop:

The corporation stop shall be 1-inch Corporation Stop (CCTH x C-Comp) as manufactured by Mueller (B-25008N) or Ford Quick Joint (FB1000-Q.)

A-18.3 Angle Meter Valve:

The meter valve shall be 1-inch (C-comp x Yoke) as manufactured by Mueller (B-24273-3N) with 360 Degree Rotation.

A-18.4 Meter Yoke:

Meter Yoke shall be 1-inch Yoke Bar as manufactured by A Y McDonald (14-4.)

A-18.5 Meter Yoke Expansion Connection:

Meter Yoke expansion connection shall be as manufactured by Ford (EC-4), Mueller (H-14234N) or A Y McDonald (14-2E.)

A-18.6 Customer Valve:

The customer valve shall be 1-inch (Yoke x FIP) as manufactured by Ford (B-91-344W / HH-34.)

A-18.7 Meter Box and Lid:

Meter boxes shall be as manufactured by Old Castle Products (FL30) with Old Castle (B-30Gp or FL-30GP) lid.

A-19 1 1/2-INCH CUSTOMER SERVICE CONNECTION

The materials for 1½ -inch service connection installations shall be as shown on the North City Water District's Standard Detail No. 9 and as further described herein. **All Brass shall be LOW LEAD.**

A-19.1 Copper Tubing:

Copper tubing shall be 2-inch Type "K" soft, domestic made with a minimum pressure rating of 150 psi and conform to AWWA C-800-05 Appendix A specifications. Fittings and couplings (if necessary) shall be as manufactured by Mueller.

A-19.2 Corporation Stop:

The corporation stop shall be 2 inch Ball Corporation Stop (MIP x C-Comp) as manufactured by Mueller (B-25028N.)

A-19.3 Service Saddle:

Service saddle for connection to main shall be as manufactured by Smith Blair or Romac Industries. Saddles shall be epoxy coated w/ stainless steel (SS) straps.

A-19.4 Angle Meter Valve:

Shall be per current District Standard

A-19.5 Customer Valve:

The customer valve shall be 2-inch gate valve with brass handle as manufactured by Nibco T-113.

A-19.6 Meter Box and Lid:

Meter boxes shall be as manufactured by Old Castle Products (FL36) with Old Castle (B-36GP or FL-36GP) lid

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A-20 2-INCH CUSTOMER SERVICE CONNECTION

The materials for 2-inch service connection installations shall be as shown on the North City Water District's Standard Detail No. 10 and as further described herein. **All Brass shall be LOW LEAD.**

A-20.1 Copper Tubing:

Copper tubing shall be 2-inch Type "K" soft, domestic made with a minimum pressure rating of 150 psi and conform to AWWA C-800-05 Appendix A specifications. Fittings and couplings (if necessary) shall be as manufactured by Mueller.

A-20.2 Corporation Stop:

The corporation stop shall be 2-inch Ball Corporation Stop (MIP x C-Comp) Low Lead as manufactured by Mueller (B-25028N)

A-20.3 Service Saddle:

Service saddle for connection to main shall be as manufactured by Smith Blair or Romac Industries. Saddles shall be epoxy coated w/ stainless steel (SS) straps.

A-20.4 Angle Meter Valve:

The Angle Meter Valve Shall be 2-inch (C-Comp x Mtr Flange) Low Lead as manufactured by Mueller (B-24276-3N) with 360 Degree Rotation..

A-20.5 Customer Valve:

The customer valve shall be 2-inch gate valve with brass handle as manufactured by Nibco T-113.

A-20.6 Meter Box and Lid:

Meter boxes shall be as manufactured by Old Castle Products (FL36) with Old Castle (B-36GP or FL-36GP) lid.

A-21 FOUNDATION GRAVEL

Foundation gravel Class A shall be coarse graded gravel and shall comply with the requirements of Section 9-03.17 of the WSDOT Standard Specifications.

A-22 PIPE BEDDING

Pipe bedding materials shall be crushed surfacing top course meeting the requirements of Section 9-03.9(3) of the WSDOT Standard Specifications.

A-23 GRAVEL BACKFILL

Gravel backfill shall consist of naturally occurring or screened gravel. It shall be essentially free from wood, roots, bark, or other extraneous material. It shall have such characteristics of size and shape that it will compact readily to a firm, stable course.

Gravel backfill shall be crushed surfacing top course meeting the requirements of Section 9-03.9(3) of the WSDOT Standard Specifications.

A-24 CONTROLLED DENSITY FILL (CDF)

Controlled Density Fill (CDF) shall conform to the requirements of Section 2-09.3(1)E of the WSDOT Standard Specifications.

A-25 ASPHALT CONCRETE

Asphalt concrete shall conform to the requirements of the local agency having jurisdiction. At a minimum, asphalt concrete shall be Class B or Hot Mix Asphalt (HMA) asphalt concrete and shall conform to Section 5.04 of the Standard Specifications for Road, Bridge, and Municipal Construction.

CONSTRUCTION METHODS

CM-1 CONSTRUCTION PROGRESS

It is the intent that the progress of the work shall be in a systematic manner resulting in as little inconvenience as possible to the public throughout the course of construction. It is necessary, therefore, that the Developer/Contractor confine his operations to a length that is feasible for the given crew size. Except by written permission of the North City Water District, at no time shall the trenching equipment be farther than 200 feet ahead of each pipe laying crew. Backfill of the trench shall be accomplished so that no section of approved pipe shall be left open longer than 48-hours except by written permission of the North City Water District.

The Developer/Contractor shall complete the progression of backfill and clean-up as each section of pipe has been inspected and approved. The Developer/Contractor shall repair and regrade all existing drainage ditches, natural drainage courses and all other drainage facilities including culverts damaged or removed during the construction.

The Developer/Contractor shall reopen streets, roads and driveways to the public as soon as practical. No road-way shall be closed while work is suspended over weekends or holidays. Where private accesses are to be closed, the property owner shall be notified by the Developer/Contractor at least 24-hours in advance of the closure. Access for fire and emergency equipment shall be maintained at all times.

CM-2 TRENCH EXCAVATION AND BACKFILL

Trench excavation shall be unclassified. The terms earthwork or excavation shall include all materials excavated or removed regardless of material characteristics. The Developer/Contractor shall estimate the kind and extent of the materials which will be encountered in the excavation.

CM-2.1 Line and Grade:

All trenches shall be dug to true line and smooth bottom grades. Surface grading, including cut, fill and compaction, shall be accomplished prior to trench excavation. In pavement sections, grading to subgrade may be sufficient for areas to be newly paved. The trench width from the bottom of the trench to the crown of the pipe shall not exceed the following:

Maximum Trench Width

6-inch Pipe - 30-inches
Maximum Trench Width

8-inch Pipe	- 30-inches
10-inch Pipe	- 36-inches
12-inch Pipe	- 36-inches
16-inch Pipe	- 42-inches
18-inch Pipe	- 48-inches
24-inch Pipe	- 48-inches

When necessary for proper pipe bedding, or as directed by the District, the trench shall be extended below the pipeline grades to permit the placing of foundation gravel. All unsuitable material shall be removed and disposed of by the Developer/Contractor. All areas of over excavation, required to remove unsuitable material, or for any other reason, shall be brought to grade with approved foundation gravel, and compacted.

The trench bottom shall form a continuous and uniform bearing and support for the pipe on bedding material at every point between bell holes, except that for a maximum distance of 18" near the center of the pipe, the bedding may be disturbed for the removal of lifting tackle. Where the trench is excavated in rock it is especially important that a minimum of three (3) inches of bedding material be used to obtain uniform bearing and support for the pipe.

The root systems of all trees which are located within the right-of-way and/or on or near the easements shall not be cut or disturbed, but shall be tunneled or otherwise protected by the Developer/Contractor to ensure that no damage is done.

CM-2.2 Pavement Removal:

Unless otherwise noted, where trenches are to be dug through paved streets or driveways, the pavement shall be cut to a straight line on each side of the trench with a pavement saw or other approved equipment. The Developer/Contractor shall conduct the pavement removal operations as to cause the minimum damage possible to the adjacent pavement.

CM-2.2 Pipe Cover:

Minimum cover over all water lines shall be 36-inches over the top of the pipe for 10-inch mains and smaller; 48-inches over the top of mains greater than 10-inches. Maximum cover shall be 6 feet, unless otherwise authorized by the North City Water District. Deeper excavation may be required due to localized breaks in grade, or installing the new main under existing culverts and/or other utilities where necessary.

CM-2.2 Shoring, Sheet piling and Bracing of Trenches:

The Developer/Contractor alone shall be responsible for worker safety, and the District assumes no responsibility.

All shoring sheet or bracing required to perform and protect the trench and to safeguard the employees, shall be designed and furnished by the Developer/Contractor. Where sheeting and bracing are used, trench widths shall be increased accordingly. All shoring, sheeting or bracing shall remain in place until the pipe has been placed and the backfill around the pipe compacted to a depth of four inches over the top of the pipe. No timber bracing, lagging, sheathing or other lumber shall be left in any excavation except with the permission of the District.

All shoring, sheeting and bracing of trenches shall be per current OSHA Standards, WSDOT Section 2-09.3(3)D and Part N of the Washington Administrative Code (WAC) 296-155.

CM-2.2 Pipe and Utility Crossings:

The Washington State Department of Health and the Washington State Department of Ecology require a 10-foot horizontal separation between all sanitary sewer lines, reclaimed water lines and potable water lines when laid horizontally, and an 18-inch separation, measured from outside pipe edge to outside pipe edge, for perpendicular and oblique crossings. Situations occurring with less than the minimum separation will require construction in accordance with Section C1-9.1 of the "Criteria for Sewage Works Design" as published by the Washington State Department of Ecology as revised August 2008.

Where it is necessary to cross sanitary sewer or storm sewer lines, trench backfill shall 100% imported Crushed Surfacing to provide uniform support for the pipe. This backfill shall extend a minimum of 3 feet each way from the centerline of the pipe which is being crossed.

A 5-foot minimum horizontal separation shall be maintained between water facilities and all other utilities such as underground power, gas and telephone facilities, unless otherwise approved.

CM-2.2 Removal of Water:

The Developer/Contractor shall furnish and maintain all equipment necessary to dewater the trench and dispose of all water entering the trench excavation during the time that the trench is being prepared for pipe laying, during the laying of pipe, and for such additional time as may be required for the setting or hardening of joint materials. In addition, the trench shall remain free of water during the time that the backfill is being placed and at such other times as may be directed by the District. All water lines, new or existing, shall be protected at all times against the intrusion of any foreign material including groundwater. The Developer/Contractor shall

dispose of water removed from the trench in a suitable manner without damage to adjacent property.

CM-2.2 Piling of Excavated Material:

All excavated material shall be piled in a manner that will not endanger the work and that will avoid obstructing sidewalks and driveways. Hydrants under pressure, valve boxes, meter boxes, or other utility controls shall be left unobstructed and accessible through the work period. Gutters and other drainage courses shall be left clear or other satisfactory provisions shall be made to divert street drainage. Natural water courses shall not be obstructed and erosion control measures shall be installed which adequately protect stockpiled material.

CM-2.2 Bedding:

Pipe bedding shall consist of 3-inches of material specified in Item M-22 hereof and shall be placed in the bottom of the trench to provide a means of uniform pipe support. At the location of each joint, bell (joint) holes shall be dug in the bedding as necessary to permit the joint to be made properly and to properly support the full length of the pipe in the bedding.

CM-2.2 Pipe Zone:

Pipe zone shall be defined as the area of the trench from the top of the bedding to 6-inches over the top of the pipe. Bedding material shall be as specified in Item M-23 hereof and shall be placed in the pipe zone of all trenches.

CM-2.2 Trench Backfill:

Pipe bedding and initial pipe-zone backfill up to 6-inches over the top of the pipe shall be completed before subsequent trench backfilling procedures are started. During backfilling operations, the Developer/Contractor shall take all necessary precautions to protect the pipe from any damage, movement or shifting.

The entire depth of the trench shall be backfilled with material as specified in Item M-23 hereof (5/8" minus Crushed Surfacing). Backfill material shall be compacted by mechanical compaction to 95% of maximum density, per ASTM D-698, to finished grade in all locations, and shall be in accordance with applicable City requirements in all City rights-of-way.

Backfill material shall be placed in layers not exceeding 12-inches in loose depth and each layer thoroughly compacted with a vibratory compactor that compacts granular material by a combination of weight, vibration, and impact. The Developer/Contractor shall be responsible for providing the proper size and type of compaction equipment and selecting the proper method of utilizing said

equipment to attain the required compaction density. In all cases, equipment shall be selected and used so as to not damage the pipe or other utilities and structures.

At a minimum, two passes over each layer shall be made with the vibratory compactor at a speed not exceeding 60 linear feet per minute. It shall, however, remain the Developer/Contractor's responsibility to determine the amount of compaction in excess of the minimum required to prevent subsequent settlement of the backfill.

Any subsequent settlement of the finished surfacing during the one (1) year warranty period shall be the Developer/Contractor's responsibility and shall be promptly repaired by the Developer/Contractor at no cost to the North City Water District.

The Developer/Contractor shall remove and dispose of all excess excavated material by at his expense.

CM-2.2 Compaction Testing:

Compaction testing will be required for all backfilled trenches. A minimum of one testing location shall be chosen for each 200 feet of water main installed. A separate test shall be performed for each two (2) feet of depth. The Developer, or the Contractor, shall contract the services of a qualified and District approved geotechnical consultant to perform the compaction testing. All testing (and retesting) shall be at the Developer/Contractor's expense. Testing locations shall be chosen by the District's field inspector. Compaction results shall be furnished to the District prior to paving. Recompression and retesting will be required for any tests which do not pass the compaction testing. Satisfactory compaction tests do not relieve the Developer/Contractor of the responsibility to provide trenches which will not fail. Subsurface settlements within the warrantee period will remain the responsibility of the Developer/Contractor.

Materials excavated from trenches may be used as backfill outside of paved areas that are within private property. However the materials excavated from the trench are not guaranteed to be suitable to meet the standards for trench backfill. Where original excavated material is unsuitable for trench backfill, imported gravel backfill shall be placed. The unsuitable material shall be removed by the Developer/Contractor to a disposal area, in accordance with City requirements.

CM-3 MAINTAINING ROAD, STREET AND DRIVEWAY ACCESS

The Developer/Contractor shall obey all rules and regulations of the applicable City, County, and State authorities regarding the closing of public streets or highways to the use of public traffic.

The Developer/Contractor's work shall be carried out so as to cause minimum disruption to traffic flow. Traffic must be kept open on those roads and streets where no detour is possible. The Developer/Contractor shall provide, erect, and maintain at all times during the progress or temporary suspension of the work, suitable barricades, fences, signs, danger lights, signals or other adequate protection per City standards. All traffic control devices shall meet City and WSDOT standards.

CM-4 PERMITS AND EASEMENTS

Where the trench lies within a City right-of-way the Developer/Contractor shall secure the applicable right-of-way permits from the City. Where the trench is to be dug within private property, the Developer/Contractor shall secure the necessary clearing and grading permits and the necessary easements prior to the start of construction. Easements shall be obtained, prepared and presented to the District as specified in the District's Water Service Extension Agreement.

Whether working in the right-of-way or an easement, the Developer/Contractor shall acquaint himself with the requirements of the permit or easement. In addition, the Developer/Contractor shall confine his operations to the area denoted within the permit or easement. At the conclusion of work within the right-of-way the applicable City shall provide written approval of the Developer/Contractor's work as complete and accepted. At the conclusion of work within easements, the Developer/Contractor shall obtain from the easement grantor a written release indicating that the work, and restoration of the property, has been satisfactorily completed in accordance with the terms of the easement. The Developer/Contractor shall notify the owners of these properties 48 hours in advance of the time when construction will be started.

CM-5 PIPE LAYING

CM-5.1 Preparation of Trench

The pipe trench shall be excavated per District Standards to the depth required so as to provide a uniform and continuous bearing and support for the pipe on solid compacted or undisturbed ground at every point between bell holes, see Section CM-2.

CM-5.1 Materials Handling

Pipe and associated materials shall be distributed on the job no faster than can be used in a timely manner. In general, no more than one week's supply of material shall be distributed in advance of the laying.

The Developer/Contractor shall provide proper implements, tools and facilities, satisfactory to the District, to be used for the safe and convenient prosecution of the work. All pipe, fittings, valves, and hydrants shall be carefully lowered into the trench, piece by piece, by means of a crane or other suitable equipment, in such a manner as to prevent damage to the pipeline materials and protective coatings and linings. Under no circumstances shall pipeline materials be dropped or dumped into the trench.

CM-5.1 Cutting Pipe

The cutting of pipe for inserting valves, fittings or closure pieces shall be done in a neat and workmanlike manner without damage to the pipe or lining and so as to leave a smooth end at right angles to the axis of the pipe.

Acceptable methods of cutting cast iron pipe are sawing with a band or powered hack saw or with a portable, gasoline engine driven abrasive saw. When approved by the District, cast iron pipe may also be cut by breaking with the use of rolling pipe cutters, hydraulically actuated cutters such as "Wheeler" cutters or with the use of a sledge and cold cutter.

Acceptable methods of cutting ductile iron pipe are only those done by sawing or milling. The flame cutting of cast iron or ductile iron pipe by means of an oxyacetylene torch shall not be allowed.

When mechanical joint or push-on joint pipe is cut in the field, it shall be cut as recommended by the pipe manufacturer, and the cut end shall be reconditioned so that it may be used for the next joint. On push-on joint pipe, the outside of the cut shall be ground back or dressed as recommended by the pipe manufacturer and approved by the District.

