2018 Water System Plan Edits

- Page 1-16: Table 7-1, added 2009 Water Right Transfer/Change Application.
- Page 1-17: added text to identify the 2009 Water Right Transfer/Change Application.
- Chapters 1 and 2 on various pages, revised references to 2015 Comprehensive Plan to be either "current Comprehensive Plan" or "2015 Comprehensive Plan with subsequent Amendments."
- Page 3-5: Updated the year of the International Fire Code to be 2015.
- Page 8-5: Updated the description of Project G-4 to reflect the next Water System Plan to be completed in 10 years.
- Appendix C: Updated Water Rights Self Assessment form to add the 2009 Water Right Transfer/Change Application, added the actual 2009 Water Right Transfer/Change Application and added the 2004 New Water Right Application.
- Appendix E: Replaced City Code and Policies with current versions.
- Appendix K: Replaced Water Boiling Notice Communication Plan with current version that omits various phone numbers.
- Appendix M: SEPA Determination added.

There was a comment made that the 2009 Dept. of Health (DOH) Water System Design Manual referenced in the Water System Plan is not the current version. DOH issued a new Water System Design Manual in October of 2019, superseding the prior 2009 Manual. However, the City's Water System Plan was not used in the preparation of the Plan and DOH is not requiring that the new Manual be used on plans that were initiated prior to October of 2019.

City of DuPont

Pierce County, Washington

2018 WATER SYSTEM PLAN UPDATE



G&O #18249
October 2019

Gray & Osborne, Inc.
CONSULTING ENGINEERS

CITY OF DUPONT

PIERCE COUNTY **WASHINGTON**

WATER SYSTEM PLAN

DOMINIC J. MILLER
STATE OF WASHINGTON
35679
REGISTERED
PROFESSIONAL ENGINEER
10/28/19

G&O #18249
OCTOBER 2019

Gray & Osborne, Inc.
CONSULTING ENGINEERS

TABLE OF CONTENTS

CHAPTER 1 – WATER SYSTEM DESCRIPTION

OBJECTIVE 1-1
Scope of Work 1-1
Chapter Objective 1-1
OWNERSHIP AND MANAGEMENT 1-2
SYSTEM BACKGROUND 1-2
Water System History 1-2
Projects Completed Since the 2011 Plan 1-4
LOCATION 1-6
City Boundaries 1-6
GEOGRAPHY AND CLIMATE 1-7
Topography 1-7
Soils 1-7
Surface Water 1-8
Sequalitchew Creek Springs 1-8
Sequalitchew Creek 1-8
Intertidal Springs 1-9
Miscellaneous Small Water Bodies 1-9
Ground Water and Aquifer Recharge 1-9
Climate 1-9
Geologic Hazard Areas 1-10
Flood Hazard Areas 1-11
Wetlands 1-11
Utility Services 1-11
EXISTING WATER SYSTEM 1-12
System Inventory 1-12
Source of Supply 1-13
Bell Hill 1-14
Hoffman Hill 1-15
Water Rights 1-15
Other Water Rights in the Area 1-17
Treatment 1-17
Interties 1-18
Storage 1-18
Bell Hill 1-19
Hoffman Hill 1-19
Pressure Zones 1-19
Booster Stations 1-20
Bell Hill 1-20
Hoffman Hill 1-20
Distribution System 1-21
ADJACENT PURVEYORS 1-24
RELATED PLANNING DOCUMENTS 1-24
RETAIL SERVICE AREA CHARACTERISTICS 1-25

Retail Service Area 1-25
Zoning and Future Land Use 1-26
SERVICE AREA POLICIES AND CONDITIONS OF SERVICE 1-28

CHAPTER 2 – BASIC PLANNING DATA

OBJECTIVE 2-1
HISTORIC POPULATION AND SERVICE CONNECTIONS 2-1
Population 2-1
Service Connections 2-2
HISTORIC WATER SYSTEM DEMANDS 2-4
Water Production 2-4
Maximum Day Production 2-6
Water Consumption 2-7
Distribution System Leakage Rate 2-10
Equivalent Residential Units 2-11
Maximum Day Demand per ERU 2-13
Peak Hour Demand 2-14
PROJECTED LAND USE, FUTURE POPULATION, AND WATER DEMANDS 2-15
Projected Land Use 2-15
Housing Unit Projections 2-15
Sequalitchew Village 2-16
Projected Housing Units 2-16
Projected Population 2-18
Projected System Demands 2-20