CM-5.1 Cleaning Pipe and Fittings

All lumps, blisters and excess coating shall be removed from the bell and spigot ends of each pipe. The outside of the spigot and the inside of the bell shall be wiped clean and dry and free from dirt, grease and foreign matter before the pipe is laid.

CM-5.1 Placing Pipe in Trench

Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the trench. If the pipe laying crew cannot put the pipe into the trench and in place without getting earth into it, the District may require that, before lowering the pipe into the trench, a heavy, tightly woven canvas bag of suitable size shall be placed over each end and left there until the connection is to be made to the adjacent pipe. During the laying operations, no debris, tools, clothing or other materials shall be placed in the pipe.

Pipe shall be laid with bell ends facing in the direction of laying, unless otherwise directed by the District. On an appreciable slope, bells shall (at the direction of the District) face upgrade.

CM-5.1 Number of Pipes Laid Before Joining

Mechanical joint pipe and push-on joint pipe shall be connected as hereinafter specified as soon as the pipe is placed in the trench.

CM-5.1 Preventing Water From Entering Pipe:

At times when pipe laying is not in progress, the open ends of pipe shall be closed by a water-tight plug or other means approved by the District, and no trench water shall be permitted to enter the pipe. These provisions shall apply during the daytime operations as well as overnight. If water is in the trench, the seal shall remain in place until the trench is pumped completely dry.

CM-5.1 Permissible Pipe Deflection

Wherever it is necessary to deflect pipe from a straight line, either in the vertical or horizontal plane, to avoid obstructions or plumb stems or where long-radius curves are permitted, the amount of deflection allowed shall not exceed one half (1/2) of the manufactures allowable deflection.

CM-6 JOINTING OF PIPE

CM-6.1 Mechanical Joint Pipe

Mechanical joint ductile iron pipe shall be installed in accordance with manufacturer's recommendations and as approved by the District. In general, the procedure shall be as hereinafter specified. The ends of the pipe shall be cleaned of all dirt, mud, and foreign matter by washing with water and scrubbing vigorously with a wire brush, after which the gland and gasket shall be slipped on the plain end of the pipe. The ends of ductile iron pipes 16-inches and larger and all rubber gaskets shall be lubricated with gasket lubricant of the type used for push-on joints. The end of the pipe shall then be guided carefully into the bell of the pipe previously

laid. The spigot shall be centrally located in the bell, the gasket placed in position, and the bolts inserted in the holes.

When tightening bolts, the gland should be brought up toward the flange evenly, maintaining approximately the same distance between the gland and the face of the flange at all points around the socket. This shall be done by partially tightening the bottom bolt first, then the top bolt, next the bolts at either side, and last, the remaining bolts. If effective sealing is not attained at the maximum torque, the joint shall be disassembled and reassembled after thorough cleaning. Over stressing of bolts to compensate for poor installation practice will not be accepted.

CM-6.2 Push-on Joint Pipe, Tyton Joint and Restrained Joint Pipe

Ductile iron pipe with push-on type, mechanical joint-tyton joint and restrained type joints shall be laid and jointed in strict accordance with the manufacturer's recommendations as approved by the District. The Developer/Contractor shall provide all special tools and devices such as special jacks, chokers, and similar items required for the installation. Lubricant for the pipe gaskets shall be furnished by the pipe manufacturer, and no substitutes will be permitted under any circumstances.

CM-6.2 Flanged Pipe & Fittings

The jointing of flanged pipe and fittings shall be in accordance with Appendix A of AWWA C115. Care shall be taken to evenly tighten all bolts and to avoid overstressing the bolts or flanges.

At times when pipe laying is not in progress, the open ends of pipe shall be closed by a water-tight plug or other means approved by the District. If water is in the trench when work resumes, the seal shall remain in place until the trench is pumped completely dry.

CM-7 SETTING VALVES, FITTINGS AND COUPLINGS

CM-7.1 General

Valves, fittings, plugs, couplings, and caps shall be set and jointed to pipe in the manner hereinbefore specified for cleaning, laying, and jointing pipe. All valves shall be operated through a full closed and full open position. Valves shall be checked for proper direction of operation.

CM-7.2 Valve Location

Inline valves along water mains shall, where possible, be located at point within the right-of-way where the pipeline and an extension of a property line intersect, unless otherwise shown on the plans.

CM-7.2 Valve Boxes

A valve box shall be provided for every buried valve. Valve boxes shall be as illustrated in the District's Standard Details. The valve box steel casing extension shall be cut to proper length so that the valve box does not ride on the extension when set at finish grade. In addition, the top section of the valve box shall slide over the extension for a minimum distance of 8-inches. The top of the valve casing shall be within 8-inches of finished grade. The valve box shall be centered and plumb over the valve wrench nut with the box cover flush with the finish surface. When valve boxes are set in paved streets, particular care shall be given to the placing of asphaltic concrete around the box to assure compaction of the paving materials under the shoulder of the box. When the distance from the top of the valve operating nut to the top of the valve box exceeds 36 inches, an extension to the operating nut shall be furnished and installed. Extension shall be a minimum of 12-inches long.

CM-8 ANCHORAGE

CM-8.1 Limiting Pipe Diameter and Degree of Bend

On all pipelines 4 inches in diameter or larger, all tees, plugs, caps, bends and all other locations where unbalanced forces exist shall be securely anchored by the use of suitable restrained joint pipe and fittings, thrust blocking or a combination of the two. No vertical bend thrust blocking will be allowed. Vertical bends must be anchored with MJ pipe and restrained joints.

CM-8.2 Thrust Blocking

Reaction or thrust blocking shall consist of concrete blocking having a compressive strength of not less than 3,000 pounds per square inch. Thrust blocks shall not be backfilled for 12 hours unless authorized by the District Inspector and/or District Engineer. Blocking shall be placed between the undisturbed ground and the fittings to be anchored. Concrete blocking shall be formed with plywood and bear against solid undisturbed earth of the sides and bottom of the trench excavation. The minimum bearing area for the blocking shall be as determined in Tables 8.2 and 8.3. The blocking shall be so placed that, unless specifically shown otherwise on the plans, the pipe and fitting joints will be accessible to repairs. Eight (8.0) mil plastic shall be placed between all concrete and fitting or pipe.

TABLE 8.2*

SIZE	TEST PRESSURE (PSI)	THRUST AT FITTINGS IN POUNDS				
		A	B	C	D	E
		TEE AND DEAD ENDS	90° BEND	45° BEND	22.5° BEND	11.25° BEND
4"	250	3,140	4,440	2,405	1,225	615
6"	250	7,070	9,995	5,410	2,760	1,385
8"	250	12,565	17,770	9,620	4,905	2,465
10"	250	19,635	27,770	15,030	7,660	3,850
12"	250	28,275	39,985	21,640	11,030	5,545
14"	250	38,485	54,425	29,455	15,015	7,545
16"	250	50,265	71,085	38,470	19,615	9,855

TABLE 8.3*

SOIL TYPE	SAFE BEARING LOAD (PSF)
MUCK, PEAT, ETC.	0
SOFT CLAY	1,000
SAND	2,000
SAND AND GRAVEL	3,000
SAND AND GRAVEL CEMENTED WITH CLAY	4,000
HARD SHALE	10,000

Table 8.2 and 8.3 Notes:

1. Contractor to provide blocking adequate to withstand full test pressure.
2. Divide thrust by safe bearing pressure to determine required.
3. Areas to be adjusted for other pressure conditions.

*Tables adapted from Washington State Department of Transportation Standard Plan B-90.40-00

CM-8.3 Mechanical Joint Restraint Glands

With suitable conditions, anchorage may be obtained with the use of ductile iron mechanical joint restraint glands with set screws, as specified in item A-3.2, in place of the follower glands normally furnished for pipe and fittings. The installation of the glands shall be in accordance with the manufacturer's recommendations. Care shall be taken to see that the mechanical joint bolts are completely tightened and that there will be no further deflection before tightening the set screws.

CM-8.4 Anchorage for Hydrants

Hydrants shall be anchored by means of mechanical joint restraint glands as specified in Item CM-8.3. above unless otherwise directed by the District.

CM-9 SETTING FIRE HYDRANTS

CM-9.1 General

Hydrants shall be inspected in the field upon arrival to determine proper working order prior to installation. Hydrants shall be set according to the District's standard details including set plumb and set to the established grade utilizing hydrant extensions if necessary. Hydrants shall also be set with the center of the nozzle being between 18 and 24 inches above final grade. Hydrants shall be backfilled with gravel under and around the barrel drain. The barrel shall be supported on a concrete bearing block. See District's Standard Details 2 through 5.

CM-9.2 Hydrant Locations

Hydrants shall be located as shown on the plans or as directed by the District. Where possible, hydrants shall be located at point within the right-of-way where the pipeline and an extension of a property line intersect, unless otherwise shown on the plans. Hydrant locations shall provide complete accessibility to the hydrant and shall minimize the possibility of damage from vehicles or injury to pedestrians.

CM-9.3 Hydrant Installation

All hydrants shall stand plumb and shall have the pumper nozzle facing the curb or the center of the street. Each hydrant shall be connected to the main with a 6-inch ductile iron branch controlled by an independent 6-inch gate valve. All hydrants shall be set with the ground line marked on the hydrant at finish grade or as directed by the District Inspector. Hydrants shall be set on a concrete base 12 inches by 12 inches square and 4 inches deep and shall be backfilled to three (3) inches above the bottom hydrant flange with 1 cubic yard of 1 ½ inch washed drain

rock. The remaining trench depth shall be backfilled with 5/8-inch minus crushed rock placed in 8-inch layers and compacted to 95% density. A 3 foot square by 6" deep concrete pad with #4 bar shall be poured around the base of the hydrant and shall be flush with the surface.

All chains shall be removed from hydrants. The hydrant shall be painted with two coats of paint as specified in the construction materials section.

Relocated fire hydrants shall meet the same requirements as new fire hydrants for grade, backfill, blocking and installation of a culvert. After relocation, the fire hydrant shall be painted like new. Relocated fire hydrants shall be subject to the same hydrostatic pressure and purity tests as new fire hydrants.

CM-10 INSTALLATION OF FIRE HYDRANT BOLLARDS

When directed by the District, fire hydrant bollards shall be set with the tops of the posts at the same elevation as the top of the operating nut. Hydrant bollards shall be set at a minimum distance of 3-feet 6-inches from the center of the hydrant. The exposed portion of the posts shall be painted with primer and two coats of paint as specified in the construction materials section. See North City Water District's Standard Details 2 through 4.

CM-11 INSTALLATION OF AIR-RELIEF ASSEMBLIES

Vacuum and air-relief valve assemblies shall be installed as shown in the North City Water District's Standard Details 21 and 22. Taps for the valves shall be made on the top of the pipe and shall be located at the high point of the main line. Valves shall be located 90° to the tap location on the main. The line from the tap location to the valve shall be constructed with continuous positive slope between the two points.

CM-12 INSTALLATION OF BLOW-OFF ASSEMBLIES

The blow-off assemblies shall be installed as shown on plans approved by the District.

CM-13 INSTALLATION OF SERVICE LINES

The services shall be installed as shown on the standard details (#7-10). Services shall be installed in one piece with no splices, unless approved otherwise by The District for special conditions.

CM-14 CONCRETE THRUST BLOCKING

Concrete thrust blocking shall be cast in place and have a minimum of 1/4-square-foot bearing against the fitting and 2 square feet of bearing against undisturbed soil and shall be clear of joints so as to permit taking up or dismantling joint. All poured in place blocking shall have a minimum measurement of 12 inches between the pipe and the undisturbed bank. All blocking configurations and sizes shall be per the standard detail. All blocking as shown on the standards are considered as minimums, and consideration should be given to unusual circumstances and topography.

CM-15 AUGERED OR BORED CASINGS

Water mains installed in casing pipe shall be made by jacking, driving, or augering a steel casing pipe beneath the surface. No open excavation shall be made closer than six feet from the edge of pavement. The diameter of the casing shall be sufficient to allow installation of the water main and also to provide allowance for adjustment of the water main to proper line and grade. Wall thickness shall be sufficient to withstand installation force and highway loading and shall not be less than 3/8-inch. After installation of the water main, and with the approval of the inspector, sand shall be placed in the casing pipe to fill all voids. Casing ends shall be sealed using linkseal, mortar, or other approved method.

Restrained mechanical joint pipe shall be installed in all casings. Approved stainless steel casing insulators (Cascade Water Works Manufacturing, or equal) shall be used to protect the pipe and adjust it to proper grade. The water main may be pushed or pulled into the casing pipe, unless MEGALUGS are used for joint restraint, in which case the water main should be pulled into and through the casing pipe.

All bore pits or related excavations shall be closed at the end of each day. Ditches must be backfilled or covered with steel sheets and, within public or private rights-of-way, barricaded with minimum 5-foot high chain link fencing and flashing warning lights to prevent people or animals from falling into the trench.

The requirements of the roadway agency as contained in the construction permit, or as issued by oral instructions of the authorized representative of the roadway agency shall be followed by the Developer/Contractor.

CM-16 HYDROSTATIC TESTING DISINFECTING

All pipelines shall be tested and disinfected prior to acceptance of work. All pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be furnished, installed, and operated by the North City Water District.

The pipeline shall be backfilled sufficiently to prevent movement of the pipe under pressure. All thrust blocks shall be in place and time allowed for the concrete to cure before testing. Where permanent blocking is not required, the Developer/Contractor shall furnish and install temporary blocking.

As soon as pipe is adequately secured against movement under pressure, it may be filled with water.

After the pipe is filled and all air expelled, it shall be pumped to a test pressure equal to 1.5 x Line Pressure or 150 psi whichever is greater @ the highest point, and this pressure shall be maintained for a period of 1 hour or what the District feels is suitable. In accordance with manufacturer's recommendation, all valves may be limited to a pressure differential equal to the rated pressure of the valve (200 psi minimum), but shall not restrict the test pressure of the main. Mainline testing shall be made with the hydrant auxiliary gate valves open and pressure against the hydrant valve. Hydrant ports shall also be tested to hold static pressure without any visible leaks. Hydrostatic tests shall be performed on every complete section of water main.

In addition to the hydrostatic pressure test, a leakage test shall be conducted on the pipeline. The leakage test shall be conducted at the same pressure as the hydrostatic pressure test for a period of not less than 1/2 hour. The quantity of water lost from the main shall not exceed the number of gallons per hour determined by the formula:

$$L = \frac{ND(P)^{0.5}}{7,400}$$

in which L = Allowable leakage, gallons/hour
 N = No. of joints in length of pipeline tested
 D = Nominal diameter of the pipe in inches
 P = Avg. test pressure during leakage test, psi

Defective materials or workmanship, discovered as a result of the tests, shall be replaced by the Developer/Contractor at the Developer/Contractor's expense. Whenever it is necessary to replace defective material or correct the workmanship, the tests shall be rerun at the Developer/Contractor's expense until a satisfactory test is obtained.

As sections of pipe are constructed and before pipelines are placed in service they shall be sterilized in conformance with the requirements of the State of Washington, Department of Health.

CM-17 DISINFECTING

Before being placed in service, all new water mains and repaired portions of, or extensions to, existing mains shall be chlorinated and a satisfactory bacteriological report obtained. Temporary or permanent physical connections shall not be allowed between the existing distribution system and non-disinfected pipelines constructed without a State Department of Health approved backflow preventer (double check valve assembly or better) temporarily installed in the connecting line

Chlorine shall be applied in one of the following manners, listed in order of preference, to secure a concentration in the pipe of at least 25 ppm:

- (1) Injection of chlorine-water mixture from chlorinating apparatus through corporation cock at beginning of section after pipe has been filled and with water exhausting at end of section at a rate controlled to produce the desired chlorine concentration.
- (2) Injection similarly of a hypochlorite solution.

After the desired chlorine concentration has been obtained throughout the section of line, the water in the line shall be left standing for at least 24 hours. Following this, the line shall be thoroughly flushed and a water sample collected. The line must not be placed in service until a satisfactory bacteriological report has been received. If the District feels the need to up the Chlorine dosage, the standing time can be lowered, This could take place if the North City Water District Operations Manager approves the method.

Discharge of hypo chlorinated water to surface waters is strictly prohibited. A reducing agent shall be applied to the water to be wasted to neutralize the chlorine residual remaining in the water. Federal, state, and local regulatory agencies should be contacted to determine special provisions for the disposal of heavily chlorinated water. This is to include lakes, rivers, streams, and any and all other waters where fish or other natural water life can be expected. Hypo chlorinated water may be required to be trucked off site and disposed of at a sewer treatment plant or other approved location.

District representatives only shall be allowed to operate existing and new tie-in valves. Developer/Contractor's personnel are expressly forbidden to operate any valve on any section of line which has been accepted by the District.

CM-18 FLUSHING / Polly Pigs

Upon completion of pipe laying and installation of any service lines, Polly Pigs shall be flushed so that all dirt and foreign matter shall be removed by a thorough flushing through all hydrants, blow offs or other approved means. Each section of

newly laid pipe between valves or dead ends shall be flushed independently, and fire hydrants or other dead end appurtenances shall be flushed simultaneously with the parent line. A minimum flushing velocity of 2.5 fps shall be developed in the main.

The Developer/Contractor shall be responsible for scheduling and organizing his work so as to use flushing water only during off-peak hours and in the most economical manner.

No flushing shall be performed without the North City Water District Personnel.