CHAPTER 3 – WATER SYSTEM ANALYSIS

OBJECTIVE 3-1
SYSTEM DESIGN AND CONSTRUCTION STANDARDS 3-1
Design Standards 3-1
Fire Suppression Standards 3-5
Storage Standards 3-6
Construction Standards 3-6
WATER QUALITY STANDARDS 3-7
WATER QUALITY ANALYSES 3-7
Source Water Quality 3-7
Inorganic Chemical and Physical Water Quality 3-7
Per- and Polyfluoralkyl Substances (PFAS) 3-8
Delivered Water Quality 3-13
Coliform Bacteria Monitoring 3-13
Disinfectant Byproduct Monitoring 3-15
Asbestos Monitoring 3-16
Lead and Copper Monitoring 3-16
Water Quality Monitoring Schedule 3-17
Water Quality Complaints 3-20
SYSTEM COMPONENT ANALYSIS 3-20
Source of Supply 3-20

Water Rights Analysis 3-21
Source Capacity Analysis 3-24
Storage Analysis 3-25
Existing Effective Storage 3-25
Storage Requirements 3-28
Fire Suppression Storage 3-29
Total Storage Requirements 3-30
Treatment Analysis 3-31
Bell Hill Water Treatment 3-32
Hoffman Hill Chlorination 3-32
Booster Stations Analysis 3-32
Bell Hill Booster Station 3-33
Hoffman Hill Booster Station 3-35
Distribution System 3-36
HYDRAULIC MODELING 3-36
Hydraulic Modeling Software 3-37
Model Assumptions 3-37
Source 3-37
Booster Stations 3-38
System Demands 3-38
Model Calibration 3-39
Fire Hydrant Tests 3-39
Calibration Procedures 3-40
Calibration Results 3-40
Model Conditions 3-41
System Analysis 3-42
Peak Hour Analysis 3-42
Available Fire Flow Analysis 3-42
WATER SYSTEM CAPACITY 3-43
Water Rights Capacity 3-43
Instantaneous Water Right Capacity Limit 3-43
Annual Water Right Capacity Limit 3-44
Source Capacity 3-44
Treatment System Capacity 3-44
Storage Capacity 3-45
Capacity Summary 3-46
SYSTEM DEFICIENCIES 3-47
Water Rights 3-47
Source Capacity 3-47
Treatment 3-47
Storage 3-48
Booster Stations 3-48
Distribution System 3-48
RECOMMENDED IMPROVEMENTS 3-48

CHAPTER 4 – WATER USE EFFICIENCY PROGRAM

OBJECTIVE 4-1
WATER USE EFFICIENCY PLANNING REQUIREMENTS 4-1
Water Use Efficiency Rule 4-1
PLANNING REQUIREMENTS 4-2
Estimation of Water Saved 4-2
Water Use Efficiency Goals 4-3
Previous Goals 4-3
New Goals 4-4
Water Use Efficiency Measures 4-4
Water Use Efficiency Measures Selected by DuPont 4-5
Customer Assistance in Repair of Leaks 4-5
Education of Consumers 4-5
Implementation of a Water Savings Program 4-6
Implement or Evaluate Water Use Efficiency Measures 4-6
METERING REQUIREMENTS 4-6
DISTRIBUTION SYSTEM LEAKAGE STANDARD 4-6
GOAL SETTING AND PERFORMANCE REPORTING 4-7
Goal Setting 4-7
Water Use Data Reporting 4-7
WATER USE EFFICIENCY PROGRAM DEVELOPMENT AND LEVEL OF IMPLEMENTATION 4-8
Regional Conservation Programs 4-8
Target Water Savings Projections 4-9
SOURCE OF SUPPLY ANALYSIS 4-11
Optimizing Use of Current Supplies 4-11
Enhanced Conservation Measures 4-11
Water Right Changes 4-11
Artificial Recharge 4-11
WATER RECLAMATION 4-11
WATER SUPPLY CHARACTERISTICS 4-12

CHAPTER 5 – WELLHEAD PROTECTION PROGRAM

BACKGROUND 5-1
SUPPORTING DOCUMENTS 5-2
AQUIFER SUSCEPTIBILITY 5-3
WELLHEAD PROTECTION AREA DELINEATION 5-4
Purpose 5-4
Local Hydrogeology 5-4
Recharge and Discharge Zones 5-7
Groundwater Modeling 5-7
Modeling Results 5-8
INVENTORY OF POTENTIAL CONTAMINANT SOURCES 5-10
Potential Contaminant Sources 5-10
Landfills 5-10
Commercial and Industrial Activity 5-11
Underground Storage Tanks 5-12

Septic Systems 5-14
Drywells, Catch Basins, and Improperly Sealed or Secured Wells 5-14
Accidental Spills 5-15
Stormwater 5-15
Confirmed and Suspected Contamination Sites 5-15
Inventory Data Sources 5-16
Wellhead Inventory 5-19
Development of Wellhead Protection Area Maps 5-19
SPILL RESPONSE 5-19
Spill Response Program 5-23
CONTINGENCY PLANNING 5-23
SUMMARY AND RECOMMENDATIONS 5-24

CHAPTER 6 – OPERATION AND MAINTENANCE PROGRAM

WATER SYSTEM MANAGEMENT AND PERSONNEL 6-1
PROFESSIONAL GROWTH REQUIREMENTS 6-2
SYSTEM OPERATION AND CONTROL 6-3
Major System Components 6-3
Control System 6-3
Bell Hill Reservoir and Booster Station 6-3
Hoffman Hill 6-5
Source of Supply 6-6
Bell Hill Wells 6-6
Hoffman Hill Wells 6-7
PREVENTIVE MAINTENANCE PROGRAM 6-8
Reservoirs 6-8
Periodic Maintenance 6-8
Cleaning and Disinfection 6-9
Internal Coatings 6-10
Distribution System 6-10
Distribution System Valve Maintenance 6-10
Hydrant Maintenance 6-10
Water Main Flushing 6-11
Dead-End Waterlines 6-14
Booster Pump Stations 6-14
Wells 6-14
Treatment 6-14
Meters 6-14
Non-Residential and Commercial Meters 6-15
Residential Meters 6-15
Inventory of Materials 6-15
Recommended Schedule 6-15
EMERGENCY RESPONSE PROGRAM 6-16
Water System Personnel Emergency Call-Up List 6-17
Public Notification 6-18
Emergency Response Procedures 6-18

Vulnerability Assessment 6-19
Bacteriological Presence Detection Procedure 6-19
VOC/SOC and Inorganic Chemical/Physical Characteristics Detection Procedures 6-19
Power Failure 6-20
Severe Earthquake 6-20
Severe Snowstorm 6-20
Fire 6-21
High Water and Flooding 6-21
Contamination of Water Supply 6-22
WATER SHORTAGE RESPONSE PLAN 6-23
Chain of Command 6-23
Mayor 6-24
City Administrator 6-24
Public Works Director 6-24
Senior Water System Operator 6-24
Communication Procedures 6-24
Emergency Phone List 6-25
Media Contact 6-25
Regulatory Agency Contact 6-25
Alternative Water Sources 6-25
Interties 6-25
Emergency Water Supplies 6-25
Transport of Potable Water During Emergencies 6-26
CROSS-CONNECTION CONTROL PROGRAM 6-28
Cross-Connection Control 6-29
City Cross-Connection Control Program 6-29
Priority Service List and Surveillance Program 6-30
New and Existing Cross-Connection Devices 6-30
Cross-Connection Control Program Record Keeping 6-30
Program Scheduling and Personnel Requirements 6-30
Cross-Connection Control Program Summary 6-31

CHAPTER 7 – DISTRIBUTION FACILITIES DESIGN AND CONSTRUCTION STANDARDS

OBJECTIVE 7-1
SYSTEM STANDARDS, POLICIES AND PROCEDURES 7-1
PROJECT REVIEW PROCEDURES 7-1
DESIGN AND CONSTRUCTION STANDARDS 7-2
CONSTRUCTION CERTIFICATION AND FOLLOW-UP PROCEDURES 7-2