CM-19 CONNECTION TO EXISTING WATER MAIN

Wet tap connections shall be installed as shown on the Plans and the tapping valve shall remain closed.

Cut-in tees and crosses shall be installed as shown on the plans and the valves on the branches of the tee or cross shall remain closed.

At connections of new piping to existing piping all of the new piping, appurtenances and blocking shall have been installed, disinfected and tested. The Developer/Contractor is required to use a state approved backflow prevention device for filling, testing and flushing of the new water system prior to cutting into the existing line.

The District shall be notified three (3) working days in advance of all scheduled connections. No cut-in connections or connections of new piping to existing piping will be scheduled on Fridays or Mondays.

All equipment and material necessary to make the connections shall be delivered to the site prior to the start of work. Bolts, flanges, gaskets, couplings and all accessories shall be checked and assembled where possible by the Developer/Contractor and verified by the District prior to shut down of the water system. Tapping tees and valves shall be air tested prior making tap.

Before connection or cut-in, the fittings, pipes, valves, and couplings shall be cleaned and sterilized with chlorine solution in the same manner as provided for the pipeline. The cleaning and sterilizing shall be done immediately prior to installation and in the presence of the District. Once the is started on this connection, it shall proceed continuously without interruption and as rapidly as possible until completed.

No shut-off of mains will be permitted overnight or over weekends or holidays. The Developer/Contractor may be required to perform the connection during times other than normal working hours

After connection to the existing system, the opening of valves shall be done with the authorization of, and in the presence of, the District's authorized representative.

CM-20 ASBESTOS/CEMENT WATER PIPE

As far as we know no AC Pipe exists in the District. But any work to be performed upon existing asbestos/cement water pipe if it does exist shall be in conformance with the latest edition of "Recommended Standard Asbestos/Cement (AC) Pipe Work Practice Procedures and Training Requirements," adopted and published by the Pacific Northwest Section of the American Water Works Association, which is included herein by reference, and Chapter 296-65 of WAC, except as revised herein. Any AC pipe which is removed from service and is not disturbed may be capped and abandoned in place. Any exposed and disturbed pipe to be removed from service shall be removed and disposed of at an appropriate waste site. The disturbed pipe may not be relocated in the trench or otherwise disposed of on site. No new or used AC pipe is to be installed in the North City Water District. Disposal of any removed materials shall be at an approved off-site facility, in accordance with the above publications. All materials, equipment and safety gear shall be on site prior to cutting, tapping or removing any AC pipe.

CM-21 RESTORATION OF DISTURBED AREAS

Restoration of public and private improvements shall be performed by experienced Contractors or by employees of the Developer who are qualified in this type of work.

The Developer/Contractor shall be responsible to maintain all roadway areas until the permanent repair is accomplished.

The Developer/Contractor shall limit construction time on each easement to the very minimum possible, including the time required for installation and testing. Restoration work shall follow immediately after pipe testing with due allowance for weather and season of year.

Asphalt Pavement

The existing asphalt concrete shall be cut on a neat line with a cutting disc or similar approved tool prior to excavation. Before the end of each day the trench shall be backfilled and compacted and a temporary cold mix patch shall be placed and maintained in good condition until replaced.

Immediately prior to permanent resurfacing of bituminous surfaced roads, the edges shall be re trimmed 18 inches wider than the excavation with straight vertical edges free from irregularities and the cold mix shall be removed. Edges of the

trimmed surfacing shall be thoroughly tacked with an emulsified asphalt and asphalt concrete shall then be placed and compacted to the grade of the original surface. All asphalt joints shall be sealed with an approved sealer.

Crushed Surfacing

The existing gravel roadway shall be restored by grading the surface to a uniform grade to the width of the roadway prior to construction.

Where ditch sections are disturbed during construction, the ditch shall be restored to the same cross sections as existed prior to construction and shall be restored prior to placement of the crushed surfacing.

The Developer/Contractor shall spread the crushed surfacing as each load is placed and shall compact the crushed surfacing after the material has been spread.

Landscaped and Improved Areas

All improvements and landscaping within the construction area which are damaged, destroyed or the use thereof interfered with due to the operation of the Developer/Contractor shall be immediately restored to their former conditions by the Developer/Contractor at the Developer/Contractor's expense, using the services of a qualified nursery and/or sod installation company, except where noted otherwise. Notice should be given to the property owners along the route of construction by the Developer/Contractor advising them of the methods to be used to preserve and restore the improvements.

Unimproved Areas

All areas disturbed by this construction for which no other restoration is specified, and for which there were no private improvements existing prior to construction, shall be seeded for erosion control.

Seeding shall not be done during windy weather or when the ground is frozen, excessively wet, or otherwise untillable. Seed shall be placed at a minimum rate of 120 pounds per acre.

Seeding, fertilizing and mulching shall be installed using an approved type hydroseeder. If hand seeding is used with prior approval, evidence of vigorous growth, in the opinion of the District, will be required prior to final acceptance.

Fertilizer shall be applied in accordance with the procedures and requirements for seeding at a minimum rate of 500 pounds per acre.

Wood cellulose fiber mulch shall be applied in accordance with the procedures and requirements for seeding at a minimum rate of 2,000 pounds per acre.

CM-22 INSTALLATION OF PRESSURE-REDUCING STATION

Excavation shall be carried to the proper grade and to a dense undisturbed firm foundation. Grade shall be as shown on drawings, but in no case shall the top slab extend higher than adjoining road grades. The vault shall be carefully placed on a prepared foundation of foundation gravel. The excavation shall be kept free of ground and surface water during installation. The Developer/Contractor shall use caution at all times to prevent flotation of the vault.

Backfill around the structure shall be carefully placed in layers not over 12 inches thick and mechanically compacted. No brush, topsoil, organic material or asphalt shall be used in backfilling. Where original excavated material is unsuitable for backfill, as determined by the Engineer, imported gravel backfill shall be placed. The unsuitable material shall be removed by the Developer/Contractor to a disposal site, in accordance with County requirements. The backfill shall be compacted by mechanical compactors to 95% of maximum density, ASTM D-698, to finished grade.

The piping, vault and metal items shall be painted as described under MATERIALS. All surfaces shall be clean and dry. No painting shall be done before the prepared surfaces are approved by the Engineer. The pipe shall be empty and the surfaces shall be free of all moisture and condensation before application begins.

Upon completion of the installation the Developer/Contractor shall furnish the services of a technical manufacturer's representative for the pressure relief and pressure reducing valves. The technical representative shall check the installation, test the equipment, place it in operation and train the District's representative.

NORTH CITY WATER DISTRICT

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North City Water District

Earthquake Early Warning – Pilot Project Implementation Predesign Report

September 3, 2019

Daniel R. Ervin, P.E.
Varius Incorporated



The seismic resiliency of a water system dictates the seismic resiliency of an entire urban region. As a result, it is critical for water systems to rapidly recover from earthquake impacts. In order to maximize resiliency, there is a need for municipal water systems to manage seismic programs and implement sound seismic practices.

The United States Geological Survey (USGS) has recently developed a new and powerful technology to give advance warning of earthquake shaking. This new technology (called **ShakeAlert™** on the West Coast of the United States) can be used to prepare for earthquakes and minimize their damage and destruction. Water systems can take advantage of this new technology to save lives and protect assets following a large, destructive earthquake. In April 2017, the USGS invited select water systems to participate in the new **ShakeAlert™** earthquake early warning system which is designed to protect West Coast businesses and residents from a large Cascadia Subduction Zone earthquake. **ShakeAlert™** is currently in beta-testing mode while the accuracy and reliability of the system are being evaluated. Selected users can participate in the beta-testing process by becoming a “Pilot Project” participant through early adoption of the technology and an agreement to participate and assist the USGS in gathering data and perfecting the alarm signal. The North City Water District (District) has been invited to participate in the **ShakeAlert™** system and become one of the early adopters of the early warning technology. Water systems are suitable early adopters of Earthquake Early Warning technology because they can use the warning signal to save a community’s most precious resource, water, and they can do this at low cost and low risk. In April 2019, the District authorized a study (by Varius Inc) to identify the details of how Earthquake Early Warning could be used to benefit the District.

I. Background

The **ShakeAlert™** earthquake early warning system uses a network of sensors installed up and down the west coast of the United States to “listen” for the acoustic signature of an earthquake (commonly referred to as the “P” wave). The sensors pass data in real-time to computer networks at Cal Tech, Cal Berkeley, and the University of Washington where the size and epicenter of the earthquake is estimated, and the warning signal is processed. This information is then made available to the public through servers at the University of Washington and participating universities. An early warning alarm of several seconds up to 4 minutes can be pushed forward to users via an internet connection from the University of Washington.

The invitation to participate in the earthquake early warning Pilot Project is limited to organizations and agencies that can take advantage of the alarm signal and take actions to reduce financial losses or improve public health and safety during and after a quake. The actions taken must be fault-tolerant and present little or no liability from false alarms or missed alarms. This limitation will remain in place for several years while the **ShakeAlert™** system is tested, tuned, and perfected.

The District fits the Pilot Project criteria and the District is a suitable candidate for Pilot Project participation in the **ShakeAlert™** system. This will give the District and their customers access to the

ShakeAlert™ system now, before the Earthquake Early Warning system is available to the general public.

To become a **ShakeAlert™** user, four steps must be completed.

Step 1. The District must develop a **plan** that details how the **ShakeAlert™** signal can be beneficially used in the District to save lives and reduce damage. These uses must be fault-tolerant and able to accommodate false and missed alarms without damage or significant cost.

Step 2. The District must develop **policies** which will ensure that the **ShakeAlert™** alarm will be contained within the District and its authorized personnel (no public notification is allowed at this time) and that the alarm will not cause damage or present a nuisance to the public.

Step 3. The District must make an **application** to the USGS and request Pilot Project status. The Pilot Project application relies on the work included in the first two steps and this information is used by USGS to determine if the District is a suitable beta-testing (Pilot) partner.

Step 4. Following Pilot Project approval, the District must acquire the ability to **connect** to the servers at the University of Washington

and convert the USGS alarm signal into a format that can be used by the existing Supervisory Control and Data Acquisition (SCADA) system.

Following completion of these four steps, the District will be able to automatically respond to an earthquake alarm and “harden” the water system before destructive shaking begins. The intent of the hardening action is to minimize damage, reduce losses, and improve the reliability of the public water supply system. Recent experience with large earthquakes in other parts of the world demonstrate that an un-hardened municipal water system can be out of service for more than 60 days following a subduction-zone quake. Earthquake hardening can be used to reduce asset loss and damage and significantly reduce the amount of time customers are out of service. While earthquakes cannot be predicted, and they cannot be stopped, an advanced warning of an earthquake can be used to reduce losses, minimize damage, and protect lives and property.

II. Objective

The District has retained Varius Inc. (Varius) to assist in evaluating the applicability of using Earthquake Early Warning Technology in the District and to prepare the District to make an application to the USGS for Pilot Project status.

This report is intended to be used by the managers and elected officials of the North City Water District to plan for and respond to the advance warning of an earthquake from the **ShakeAlert™** Earthquake Early Warning system. It will also serve as a useful resource during the application for the Pilot Project from USGS and will be an attachment to that document.

This report will:

1. Identify the actions that are recommended immediately after an earthquake alarm is received.
2. Include sufficient information to assist in the completion and application to USGS for Pilot Project status and be written to serve as an appendix to that application.
3. Identify a recommended configuration for the software and hardware necessary to receive and process the earthquake alarm signal.
4. Recommend the automatic actions that should be initiated immediately following an earthquake alarm signal.
5. Identify policies that should be considered to take full advantage of the early warning opportunities.
6. Identify potential future actions and improvements related to early warning to improve the value of the system to the District.

III. Executive Summary

The District has been a leader in emergency response planning and has an obligation to plan for natural disasters.

The **ShakeAlert™** Earthquake Early Warning system is a tested and proven technology and is available to selected users now. While the accuracy and reliability of the **ShakeAlert™** system are expected to improve over the years, it is suitable for use now and there is no advantage to the District to wait to implement this technology.

The **ShakeAlert™** Earthquake Early Warning System can be used to make a significant improvement in the District’s ability to provide service to customers following a large and damaging Cascadia Subduction Zone earthquake. Experience with other large quakes around the world demonstrate the frailty of un-hardened water systems and the value in early warning preparations. Seattle Public Utilities has notified wholesale customers (like the District) to prepare for an outage of at least 60 days following a quake. In addition, the early warning signal can be used to protect facilities and minimize asset loss after an earthquake.

The District’s utility system has been designed to be robust and reliable and there is reason to believe that many of the District’s pump stations, supply stations and reservoirs will survive a large earthquake. **The primary objective of an effective earthquake early warning plan, therefore, is to save the stored water in the reservoirs and prevent the reservoirs from emptying due to broken water mains. A secondary objective is to prevent fires in the supply stations and pump stations following an earthquake. If the reservoirs hold water - and the supply and pump stations are serviceable – water service can be provided to a traumatized community following a Cascadia-size earthquake event (estimated at 8.0 or larger magnitude).**

There is a significant positive return on investment for early adoption of the **ShakeAlert™** technology. **ShakeAlert™** should be installed and placed on-line as soon as possible.

The **ShakeAlert™** system will be installed in phases so that the most critical and beneficial features of the technology can be in place and online as soon as possible. Phase 1 is detailed in this report. Future phases will be evaluated separately and used to improve the technology and take advantage of advanced features.

Some new hardware, an electronic device called an “**OmniMonitor®**”, will be required to interface with the **ShakeAlert™** system and capture and decode the alarm signal. This hardware is provided by a third-party vendor and is a device manufactured explicitly for this purpose. We do not anticipate that any new SCADA hardware will be required to interface with the **OmniMonitor®**, however, some new software or programming may be needed in the existing SCADA system to implement the hardening actions as a result of the earthquake early warning alarms.

Phase 1 will include the following actions by zone (in response to an earthquake alarm):

432 Zone:

- Close – 432 Reservoir Valve
- Throttle – No Actions (NA)
- Stop Pumps – No Actions (NA)
- Take no action – Supply Station 2
- False Alarm Supply – 502 Zone via PRVs

502 Zone:

- Close – NA
- Throttle – NA
- Stop Pumps – NA
- Take no action – Supply Station 1, Supply Station 3
- False Alarm Supply – Supply Station 1 and Supply Station 3

590 Zone:

- Close – 590 Reservoir
- Throttle – NA
- Stop Pumps – Pump Station 1, Pump Station 2

- Take no action – Supply Station 4
- False Alarm Supply – Supply Station 4

615 Zone:

- Close – NA
- Throttle – NA
- Stop Pumps – North City/Denny Clouse Pump Station
- Take no action - NA
- False Alarm Supply – 590 Zone Via Check Valve

System-Wide (not site-specific) Actions

- Use an on-site seismic sensor to verify the **ShakeAlert™** Alarm (by corroborating arrival of the P wave in the correct temporal window) to differentiate between a likely earthquake and a likely false alarm. Initiate non-fail-safe actions based on high probability alarms (Disable emergency power generators at the District Office, the North City/Denny Clouse Pump Station, the Maintenance Facility and the Communications Building and leave the power off until manual reset).
- Notify District Personnel that an earthquake alarm has been triggered from the OmniMonitor via email.

Future phases should include the following additional actions (in response to an earthquake alarm):

- Add Uninterruptable Power Supplies to key control system and control action components (battery, not Engine-Generator set based)
- Perform a study to identify optimum valve closure speeds for the reservoirs.
- Add SCADA to PRVs future flow control.
- Relocate Pump Station 1 from its current location near 8th Avenue NE to the new District maintenance facility at 15th Ave NE and NE 158th Street in order to improve resilience and survivability following a quake. In addition, this location provides the ability to add terminal storage (as much as 1.5 mg) that can be configured and easily isolated for use as long-term supply following an earthquake.
- Complete pipeline loops to areas of the District served by single pipelines (i.e. Sheridan Beach) and replace all old cast iron pipelines in local landslide hazard or liquefaction or flood zones with earthquake resistant pipelines.
- Harden (replace with special earthquake-resistant piping) selected pipelines within the District to connect strategic public distribution sites with the hardened reservoirs (for long-term supply following a quake).

There is no cost to “buy into” the **ShakeAlert™** system, it has been publicly funded. There are also no on-going subscription costs to maintain access to the **ShakeAlert™** system that is maintained by the USGS. There are some costs to plan for the **ShakeAlert™** alarm (this predesign effort and the subsequent Pilot Project Application) and some costs to connect to the **ShakeAlert™** alarm signal using the **OmniMonitor©**. This work, Phase 1, is estimated to cost approximately \$120,000 (excluding contingency). In addition, there are some ongoing monthly costs to maintain the **OmniMonitor©** and

provide software updates and periodically service and maintain the unit to ensure it remains operational and connected to the USGS network. We anticipate these costs are approximately \$250/month.

ShakeAlert™ is available now following acceptance as a Pilot Project participant by the USGS. Some work is necessary to prepare the Pilot application (1 month) and some work is necessary to acquire and connect the **OmniMonitor©** (3 months). We recommend that the District complete the Phase 1 work as soon as possible and budget for the Phase 2 work in 2020. Phase 1 can be operational within three months of USGS acceptance of the Pilot Project Application.

IV. SHAKEALERT™ System Architecture

The **ShakeAlert™** Earthquake Early Warning (EEW) signal originates at the University of Washington from computer servers that are configured specifically for making EEW available to remote users (like the District). When an earthquake occurs, the USGS **ShakeAlert™** system generates an EEW alarm signal. That alarm signal includes data about the calculated epicenter (location) of the quake, the magnitude of the quake, the expected intensity of the shaking that will be caused by the quake at your location, the time to shaking, and a “confidence” rating.”. These values are pushed to authorized users over an encrypted internet connection. The District will receive the signal using an electronic device specifically designed and manufactured for that purpose. The device is a programmable logic controller that has been equipped with special communication modules to connect to and “talk” to the host computers at the UW and special decoding software that calculates local shaking intensities and timing. The device is called an “**OmniMonitor©**” and is available from a third party via direct purchase (coordinated by Varius).

The **ShakeAlert™** alarm signal that is received from the USGS is in a prototype configuration and the reliability and accuracy of the signal is still being evaluated and improved. It is important that prototype users (like the District) can tolerate false and missed alarms without damage or inconvenience to the public and without incurring significant liability for the District or for the USGS. For this reason, fault tolerance is one of the primary design and implementation goals for the earthquake early warning system. This requirement will be a significant issue in the phasing of EEW, in that some beneficial pre-earthquake actions (for example, E/G set disabling, and power supply disconnect at Pump Station 1 and 2) might need to be deferred to a second phase when the signal is more reliable.

V. OmniMonitor© Configuration

The device that will be used to connect to the **ShakeAlert™** alarm network at U.S.G.S. and provide an alarm interface and data conversion for the existing SCADA system is an industrial-hardened programmable logic controller called an **OmniMonitor©** (Unit) manufactured by Weir-Jones and Associates in Vancouver Canada. The device is modified for Varius and for the **ShakeAlert™** network with special communication modules to connect to the **ShakeAlert™** network and to provide cyber-safe connection to the SCADA system. The device is UL labelled.

The **OmniMonitor©** connects to the U.S.G.S. network through a conventional RJ45 internet connection. The device does not employ a static IP address but rather a dynamic IP address. This makes it impossible to initiate internet communications from outside the

connection location or to connect to the internet using any device outside the connection location. In other words, the device must call out to you, you cannot call in to the **OmniMonitor**®. This protects the device, and the District's SCADA system, from hacking and other outside internet-related security threats.

The **OmniMonitor**® connects to the SCADA system through two on-board relays, each able to be user configurable to respond to earthquakes of different threshold values. For example, one relay could be configured to close at any magnitude 6.5 or larger event and the second relay could be configured to close at any 8.5 or larger event. Each relay is form C and operates as a dry contact closure, in this way it is impossible to pass digital data across the relay interface and this, in turn, increases security for the SCADA system. There is no ability to make a digital data connection from the SCADA system to the internet through the **OmniMonitor**® connection. After alarm initiation, one of the two relays are closed (based on expected earthquake magnitude) and remains closed until the system is reset.

The Unit includes two front-mounted pushbuttons. One is a "TEST" button which closes both on-board relays and this action can be programmed to initiate a test sequence in the SCADA system. The second button is a "RESET" button which un-latches the two on-board relays. Three indicator lights are provided showing "POWER" (Unit is on), "STANDBY" (the Unit is functioning properly and has a valid connection to the USGS network) and "ALARM" (a **ShakeAlert**™ alarm has been triggered by the USGS network).

The **ShakeAlert**™ network initiates an alarm condition using pre-programmed threshold magnitudes (selected by USGS) and pushes this alarm, along with some alarm data, to the **OmniMonitor**®. The **OmniMonitor**® in turn calculates the expected time to shaking at the Unit location (using geo-spatial data and on-board algorithms) and also the expected shaking intensity using shake-terrain maps from USGS and transmitted with the alarm event. This closes either relay one or relay two based on user-setpoints. Each alarm setpoint can be used to initiate different shutdown or hardening actions through the SCADA system.

The Unit will be mounted near the SCADA master and will include an attached seismic sensor that can be used to verify false-alarms and used to alarm after-shocks if the USGS **ShakeAlert**™ system is off-line (which is likely following a subduction-zone event). The on-board P-Wave detector will be programmed to "watch" for the P wave at the Unit location based on propagation algorithms triggered by the U.S.G.S. alarm. If the P wave arrives at the on-board seismic sensor within the time calculated based on the **ShakeAlert**™ alarm, the system will assume the earthquake is not a false alarm and close relay 2, the hard alarm relay. If no P wave is detected, relay 1 will remain closed and latched, but relay 2 will not close. This can be used by the SCADA system (through programming) to delay or soften response actions based one either the severity of the alarm or the likelihood that the alarm is a false alarm.

The Unit is designed to communicate with operators via email and through connection to the SCADA system. Following an alarm notification from USGS, the Unit will close and latch the appropriate relays (see above) and send a broadcast email to those listed in the Unit's configuration file. The email will include the alarm notification, the time the alarm was received, the expected magnitude and the expected time to shaking. In addition, the Unit will periodically send an email to those addresses listed in the configuration file with Unit status, including TEST and RESET activations.

The Unit will be mounted by Varius staff using space that is dedicated for this purpose. Varius will connect the Unit to 120VAC power and to the internet using an RJ45 connector. Both power and internet connections must be available within 48" of the Unit location. Varius will also provide and mount a spade-type terminal block for connection to the SCADA system. Wire connections from the terminal block to the SCADA Master must be provided by the SCADA Integrator.

The SCADA Integrator is expected to provide the following programming/logic (in the SCADA system and independent of the **OmniMonitor**®) in order to initiate system hardening following an alarm condition:

1. Any interface or programming necessary to connect to the terminal block and initiate program subroutines following relay activation in the **OmniMonitor**®. Both N.O. and N.C. connections are available for each relay and the SCADA Integrator may use either configuration. Connections are 12 VDC, .5 amps max)
2. Alarm initiation, control initiation and reset subroutine time delays to prevent nuisance tripping and filter-out anomalous relay activation or noise in the connection network.
3. Discrimination of the field actions to be taken based on the actual operating conditions in the system (for example, determining whether is pump is running, or not, before initiating pump shutdown sequences, determining the position of a valve before initiating valve re-positioning, etc.)
4. Providing feedback to operators regarding system status, alarm activation, alarm condition, actions taken, reset, etc.
5. Control logic and programming to implement the hardening actions shown in this report following a **ShakeAlert**™ alarm. The actual hardening actions and sequence will be defined by the owner. Two separate hardening sequences may be required; one initiated by Relay 1 activation and the second initiated by Relay 1 and Relay 2 activation. Both relays latch after activation and remain latched until cleared by the front-panel mounted pushbutton or by the on-site seismic sensor.
6. Control Logic and programming to initiate a system test following activation of Relay 2 on the terminal block (with appropriate time delays to prevent nuisance tripping and to discriminate between a "reset" and an alarm). The actual test actions and sequence will be defined by the owner.
7. Control logic to reset the system after an alarm has cleared and return system control to normal operation. The "reset" is initiated from the **OmniMonitor**® by unlatching the control relays.

VI. Earthquake Hardening

Earthquake "Hardening" is used to place the District water facilities, equipment, and personnel into the optimum configuration in anticipation of a large seismic event. Essentially, it is the answer to the question: "If you knew an earthquake was coming, what would you do?"

The Hardened configuration can then be used to design the improvements needed for an effective EEW system. The options for hardening can be divided into the following categories:

1. Close a reservoir valve to prevent the loss of water through broken downstream piping systems. A reservoir is typically closed when it is not needed for normal demands (for example there may be two reservoirs in a single pressure zone and one of the reservoirs can be closed (isolated) while the other tank remains on-line).
2. Throttle a reservoir to limit outflow through broken downstream piping systems yet still provide some supply to customers in case of a false alarm.
3. Stop running pumps using the normal shutdown sequence.
4. Stop running pumps using an emergency shutdown sequence (stop as soon as possible)

VII. Earthquake Protection (Hardening) Strategy

Water systems are natural candidates for earthquake early warning technology because water system components are so valuable (especially following an earthquake) and the assets can be protected without significant cost and without significant adverse liability. The overall hardening strategy is best illustrated in **Figure 1** through **3**.

Figure 1, System Wide Hydraulic Profile, shows the relationship of the District's major water facilities to the pressure zones (the pipes serving the customers). This Figure illustrates how water is supplied, stored, and delivered to the District's customers during normal (non-emergency) conditions. In general, water is supplied from the supply stations and pump stations to the pipes serving the customers and the excess pumped water is stored in the reservoirs. Customers are connected directly to the pipes and the reservoirs provide the appropriate pressure for each pressure-zone. The reservoirs also provide stored water for peak demand periods when the customers require more water than can be provided by the supply and pump stations.

During an earthquake, a water system's pump stations often burn (due to electrical short-circuits) and reservoirs empty (due to ruptured mains downstream from the reservoirs). This would disrupt both the short-term and long-term water service to the District's customers. During an earthquake, the pump stations would ideally be de-energized (so they do not burn), and the reservoirs isolated from the system (so they would not be emptied by ruptured mains). This "ideal" situation is not feasible, however, because false alarms would adversely affect customers (since there would be no water service from the isolated reservoirs) and require the District's mains to have to be disinfected (due to loss of pressure in the water mains). Therefore, following a **ShakeAlert™** alarm, it is necessary to leave some facilities on-line so that the mains can remain pressurized and customers can still be served with tap water in the event an alarm is a false alarm, or the earthquake is not sufficiently large enough to cause damage. This can be accomplished by strategically disengaging some facilities but leaving others engaged or partially engaged. This configuration, wherein some facilities are off, some are on, and some are partially on, will be referred to as the "Hardened" configuration. Hardening allows minimum service levels to be met (no disruption of service to customers, no need to perform O&M work after an alarm) while saving strategic facilities from earthquake damage.

Figure 2, Hardened Supply Strategy, shows how water can move through the system to all customers using the minimum number of operational facilities. For Phase 1, these are the facilities that will be hardened, or protected, following an alarm. Only some facilities need to remain in-service to supply water to most customers following an earthquake. This combination of on-line storage and operating pumping provides hydraulic gradeline service to most customers in the District.

Figure 3, Proposed Phase 1 Control Responses, shows the facilities that will be equipped with controls that react in response to a **ShakeAlert™** alarm. **The entire objective of the Earthquake Early Warning System is to get the water system to this hardened state as soon as possible following an alarm.**

The Hardened configuration is often difficult to implement and is especially difficult in the short period of time after a **ShakeAlert™** alarm is received but before shaking begins. Pump stations cannot be instantaneously stopped, in some cases they cannot be simultaneously stopped, and valves cannot be instantaneously closed. Rapid pump shutdown and rapid valve closure may cause damage in the water system due to water column separation and hydraulic pressure surges.

Figure 4, False Alarm Supply Strategy, shows how water is supplied to customers immediately following an alarm and after the system has been hardened. This primarily occurs through the existing SPU Supply Stations, which, during a false alarm will be in-service. If the alarm is a false alarm, the system is returned to normal operation by the operators and no customers are adversely affected by the false alarm. (If the alarm is not a false alarm, long-term supply is provided from the hardened facilities and it is assumed the SPU facilities are out of service).

VIII. Phasing

It is anticipated that EEW will be integrated into the District in multiple phases. The phased approach allows some benefit to be provided right away and greater benefit to be provided in the future when appropriate. The phased approach allows the District to provide some level of protection now at low cost and a greater level of protection later (at higher cost).

Phase 1 includes the work necessary to plan for EEW and to receive and process the **ShakeAlert™** early warning alarm from the USGS. The **ShakeAlert™** alarm will be connected to the District's existing water SCADA network at the District office and take actions that can be performed without the risk of damage, cost, or customer inconvenience within the watersystem. In addition, Phase 1 includes audible alarms to District personnel (cell and radio notification) so that staff can prepare for post-response triage or extricate themselves from potentially hazardous locations.

Phase 1 actions are designed to prevent the pump stations from being damaged by seismic shaking and to prevent them from catching fire. This is accomplished by stopping the rotating pumps and motors (rotating machinery has higher loads during shaking), and de-energizing the power at the pump buildings (buildings tend to burn due to sparks generated from electrically energized equipment that short-circuits during displacement). In addition, valves on the District's reservoirs will be closed to prevent the stored water in the tanks from emptying through ruptured or severed mains that are downstream from the tanks. After shaking has subsided (or if an alarm is determined to be

a false alarm) the stations will automatically restart and to the extent they are operational will continue to supply the affected zones.

This sequence is the key to fault-tolerance in the water system. If the pressure zones remain pressurized a false alarm can be accommodated without any customers knowing it occurred (see Figure 4 for a depiction of how water is supplied to customers following a false alarm and after the other facilities have been hardened).

In addition to the actions described in this report, the District should consider the following items for future phased improvements.

1. Fine tune the automatic stop and emergency stop sequences in the water pump stations (primarily through dynamic-response modeling) so that the pumps can be stopped as soon as possible without the risk of structural or hydraulic damage. This could include the installation of additional control valves to manage in-station hydraulic transients.
2. Harden hazardous material inventories or feed systems (such as chemicals for disinfection) in the Maintenance Facility.
3. Fine-tune the valve throttle setpoints on the in-service reservoirs to optimize fire-flow while minimizing potential damage from broken water mains.
4. Install remotely controlled service entrance switches at Pump Station 1 and Pump Station 2 so that power can be interrupted following an alarm.
5. Update the District's Emergency Response Plan to acknowledge and take advantage of the **ShakeAlert™** system.
6. Integrate post-quake analysis software to predict post-quake failures (structural and hydraulic) based on actual shaking patterns.
7. Perform a cost/benefit analysis of replacing strategically located water mains with large diameter earthquake-resistant pipes to improve post-quake storage volumes and deliver water to neighborhoods that may not have mobility following a quake.
8. Install flow metering capability on reservoir outlet pipes to manage and control flow throttling.
9. Complete pipeline loops to areas of the District served by single pipelines (i.e. Sheridan Beach) and replace all old cast iron pipelines in local landslide hazard or liquefaction or flood zones with earthquake resistant pipelines.
10. Harden (replace with earthquake-resistant pipes) selected pipelines within the District to connect strategic public distribution sites with the hardened reservoirs (for long-term supply following a quake).

IX. **ShakeAlert™ Connection and Control**

There are three separate and distinct steps in the chain of events that starts with an earthquake and ends with an alarm at the District SCADA system.

The **first** step is sensing and analyzing the earthquake location and its magnitude. This is accomplished by the existing **ShakeAlert™** alarm system that is currently up and running at the University of Washington

and other host universities *Step one is complete and the **ShakeAlert™** system is ready for connection and decoding.*

The **second** step is connecting to the **ShakeAlert™** alarm system at the UW and converting that alarm signal into a format that can be used by the District's SCADA system. There are two parts to this step, the connection and the signal conversion. *Step two is the work described and detailed in this predesign report.*

The **third** step is adding to, or changing, the programming in the existing SCADA system so that the control actions summarized in this report can be implemented at the District facilities. *Step three will be completed by District staff, or contractors, in conjunction with or following step 2.*

The District connects to the **ShakeAlert™** system using a "conventional" internet connection via an ethernet or coaxial cable (see **Figure 5 and 6**). Following Pilot Project approval from the USGS, the District will receive a single username and password for District-wide connection to a test server (used to test and troubleshoot the remaining hardware and software systems) and to the event server (which generates the earthquake alarms). The internet connection is secured to a specially designed PLC, called an **OmniMonitor©**, which communicates with the **ShakeAlert™** servers and with the District's water SCADA system. The **OmniMonitor©** provides the signal conversion necessary to communicate with the District's SCADA system and the control necessary to sort, prioritize and process the alarm signal so that the District has control over when an alarm is activated and when it is ignored.

The **OmniMonitor©** remains on-line 24/7 and in constant communication with the event servers at the UW. Following receipt of a **ShakeAlert™** alarm from USGS, the **OmniMonitor©** will receive electronic notification of the alarm through the internet connection. This notification includes the location of the epicenter of the quake, the expected magnitude of the shaking, and the confidence rating of the event. The **OmniMonitor©** accepts the alarm, including the expected magnitude of the event, and calculates the elapsed time before the shaking will begin at each District facility. The **OmniMonitor©** then processes this information and passes two different alarm conditions to the existing SCADA system for automatic operations at the remote facilities (see **Figure 6**). District staff (or contractors) will need to program the SCADA system to respond to the **ShakeAlert™** alarm (when appropriate) and place the water system in the targeted and optimum hardened configuration (see **Figure 3**).

Figure 3, Proposed Phase 1 Control Response, includes a summary of the control responses at each District water facility or groups of facilities. It is the intent that each operating zone in the water system responds as necessary to harden the system as depicted in **Figure 2**. It is also the intent that control algorithms be written and integrated into the existing District SCADA system (by District staff or others) to implement these control protocols. In general, four separate actions are initiated and programmed into the SCADA system. 1) stop a pump or pumps using standard shutdown processes (the same actions taken now to stop a pump), 2) stop a pump as quickly as possible without using the usual shutdown sequence (often referred to as a "dump") and disengage the power at that facility as soon as the pump has stopped, 3) close a valve, 4) throttle a valve. The application of these four actions are depicted in **Figure 3**.

See **Section III – Executive Summary** for a description of Phase 1 Hardening actions.

It should be noted that in this hardened configuration the District will likely not be able to meet conventional peak-day customer demands for water and customers are expected to minimize water use and implement water conservation practices following an emergency. Water for long-term supply will most likely need to be rationed from the hardened water reservoirs.

The **OmniMonitor**® includes a self-testing button so that the integrity of the EEW system can be monitored. This self-test should be performed weekly. In addition to the weekly self-test, the USGS will periodically issue diagnostic alarms for system testing. The District will be notified of the test alarm, in advance, via email. In addition, diagnostic alarms can be individually requested from the USGS via email.