CHAPTER 8 – CAPITAL IMPROVEMENT PROGRAM

OBJECTIVE 8-1
IDENTIFICATION OF SYSTEM IMPROVEMENTS 8-1
Source 8-1

Project S-1 8-1
Project S-2 8-2
Project S-3 8-2
Project S-4 8-2
Project S-5 8-2
Treatment 8-2
Project T-1 8-2
Project T-2 8-3
Project T-3 8-3
Storage 8-3
Project ST-1 8-3
Project ST-2 8-3
Project ST-3 8-4
Distribution System Improvement Program 8-4
Project D-1 8-4
Public Works Building 8-5
Project PW-1 8-5
General Budgetary Items 8-5
Project G-1 8-5
Project G-2 8-5
Project G-3 8-5
Project G-4 8-5
SUMMARY OF RECOMMENDED IMPROVEMENTS 8-6
Ten-Year Capital and Non-Capital Improvements 8-6
Twenty-Year Capital and Non-Capital Improvements 8-8
ADDITIONAL RECOMMENDATIONS/ACTION ITEMS 8-8
Operations and Administrative Recommendations 8-8

CHAPTER 9 – FINANCIAL ANALYSIS

FINANCIAL STATUS OF EXISTING WATER UTILITY 9-1
Current Water Rates 9-1
Utility Fees and Development Charges 9-2
Historical Financial Operations 9-4
PROJECTED GROWTH 9-6
PROJECTED EXPENSES, REVENUES, AND CAPITAL RESERVES 9-6
Future Operation and Maintenance Expenses 9-6
Financial Viability Test 9-8
Rate Structure Analysis 9-8
CONCLUSIONS AND RECOMMENDATIONS 9-9
ALTERNATIVE CAPITAL IMPROVEMENT FUNDING SOURCES 9-9

LIST OF TABLES

No.	Table	Page
1-1	City of DuPont Water System History	1-4
1-2	2011 Capital Improvement Plan Summary	1-5
1-3	City of DuPont Village Names	1-7
1-4	City of DuPont (Puyallup 2 West Experimental Station) Climatological Data	1-10
1-5	Estimated Facilities Replacement/Rehabilitation Costs	1-12
1-6	Existing Sources	1-14
1-7	City of DuPont Water Rights	1-16
1-8	Additional DuPont Area Water Rights	1-17
1-9	Storage Facilities	1-19
1-10	Booster Station Inventory	1-21
1-11	Pipe Length (feet) by Size (inches), Material, and Ownership	1-23
1-12	Land Use Zoning by Village	1-27
1-13	City of DuPont Service Area Policies	1-28
2-1	OFM Official April 1 Population Estimates for DuPont	2-2
2-2	Number of Service Connections by Meter Size (2017)	2-3
2-3	Year-End Service Connections by Customer Class (2011-2017)	2-4
2-4	Annual Metered Water Production	2-6
2-5	Highest Water Production Days for 2011-2017	2-7
2-6	Metered Water Consumption	2-9
2-7	Average Percent Consumption by Customer Class	2-9
2-8	Annual Water Production, Water Use and DSL	2-11
2-9	Annual Average Water Use per Residential Connection	2-12
2-10	ERUs for the Year 2017	2-13
2-11	Summary of Water Demand Statistics	2-14
2-12	Projected Land Use	2-15
2-13	Projected Housing Units	2-17
2-14	Projected Population	2-19
2-15	Projected ERUs	2-21
2-16	Projected Water Demands	2-22
3-1	General Facility Requirements	3-3
3-2	City of DuPont Fire Flow Standards	3-6
3-3	Inorganic Chemical Sampling Results	3-9
3-4	Nitrate Monitoring Results	3-11
3-5	Test Results for Radionuclides	3-12
3-6	VOC Sampling History	3-12
3-7	SOC Sampling History	3-13
3-8	TTHM and HAA5 Sampling History	3-15
3-9	Lead and Copper Monitoring Results	3-17
3-10	City of DuPont Water System Water Quality Monitoring	3-17
3-11	Instantaneous Production Capacity versus Water Right Analysis	3-21
3-12	Projected Instantaneous Water Right Analysis	3-22