X. Policies Related to EEW

The following policies should be considered by the District for the purposes of effectively integrating the earthquake early warning actions into the existing water system and District operations.

Hardware and Software Testing

1.1 Hardware and software should be tested at least once weekly. District staff will check, following each diagnostic test, that the test was successfully completed. The District should assign personnel to ensure that diagnostic testing is completed and the **ShakeAlert**™ system remains active. Testing will be limited to initiating a test signal (from the front panel of the **OmniMonitor**®) and ensuring that the signal is received by the appropriate RTU. Pumps and valves will not be activated or deactivated during a system test.

1.2 The District should request an EEW test from the USGS annually. This should occur at a prescribed time each year, so the event can be easily programmed and monitored. This test should occur while “on-line” with the booster pumps running so that auto shut-down sequences can be checked. The District should assign personnel to ensure that diagnostic testing is completed and the **ShakeAlert**™ system remains active.

Water Supply Allocation

2.1 For the duration of Phase 1 the District will assume fireflow is available from the Supply Stations (not the closed reservoirs) and the distribution system.

2.2 The District will use the water stored in the closed reservoirs for domestic potable use for District customers (assuming the SPU regional waterlines are not operable). If the piping system is compromised or unserviceable, customers may need to obtain water by walking into the reservoir site and filling a portable container.

Post-Earthquake Response

3.1 Following an EEW alarm, the District’s SCADA alarm system should issue an audible and visual warning of the EEW alarm and automatically perform the actions summarized earlier in this document. When an alarm occurs, District staff should assume the alarm is valid and allow the automatic actions to proceed.

3.2 If the time to shaking has elapsed, and no shaking is noticed, District staff will manually override the EEW signal and cancel the

alarm actions that were initiated by the alarm signal.

3.3 If the time to shaking has elapsed, and shaking is observed, District staff will take appropriate emergency response based on the District’s existing protocol and emergency response procedures. In other words, the system will be automatically hardened, and District staff can concentrate on other post-earthquake actions and remediation.

3.4 As soon as possible after an earthquake, District staff will assess the damage in the supply and distribution system and decide whether to return the SCADA system to routine operations or leave the system disabled (with the intent to preserve as much stored water as possible for long-term emergency supply needs).

3.5 If it is determined that the EEW alarm was a false alarm, District staff will notify the USGS via phone or email.

Regional Participation

4.1 The District will assign a contact person to coordinate with adjacent purveyors and the USGS and share data and experiences regarding EEW so that the regional system, and regional benefits, can be improved.

Administration

5.1 The District will include earthquake early warning in future Water System Plan updates and include those capital projects necessary to optimize the protection available from early warning technology.

5.2 The District will periodically assess the current state of the art in early warning technology and implement updates deemed to provide positive return on investment.

XI. Budget

The first phase of implementation primarily consists of the planning necessary to effectively adopt early warning technology (this report), making application to USGS to access the alarm signal, purchasing the necessary hardware (**OmniMonitor**®), programming the SCADA system to automatically respond to an alarm signal and equipping the Phase 1 facilities with the modifications necessary. The anticipated cost for these actions is listed below. (Phase 2 budget estimates will be refined after Phase 1 is complete and the scope of Phase 2 can be refined based on Phase 1 experience).

Phase 1

System-Wide Costs	\$80,000
Reservoir Upgrades	\$10,000
Pump Station Upgrades	\$30,000
Subtotal	<u>\$120,000</u>
Phase 1 Budget	<u>\$120,000¹</u>

XII. Schedule

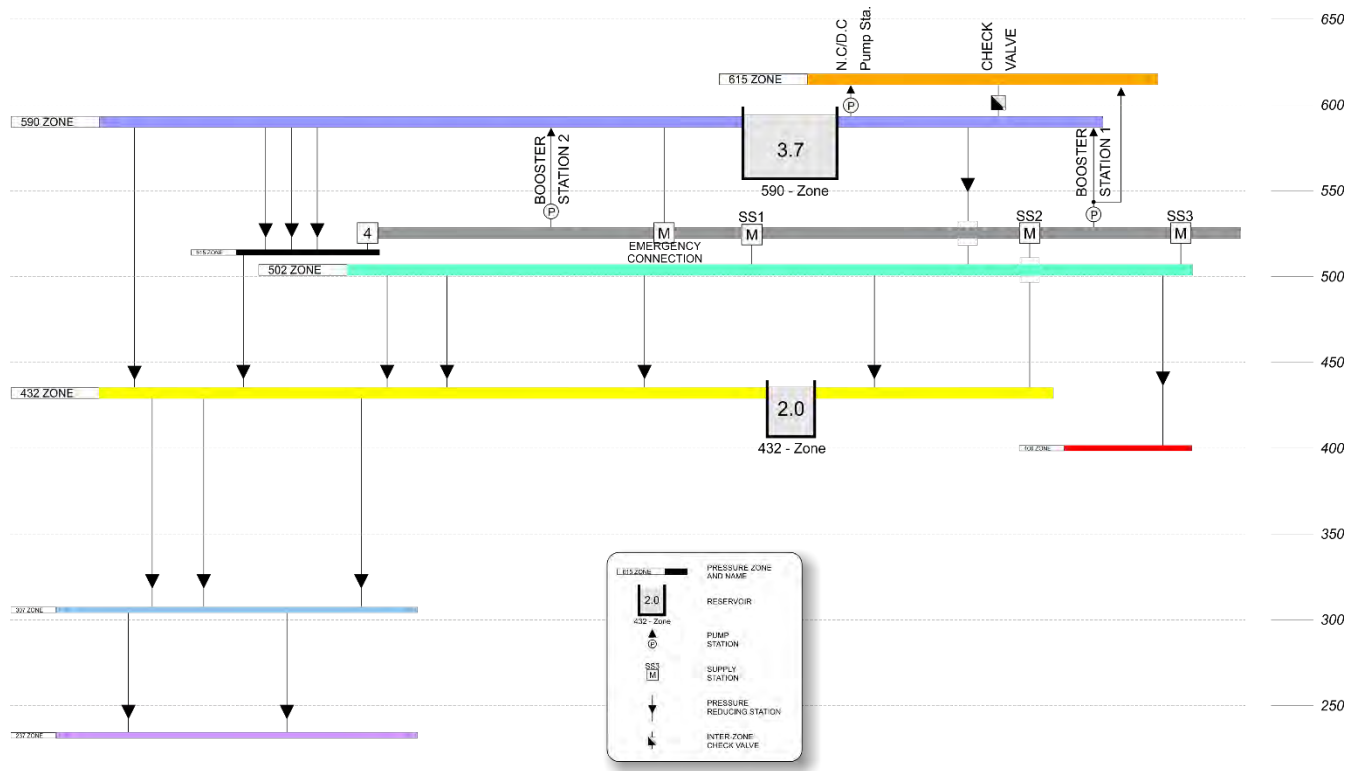
Phase 1 should be completed as soon as possible following acceptance of the Pilot Project approval from the USGS. The cost to implement Earthquake Early Warning protection is small and the benefits are large.

¹ Does not include monthly O&M costs to maintain the **OmniMonitor**® and provide support and software updates (estimated at \$150/month).

District staff believe they can be online and operational for Phase 1 improvements within 3 months of approval of the Pilot Application from USGS.

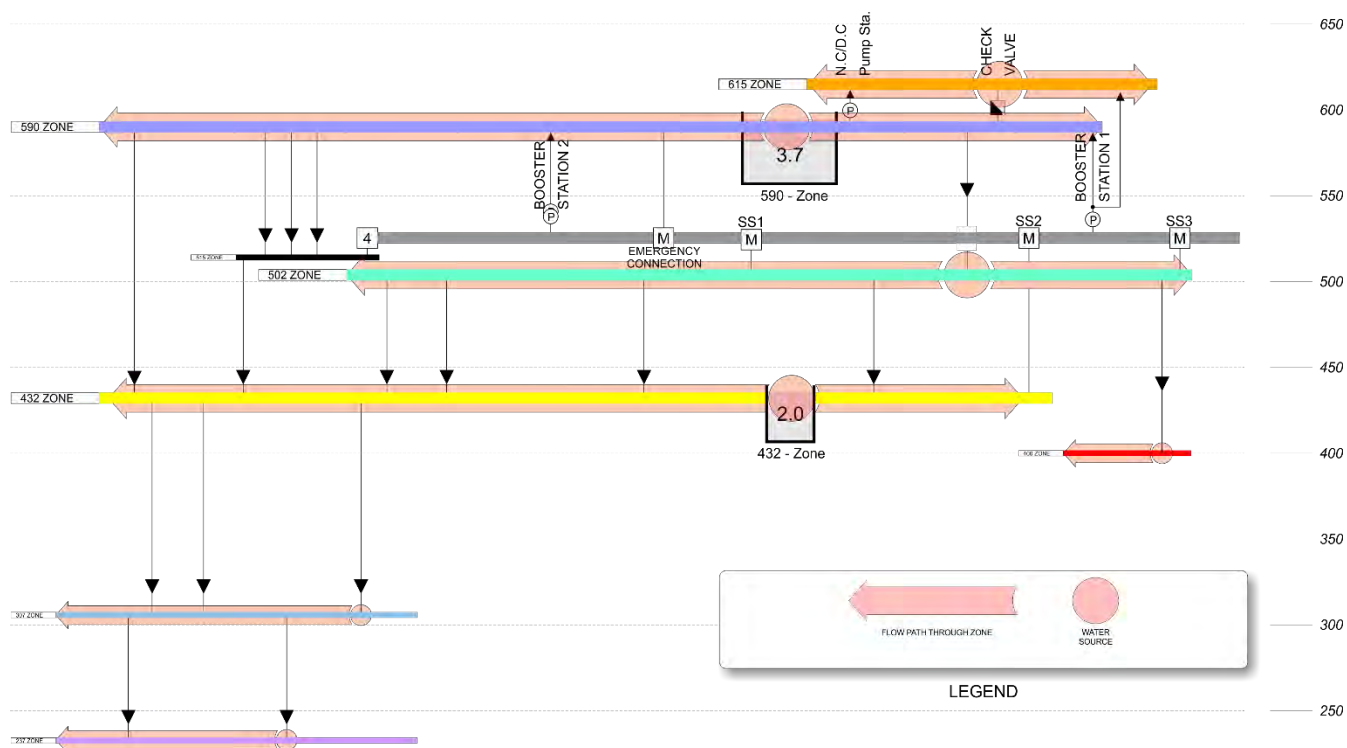
Following review and acceptance of this predesign report, Varius should be given notice to proceed for the USGS Pilot Application to be completed and submitted to the USGS.

Figure 1 – System-Wide Hydraulic Profile



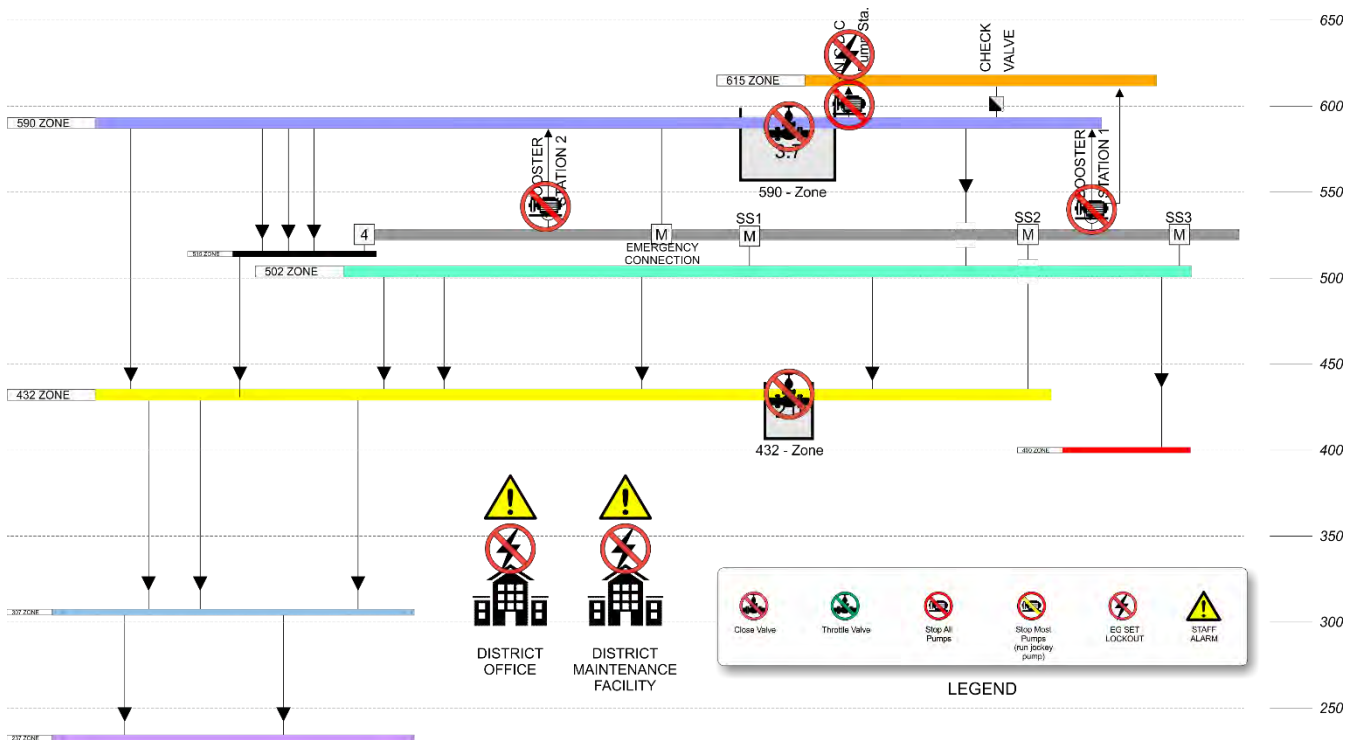
Water moves vertically (higher and lower elevations) through the system via booster and pump stations (by adding energy) or pressure reducing valves (by dissipating energy). Water is stored in reservoirs to equalize the difference between the demand for water and the supply of water (filling when demand is low and emptying when demand is high). Water moves to customer services through pipes that connect the supply and storage facilities to customer meters. Pipes operate at uniform hydraulic gradeline within each pressure zone (not including dynamic losses).

Figure 2 – Hardened Supply Strategy



Following an alarm, and after the hardening actions have been completed, long-term domestic water is supplied from select facilities shown above with the circle overlay. Reservoirs and supply facilities without the circle overlay will be used to meet fire demands and first-responder needs.

Figure 3 – Proposed Phase 1 Control Responses (hardening actions)



The **Phase 1** control responses, following an EEW alarm, include the following (all items happen simultaneously following an alarm):

432 Zone:

- Close – 432 Reservoir
- Throttle – NA
- Stop Pumps – NA
- Take no action – Supply Station 2
- False Alarm Supply – 502 Zone via PRVs

502 Zone:

- Close – NA
- Throttle – NA
- Stop Pumps – NA
- Take no action – Supply Station 1, Supply Station 3
- False Alarm Supply – Supply Station 1 and Supply Station 3

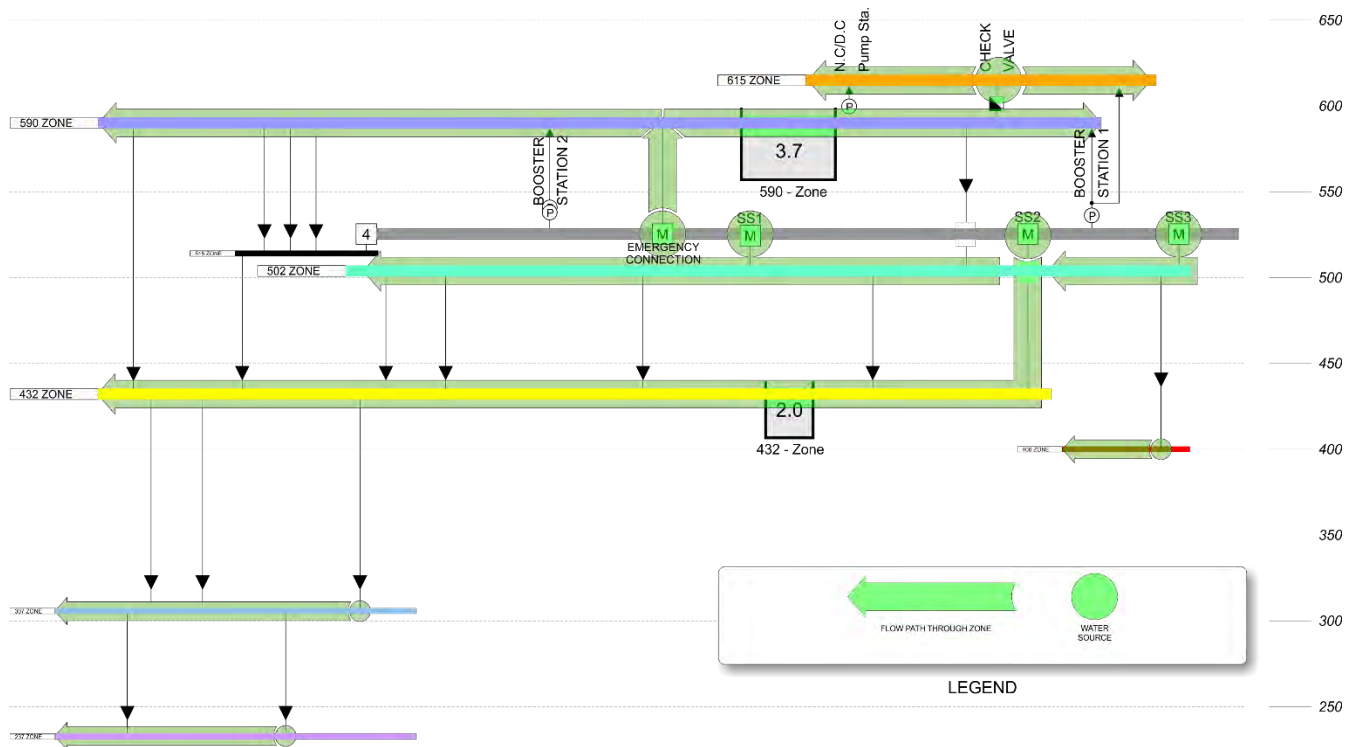
590 Zone:

- Close – 590 Reservoir
- Throttle – NA
- Stop Pumps – Pump Station 1, Pump Station 2
- Take no action – Supply Station 4
- False Alarm Supply – Supply Station 4

615 Zone:

- Close – NA
- Throttle – NA
- Stop Pumps – North City/Denny Clouse Pump Station
- Take no action - NA
- False Alarm Supply – 590 Zone Via Check Valve

Figure 4 – False Alarm Supply Strategy



If an alarm is a false alarm, and after the water system hardening actions have been completed, water is supplied to customers from the facilities shown above with the circle overlay. Reservoirs and supply facilities without the circle overlay have been hardened to reserve water and supply for post-quake purposes. After the alarm has been determined to be a false alarm, the system is returned to normal operation.

Table 1 - Budget Estimate Phase 1

System-Wide Costs (One-time expenses)		
Predesign Report, USGS Application (Varius)	\$	45,000
OmniMonitor (Purchase, Installation, Startup) (Varius, Weir-Jones)	\$	15,000
SCADA System Connection to OmniMonitor (SI)	\$	5,000
SCADA System MTU Programming (SI)	\$	15,000
Subtotal	\$	80,000
Typical Reservoir Site Costs		
ShakeAlert Integration, Valve Throttle Control Logic (Varius)	\$	1,500
SCADA Design (SI)	\$	1,500
RTU Programming, startup, debugging (SI)	\$	2,000
Subtotal (ea)	\$	5,000
Subtotal (2 sites required)	\$	10,000
Typical Pump Station Site Costs		
ShakeAlert Integration, Pump Control Logic (Varius)	\$	2,500
SCADA Design (SI)	\$	2,500
RTU Programming, startup, debugging (QCC)	\$	5,000
Subtotal	\$	10,000
Subtotal (3 sites required)	\$	30,000
Subtotal	\$	120,000
Total (Phase 1)	\$	120,000

Note: the cost estimates shown include the costs to bring the ShakeAlert alarm into the District, connect the alarm to the existing SCADA system, and program the existing SCADA system (including the RTU and MTU) to accept and process the alarm. The costs do not include any work necessary at each site (valve modifications, valve additions, transfer switch additions, bypass piping, etc.). "SI" refers to work performed by and incurred by the system integrator.

Table 2 – Affected Facility Locations

FACILITY	Location
District Office (SCADA Master)	47°45'26"N , 122°18'44"W
Maintenance Facility	47°44'35"N , 122°18'49"W
432 Zone Reservoir	47°46'17"N , 122°17'02"W
590 Zone Reservoir	47°45'35"N , 122°18'41"W
Pump Station 1	47°45'18"N , 122°19'15"W
Pump Station 2	47°45'47"N , 122°19'14"W
North City/Denny Clouse Pump Station	47°45'35"N , 122°17'02"W

Figure 5 – System Connection Block Diagram

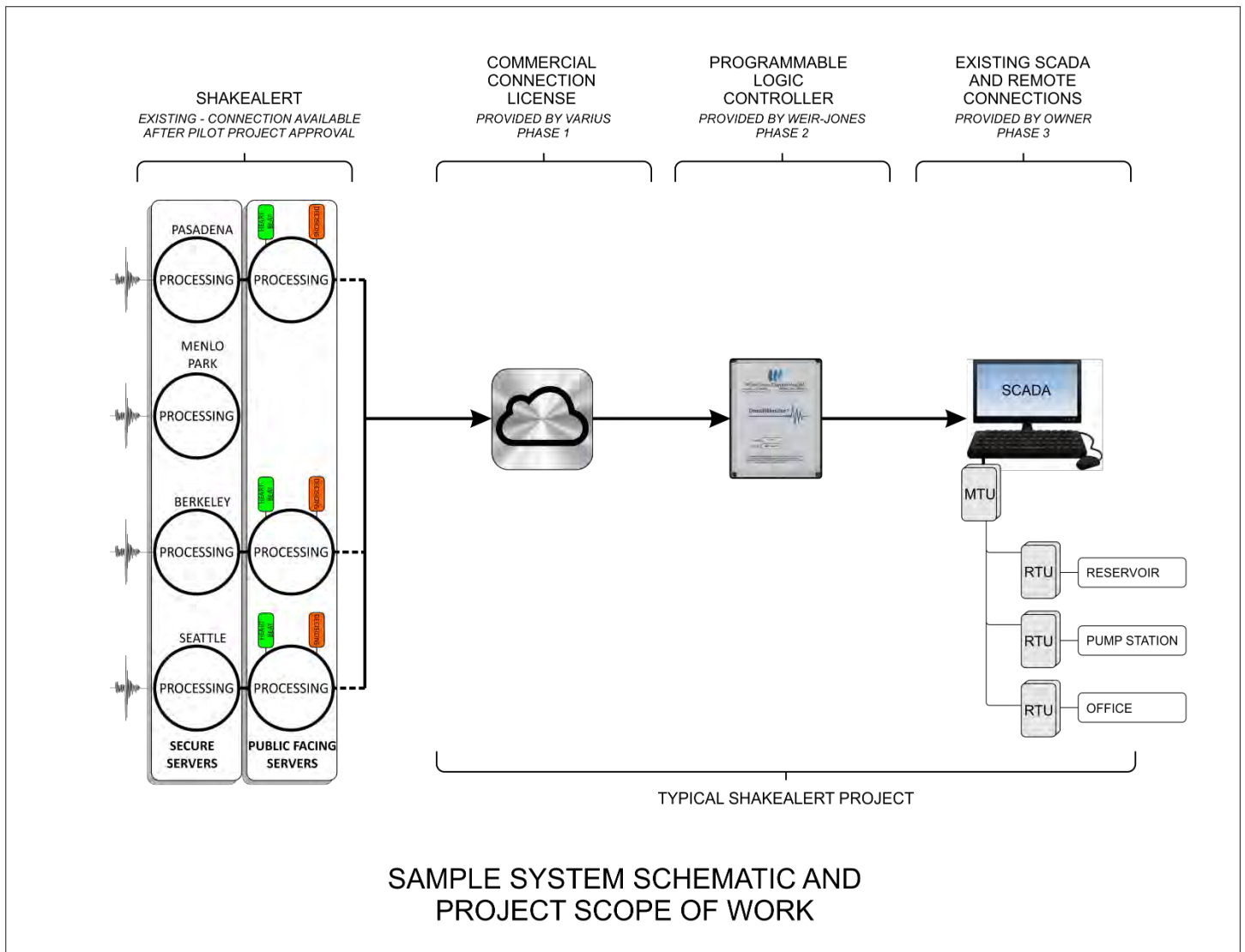
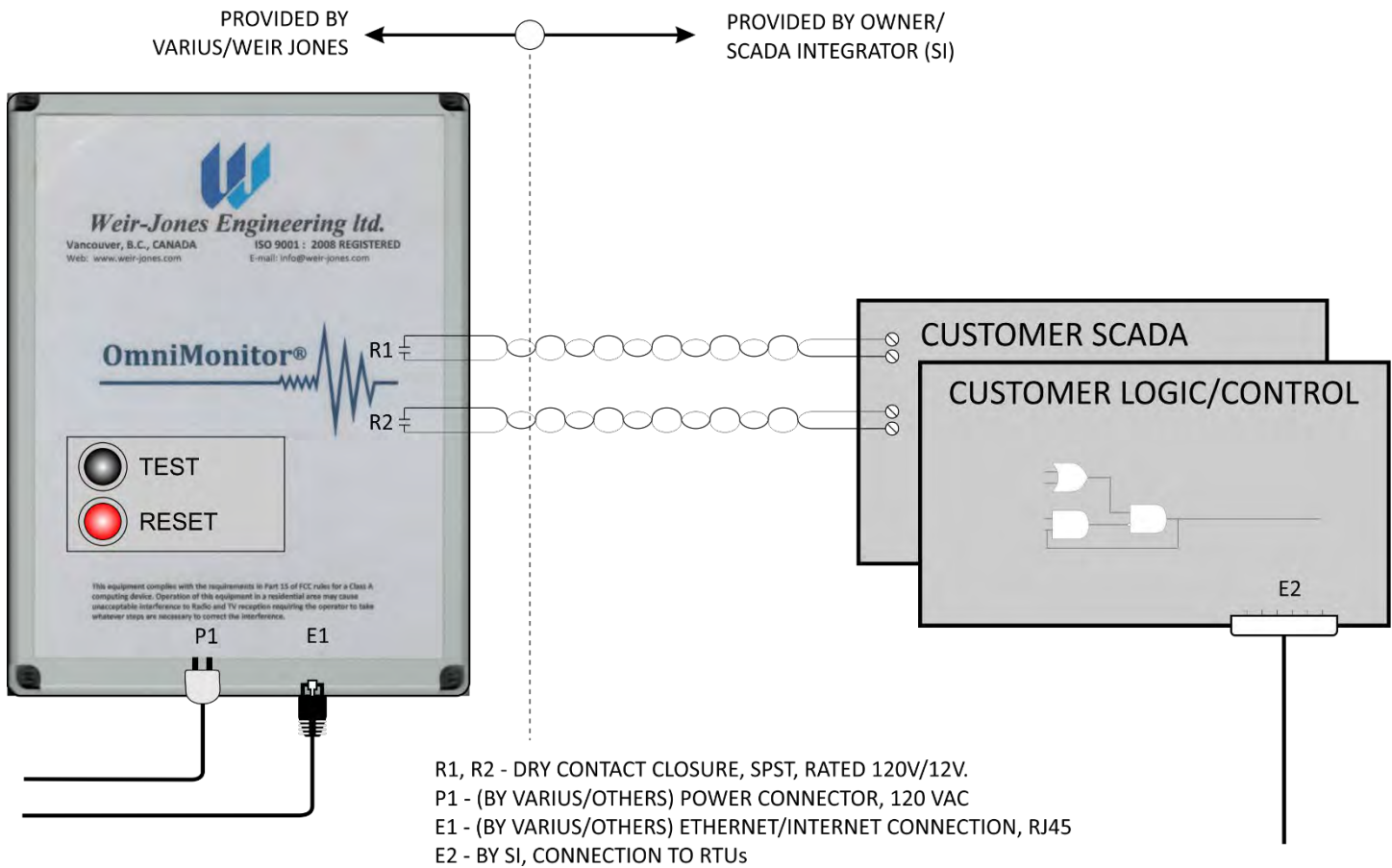
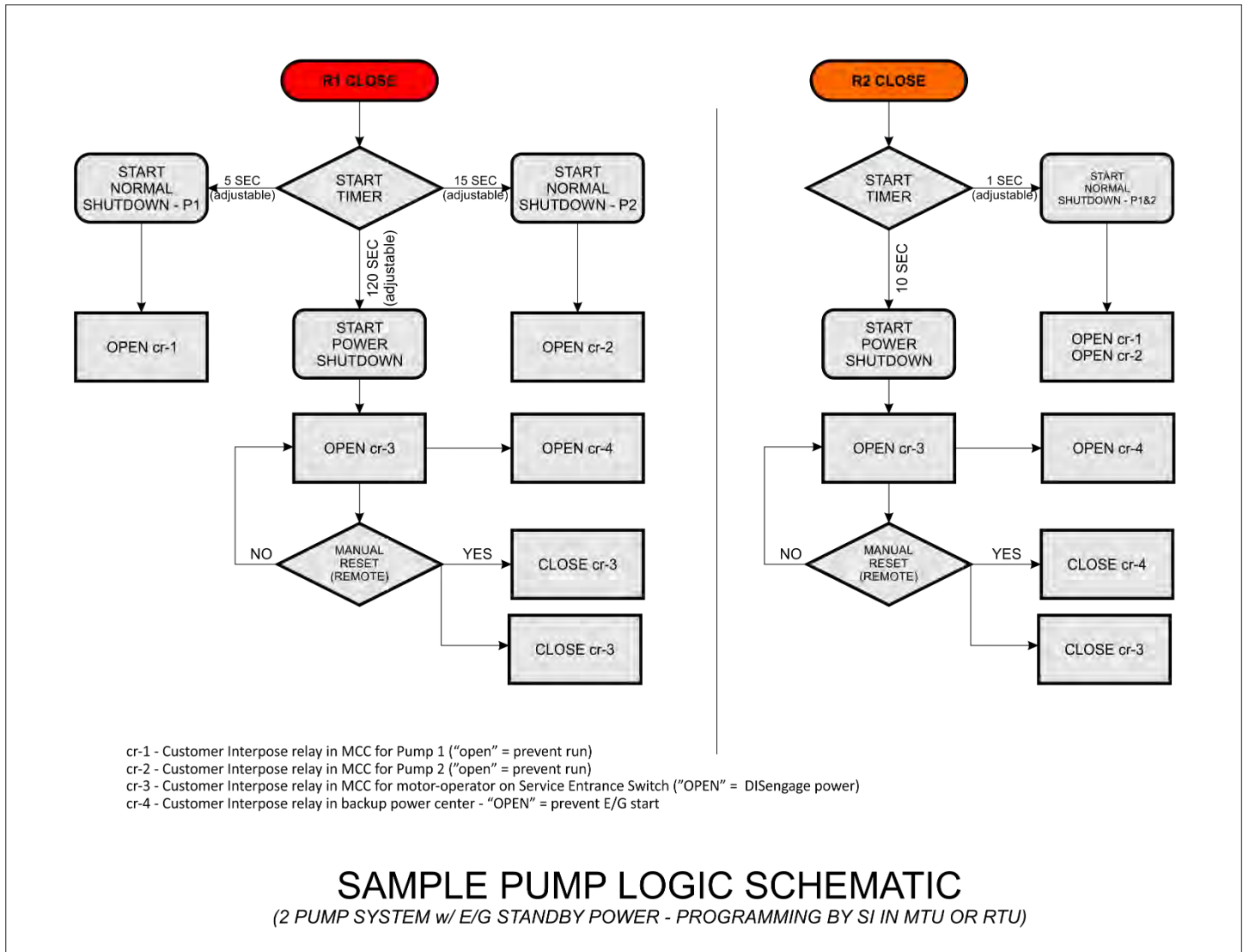


Figure 6 – Sample Connection Schematic



Connection to the USGS alarm occurs using the **OmniMonitor**® which will be purchased by the District and programmed by Varius. The **OmniMonitor**® will pass alarms to the existing SCADA system which will be reprogrammed to accept the alarms and activate specific shutdown and hardening functions in the District facilities (pump stations, reservoirs).

Figure 7 – Sample Logic Schematic

This is a sample of the information provided to the District SCADA Integrator to use for programming Pump Shutdown following an alarm. Similar logic diagrams will be provided for all District facilities that are designated to react to early-warning alarms.

America's Water Infrastructure Act (AWIA)

Risk & Resiliency Assessment Emergency Response Plan

Overview

- AWIA Section 2013 (a)-(f)
 - Replaces requirements from 2002 Bioterrorism Act
 - Community water systems serving more than 3,300 people
 - Focus on risk, resilience, and emergency management from all threats
 - Risk & Resilience Assessment
 - Emergency Response Plan
 - Submit certification to EPA by deadline
 - Re-certify every 5 years

What is Risk and Resilience?

- Risk = Threat x Vulnerability x Consequences
- Resilience
 - Comprehensively reduces risks and improves response capabilities.
 - Promotes adaptive learning
 - Identifies disparate impacts
 - Addresses long-term risks

Risk & Resilience Assessments

- Description of Risks and Resilience
 - Source Water
 - Water Collection and Intake
 - (Pre) Treatment
 - Storage and Distribution Facilities
 - Physical Barriers
 - Electronic, Computer, and other Automated Systems
 - Monitoring Practices
 - Financial Infrastructure
 - Use, Storage, and Handling of Chemicals
 - Operations and Maintenance
 - Capital and Operational Needs (optional)

EPA Threat Categories

Assault on Utility-Physical

Contamination of Finished Water-Accidental

Contamination of Finished Water- Intentional

Theft or Diversion- Physical

Cyber Attack- Business Enterprise

Cyber Attack- Process Controls

Sabotage- Physical

Contamination of Source Water-Accidental

Contamination of Source Water-Intentional



Emergency Response Plans

- Strategies and resources to improve resilience
- Plans, procedures, and equipment for responding to a malevolent act or natural hazard
- Actions, procedures, and equipment to lessen the impact of a malevolent act or natural hazard, including:
 - Alternative source water
 - Relocation of intakes
 - Flood protection barriers
- Strategies to detect malevolent acts or natural hazards that threaten security or resilience

Certification Deadlines

Population Served	Risk Assessment	Emergency Response Plan
≥ 100,000	March 31, 2020	6 months After Risk Assessment Submission
50,000-99,999	December 31, 2020	6 months After Risk Assessment Submission
3,301-49,999	June 30, 2021	6 months After Risk Assessment Submission

Certification Process

- Online portal, email, or regular mail
- Online portal preferred
- Submission forms and details:

<https://www.epa.gov/waterresilience/how-certify-your-risk-and-resilience-assessment-or-emergency-response-plan>

SPU's Plans

- What do we have, and what do we want to achieve
- Build on existing documents and analyses
 - 2019 Water System Plan
 - 2019 Cyber Security Assessment
 - 2019 Risk & Resiliency Report to Council
 - 2018 Water Seismic Study
 - 2018 Water Long Term Vision
 - 2015 Hazard Identification Vulnerability Assessment (HIVA)
 - Ongoing physical security assessments
 - Ongoing Asset Management Plans

SPU's Risk & Resiliency Assessment and Framework Report

- Types of Risks
 - Earthquake
 - Climate change
 - Aging Infrastructure
 - Cyberattack and Terrorism
 - Economy and Markets
 - Technology
 - Workforce
- Assess vulnerabilities, identify new risks, develop strategies
- Optimize investments, address multiple risks, focus on affordability

Looking Forward: Going Beyond EPA Requirements

- Divide chapters by expertise
- Timeline: Work backwards from due date
- Sensitive information
- Sharing Lessons learned

Additional Considerations

- Coordination with local emergency planning committees
- 5-year review and revision
- Records maintenance
- Use of previous assessments and ERPs
- Standards and Tools
- Important documents
 - Baseline Information on Malevolent Acts for Community Water Systems
<https://www.epa.gov/waterriskassessment/baseline-information-malevolent-acts-community-water-systems>
 - Vulnerability Self-Assessment Tool
<https://www.epa.gov/waterriskassessment/conduct-drinking-water-or-wastewater-utility-risk-assessment>

EPA Contacts and Links

EPA Contacts

Nushat Dyson, Water Security

Dyson.Nushat@epa.gov

Dawn Ison, Emergency Notification

Ison.Dawn@epa.gov

Steve Allgeier, Chemical Inventory Availability

Allgeier.Steve@epa.gov

Useful Links

Drinking Water & Wastewater Resilience

<https://www.epa.gov/waterresilience>

AWIA: Risk Assessments & Emergency Response Plans

<https://www.epa.gov/waterresilience/americas-water-infrastructure-act-risk-assessments-and-emergency-response-plans>

Vulnerability Self- Assessment Tool (VSAT)

<https://www.epa.gov/waterriskassessment/conduct-drinking-water-or-wastewater-utility-risk-assessment>

Baseline Information on Malevolent Acts for Community Water Systems

<https://www.epa.gov/waterriskassessment/baseline-information-malevolent-acts-community-water-systems>

Questions and Discussion

Water Supply Forum Resiliency Project Results and Next Steps

2/7/2019

Seattle Public Utilities

Water Supply Forum

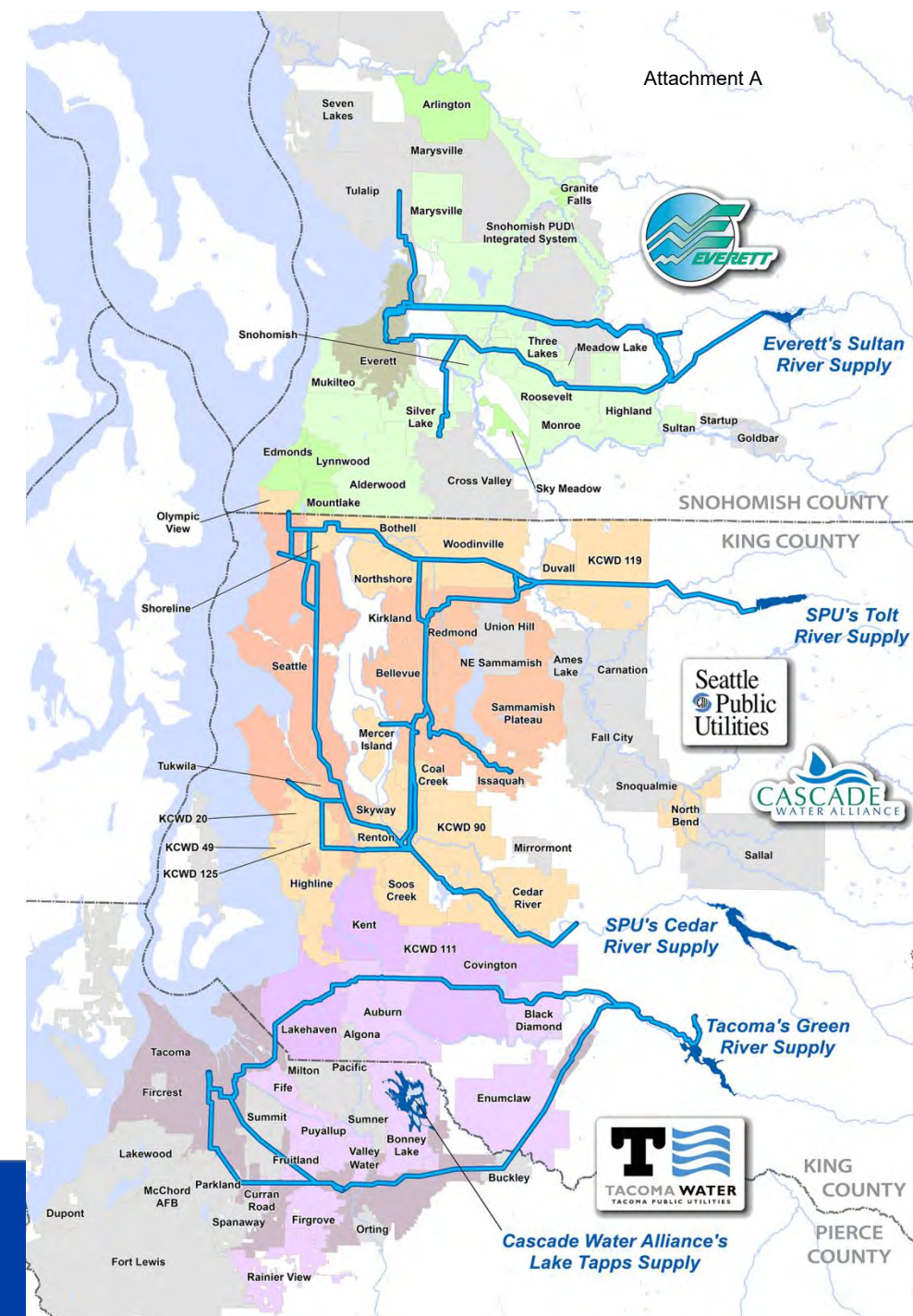
VISION

Provide leadership, from the utility perspective, on current and future regional water supply and related water resources issues in King, Pierce and Snohomish counties.

MISSION

Provide a venue for policy discussions on critical water supply and stewardship issues while sharing utility perspectives and insights with regional stakeholders.

The Forum provides members and the public with a portal for water supply and related water resource issues.



Resiliency Project Phase I Overview

Attachment A

Preparing for Water Supply Disruption



EARTHQUAKE



WATER QUALITY



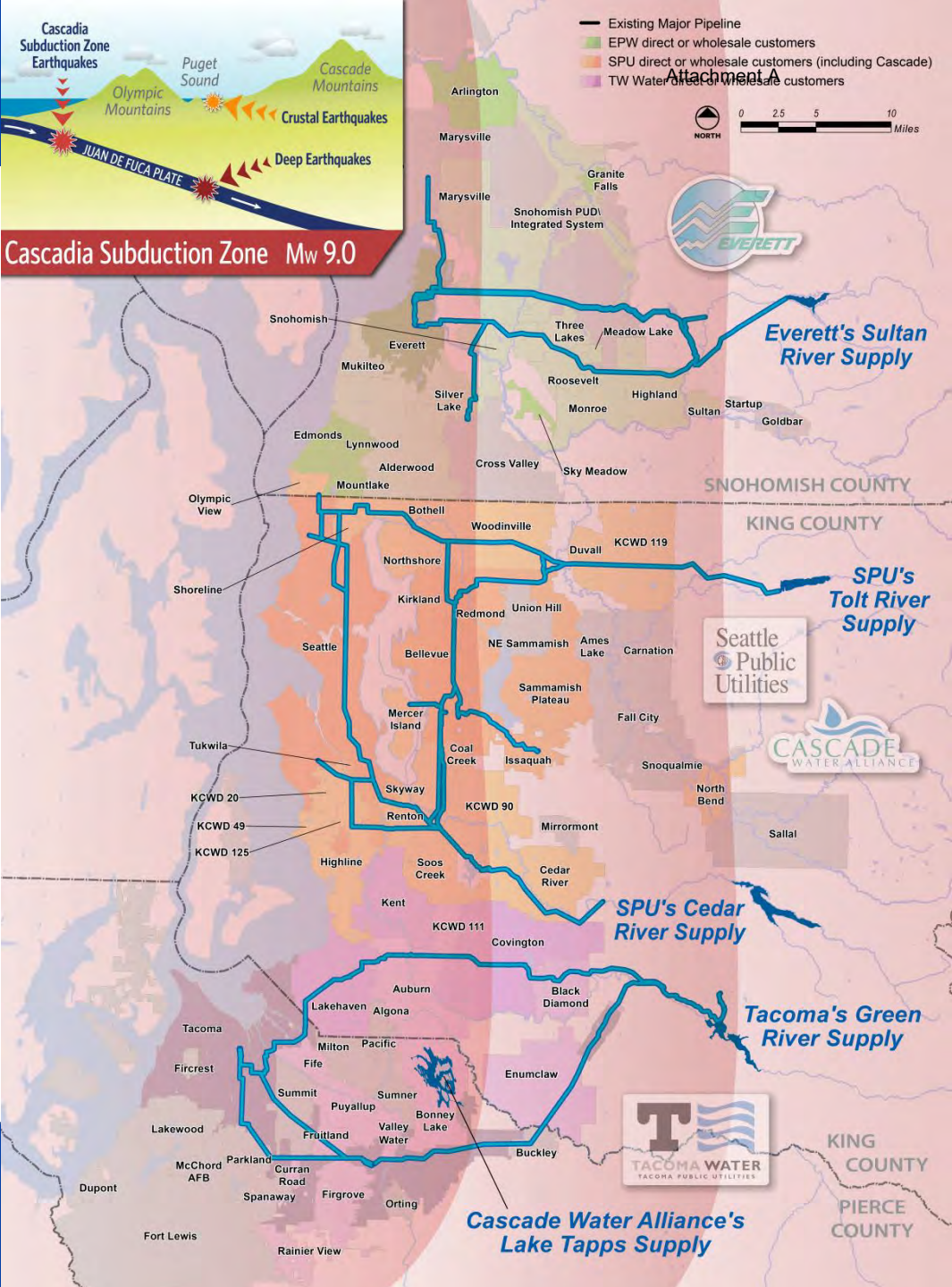
CLIMATE CHANGE



DROUGHT

EARTHQUAKE RESILIENCY

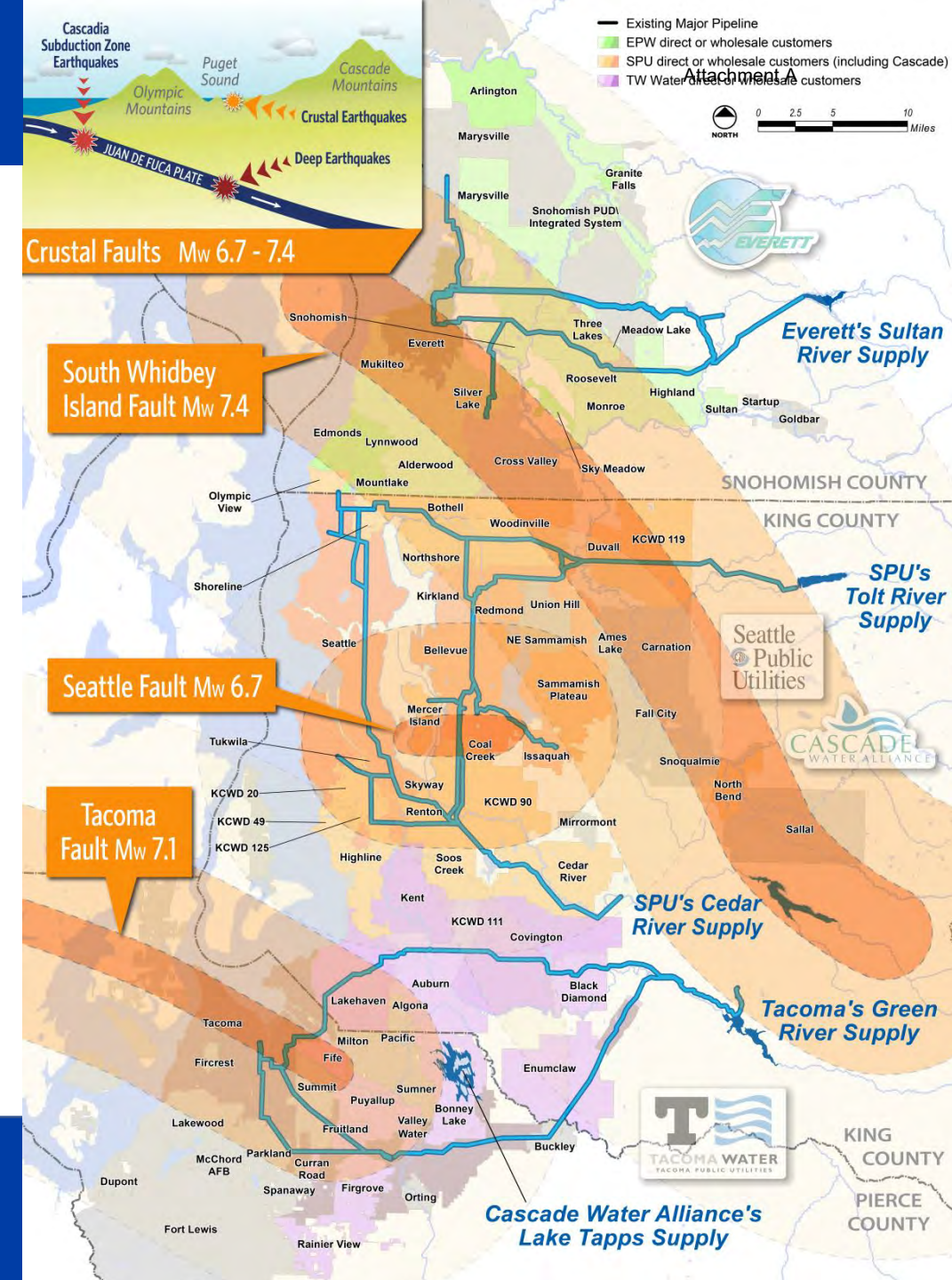
Cascadia Subduction Zone



EARTHQUAKE RESILIENCY

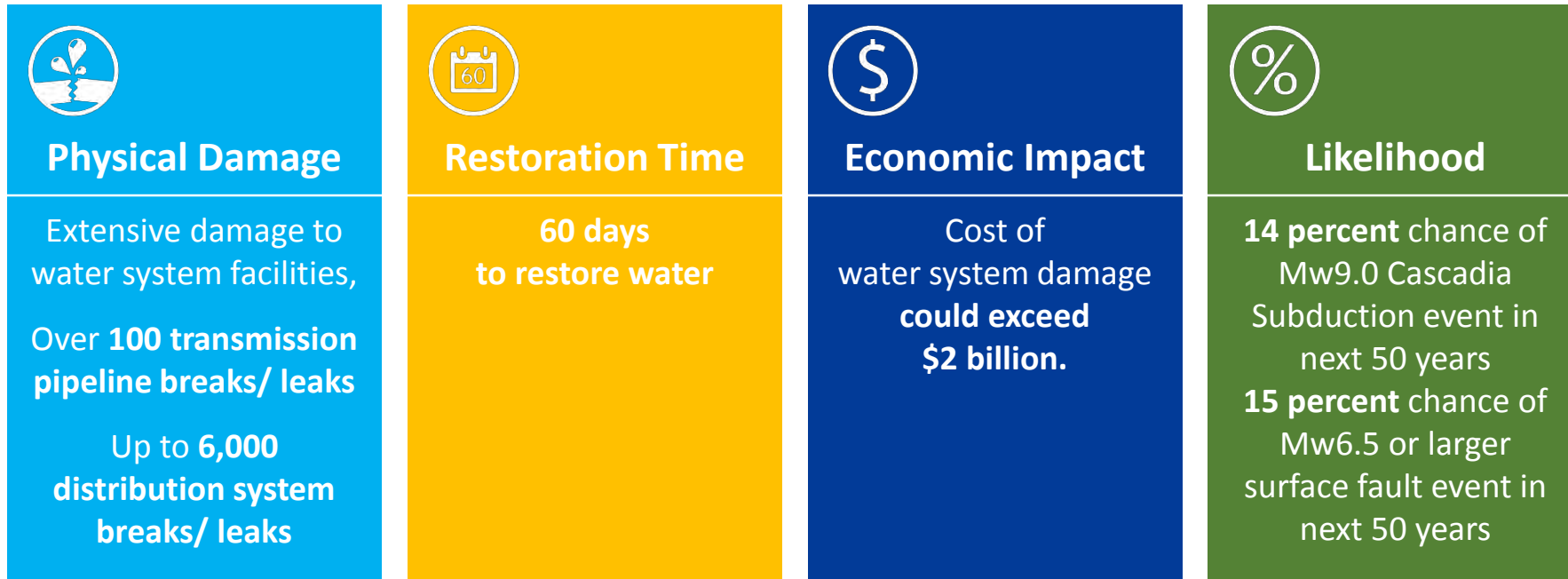
SURFACE FAULTS:

- South Whidbey Island Fault
- Seattle Fault
- Tacoma Fault



EARTHQUAKE RESILIENCY

Attachment A



WATER QUALITY RESILIENCY

Attachment A



WATER QUALITY RESILIENCY

Attachment A

- Wildfire Impacts
- Volcanic Eruption Impacts
- Supply Chain Disruption
- Accidental Contamination
- Severe Adverse Weather
- Earthquakes



DROUGHT RESILIENCY

Attachment A

Surface Water Assessment

- Historical drought scenario
- Extreme drought scenario

Groundwater Assessment

- Aquifer susceptibility
- Potential mitigation options

Drought Survey

- Surveyed 45 water utilities in the central Puget Sound region

DROUGHT RESILIENCY

Attachment A

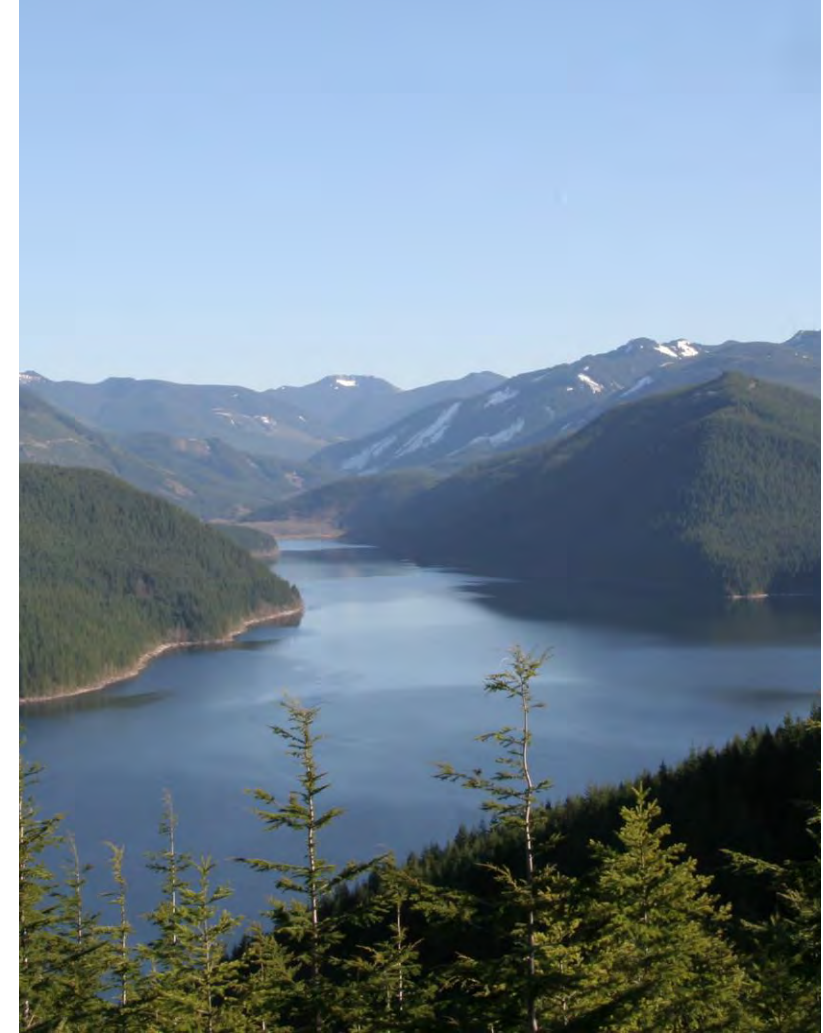
- Historical Drought Scenario: Sufficient supply to meet future demands if the worst drought on record (1987) repeated itself.
- Extreme Drought Scenario: Unable to meet future demands if reservoir inflow were ~25 percent lower than 1987 drought conditions.
- Groundwater Resiliency: Less vulnerable to drought than surface water.
- Drought Survey: Measures have been implemented to address drought.



CLIMATE CHANGE RESILIENCY

Attachment A

- Surface Water Assessment
- Groundwater Assessment
- Climate Migration Study
- Water Quality Literature Review
- Wildfire Assessment



CLIMATE CHANGE RESILIENCY

Attachment A

Surface Water

- Water availability may be significantly reduced
- Impacts to surface water will be similar throughout the region

Groundwater Resources

- Less risk to groundwater resources
- Sea level rise poses little or no risk

Climate migration

is unlikely

Water quality

will be degraded

Likelihood

frequency will increase

Resiliency Project Phase II Overview



EARTHQUAKE



WATER QUALITY



CLIMATE CHANGE



EMERGENCY SUPPLY



LIFELINE SECTORS



ACTION PLAN

EARTHQUAKE RISK

Attachment A

Post-Event LOS

- Time to restore services
- Earthquake type (i.e., crustal vs. CSZ)
- Planning horizon (20 years vs. 50 years)
- Funding level (basic, moderate, aggressive)

Preparedness & Response

- Transmission line repair materials
- Access to specialized personnel
- Tanker truck availability for emergency supply

Mitigation Strategies

- Isolation of vulnerable areas
- Seismic retrofit and replacement of vulnerable pipe

WATER QUALITY RISK

Attachment A

“Break-the-System”

Wildfire Impacts Volcanic Eruption Impacts
Supply Chain Disruption Accidental Contamination
Severe Adverse Weather Earthquakes



Template for Utilities Restoring Potability



Emergency Communications Planning Template

Do's and Don'ts for Using Climate Science



- When designing a study



- When selecting models



- When interpreting climate change data



EMERGENCY SHORT-TERM WATER SUPPLIES

Attachment A

Critical Needs

- Fire Flows
- Hospitals
- Vulnerable Populations
- Domestic Needs

Alternative Supplies

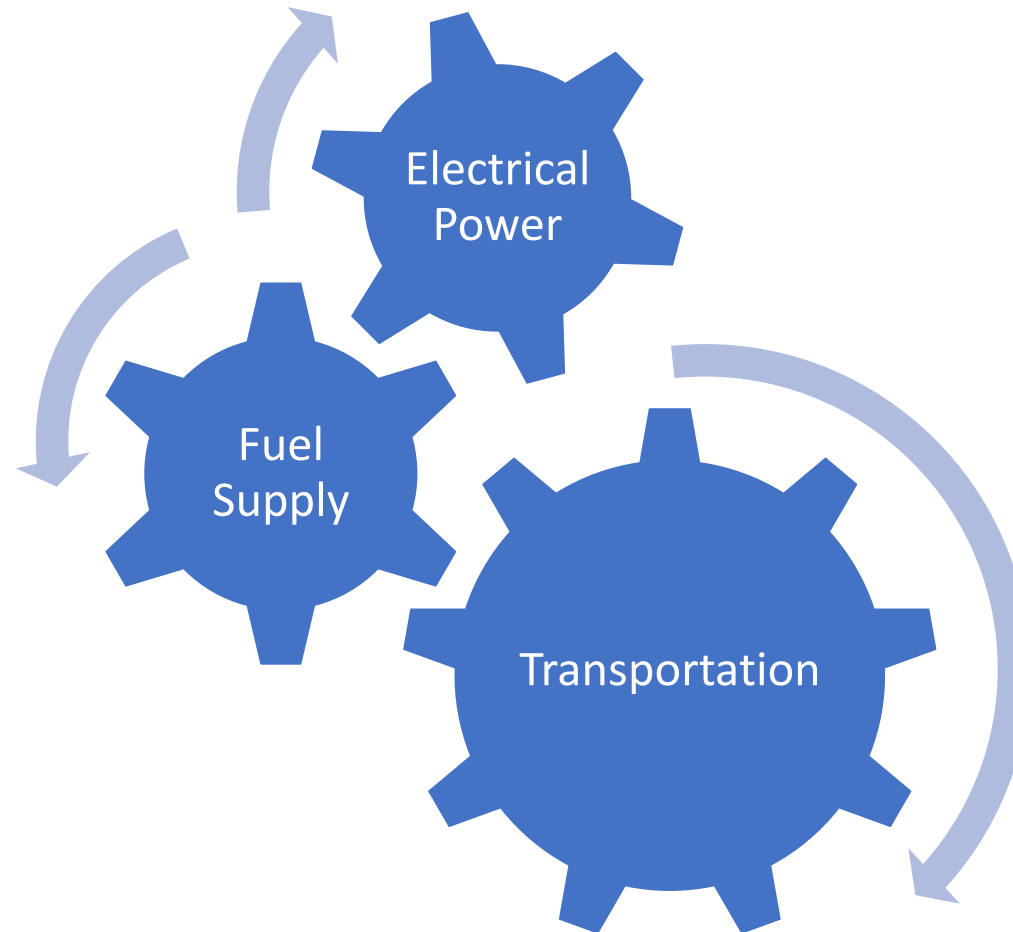
- Bottled water deliveries
- Public and private wells
- Tanker trucks and bladders
- Public utility reservoirs
- Rivers, lakes, and seawater
- Truck- or ship-mounted filtration plant
- Rainwater

Utility Roles and Coordination with
Emergency Response Entities

Mapping of Emergency Wells

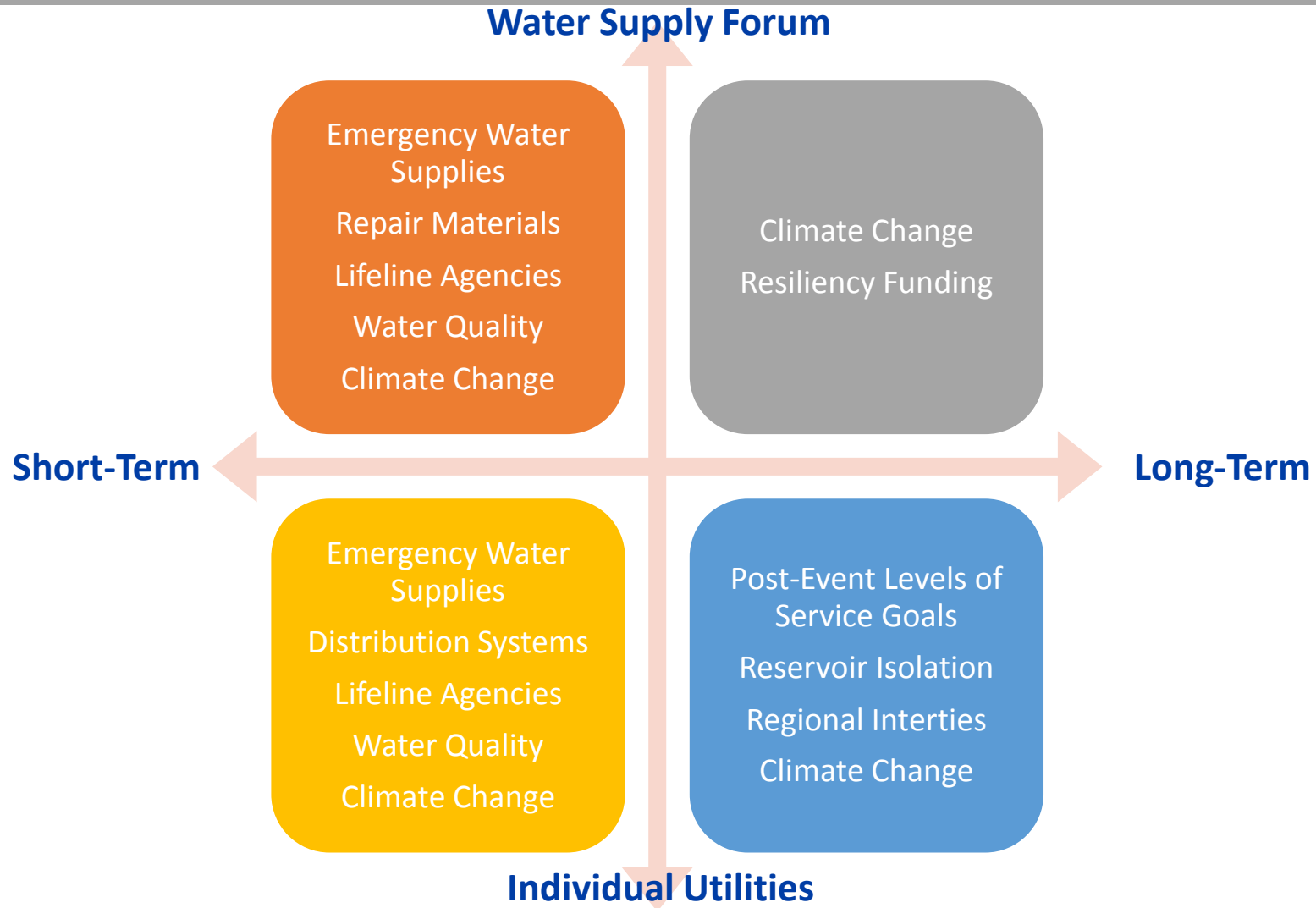
Coordination with Other Lifeline Services

Attachment A



Action Plan

Attachment A



NORTH CITY WATER DISTRICT

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1519 NE 177th St. • P.O. Box 55367 • Shoreline, WA 98155 • Phone: 206.362.8100 • Fax: 206.361.0629

August 6, 2020

Commissioners:

Ron Ricker

Charlotte Haines

Patricia Hale

District Manager:

Diane Pottinger, P.E.

Jae Hill
King County UTRC Chair
Department of Local Services
35030 SE Douglas St. #210
Snoqualmie, WA 98065

SENT VIA EMAIL

RE: North City Water District Water System Plan
File 2020-0722

Dear Jae:

Thank you for your comments dated July 22 regarding our water system plan. In regards to the four pages referenced (ES-7, 1-10, 1-11 and 2-1), the North City Water District ("the District" or "NCWD") has been providing water service along both the eastern and western boundaries of the District since the early to mid-1950s. The parcels along the western boundary are not part of the Seattle Public Utilities service area, which provides services generally west of the NCWD in the City of Shoreline.

Along the eastern part of the District, there are two specific areas that are within the corporate boundaries of Lake Forest Park Water District ("LFPWD"). The following are the King County Parcels that are in each of these areas.

Northern area

4023500211
4023500212
4023500215
4023500216
4023500217
4023500220
4023500225
4023500226
4023500227
4023500228
4023500229

Southern Area:

4023500465
4023500590
4023500595
4023500600
4023500605
4023500610
4023500635
4023500640
4023500645
4023500650
4023500700

There is an area between both Districts that is not in either District's corporate boundaries along the southern part of NE 178th Street between Brookside Ave and Ballinger Way NE. Ten of the following 12 parcels have been served by King County Water District No. 42, the oldest since 1954. Three parcels 1154100115, 1154100116, and 1154100005, are served by Lake Forest Park Water District. Parcel 11541000010 is currently being developed and will be served by LFPWD.

1154100660
1154100135
1154100130
1154100125
1154100120
1154100115
1154100116
1154100110
1154100105
1154100100
1154100010*
1154100005

LFPWD is currently serving two parcel within the North City Water District boundaries:

4023501233
4023501235

The District has had some preliminary discussions with LFPWD about which district is the more appropriate water provider for these specific parcels. North City Water District is open to further discussions with LFPWD about these areas at some time in the future. We recognize that the corporate boundaries and/or the water purveyor may change at one or more of these parcels but getting these boundaries straightened out has taken a backseat to other more urgent projects within both Districts. For now, we propose simply identifying the parcels in question and agreeing to address these questions in the future.

Sincerely,

A handwritten signature in blue ink, appearing to read "Diane Pottinger", written in a cursive style.

Diane Pottinger, PE
District Manager

Certificate Of Completion

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Status: Completed

Subject: Please DocuSign: Ordinance 19266.docx

Source Envelope:

Document Pages: 4

Signatures: 3

Envelope Originator:

Certificate Pages: 5

Initials: 0

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401 5th Ave

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Suite 100

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Seattle, WA 98104

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claudia.balducci@kingcounty.gov

King County General (ITD)

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angel.allende@kingcounty.gov

Deputy Clerk of the Council

King County Council

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(None)

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Angel Allende for Melani Pedroza

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dow.constantine@kingcounty.gov

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Dow Constantine

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Editor Delivery Events

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Agent Delivery Events

Status

Timestamp

Intermediary Delivery Events

Status

Timestamp

Certified Delivery Events	Status	Timestamp
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Carbon Copy Events	Status	Timestamp
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Notary Events	Signature	Timestamp
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Completed	Security Checked	4/15/2021 1:14:56 PM

Payment Events	Status	Timestamps
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- i. decline to sign a document from within your DocuSign session, and on the subsequent page, select the check-box indicating you wish to withdraw your consent, or you may;
- ii. send us an e-mail to bob.johnson@kingcounty.gov and in the body of such request you must state your e-mail, full name, US Postal Address, and telephone number. We do not need any other information from you to withdraw consent.. The consequences of your withdrawing consent for online documents will be that transactions may take a longer time to process..

Required hardware and software

Operating Systems:	Windows® 2000, Windows® XP, Windows Vista®; Mac OS® X
Browsers:	Final release versions of Internet Explorer® 6.0 or above (Windows only); Mozilla Firefox 2.0 or above (Windows and Mac); Safari™ 3.0 or above (Mac only)
PDF Reader:	Acrobat® or similar software may be required to view and print PDF files
Screen Resolution:	800 x 600 minimum

Enabled Security Settings:	Allow per session cookies
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