No.	Table	Page
3-13	Projected Annual Water Right Analysis	3-23
3-14	Projected Demand versus Source Capacity Analysis	3-25
3-15	Existing Effective Storage	3-27
3-16	Storage Capacity Analysis	3-31
3-17	Hydrant Testing Locations	3-39
3-18	System Conditions during Hydrant Testing	3-40
3-19	Calibration Results	3-41
3-20	Model Conditions	3-42
3-21	Summary of Peak Hour Demand Analysis Results	3-42
3-22	Storage Capacity Limits with Current Control Level Settings	3-45
3-23	Storage Capacity Limits with One Foot Operating Interval	3-46
3-24	Summary of Water System Capacity Limits	3-46
4-1	Estimation of Water Saved	4-3
4-2	Summary of Water Use Data Collection	4-8
4-3	Projected Savings with WUE Measures	4-9
5-1	Hydrogeology Summary	5-6
5-2	Groundwater Modeling Assumptions	5-9
5-3	Wellhead Protection Zones of Contribution for the City of DuPont	5-10
5-4	Contaminants Associated with Commercial and Industrial Activities	5-12
5-5	Potential Contaminant Sources within the Wellhead Protection Area	5-18
6-1	City of DuPont Water System Operators	6-1
6-2	Bell Hill Booster Pumps	6-5
6-3	Hoffman Hill Booster Pumps	6-6
6-4	Bell Hill Well Pump Description	6-7
6-5	Hoffman Hill Well Pump Description	6-8
6-6	Preventive Maintenance Schedule	6-16
6-7	Emergency Phone List	6-17
6-8	Commercial Hazard Categories	6-30
6-9	Cross-Connection Control Program Implementation Schedule	6-31
8-1	Ten-Year Capital and Non-Capital Improvement Projects	8-7
8-2	Twenty-Year Capital and Non-Capital Improvements	8-8
8-3	System Operation and Administrative Action Plan	8-9
9-1	Monthly Water Service Rates	9-2
9-2	Utility Fees and System Development Charges	9-3
9-3	Historic Revenues and Expenditures	9-5
9-4	Projected Revenues and Expenditures	9-7
9-5	Water Rates Comparison to AWC Utility Rate Study Data	9-9

LIST OF FIGURES

No.	Figure	On or Follows Page
1-1	Location Map	1-2
1-2	Land Use Map	1-2
1-3	Soils Map	1-8
1-4	Wetlands Map	1-8
1-5	FEMA 100-Year Floodplain Map	1-12
1-6	Water System Schematic	1-12
1-7	Water System Facilities	1-22
1-8	Water Service Area	1-24
2-1	Historic DuPont Population	2-1
2-2	Monthly Water Production by Source	2-5
2-3	Bimonthly Water Consumption by Customer Class	2-8
2-4	Total Production, Consumption and DSL (2011-2017)	2-10
2-5	Projected Housing Units	2-18
2-6	Projected Population	2-20
3-1	Reservoir Effective Storage Capacity	3-28
3-2	Bell Hill Booster Station Schematic Normal Operation	3-34
3-3	Hoffman Hill Booster Station Schematic Normal Operation	3-36
3-4	Historic DuPont Population	Back of Plan
5-1	Well Locations	5-4
5-2	Schematic Hydrogeologic Cross Section	5-4
5-3	Combined Well Head Protection Areas Bell Hill Wells	5-10
5-4	Combined Well Head Protection Areas Hoffman Hill Wells	5-10
5-5	Well Head Protection Map Potential Contaminant Source Inventory	5-20
8-1	Capital Improvements	8-6
9-1	Area in which System Development Charges Apply	9-4

APPENDICES

Appendix A – DOH Forms
Appendix B – Rate Study
Appendix C – Water Rights and Well Logs
Appendix D – Intertie Agreement
Appendix E – City Code and Policies
Appendix F – Monitoring Schedules and Plans
Appendix G – Hydraulic Modeling
Appendix H – Wellhead Protection
Appendix I – O&M Materials
Appendix J – Cross-Connection Program
Appendix K – Water Quality Notifications
Appendix L – Developer Standards
Appendix M – SEPA Environmental Checklist
Appendix N – PFAS Technical Memorandum

CHAPTER 1

WATER SYSTEM DESCRIPTION

OBJECTIVE

SCOPE OF WORK

This Water System Plan (Plan) is an update of previous water system plans prepared for and adopted by the City of DuPont in accordance with requirements set forth in Washington Administrative Code (WAC) 246-290-100. The previous 2011 Water System Plan was completed with the assistance of Gray & Osborne, Inc., and was approved by the Washington Department of Health (DOH) on December 11, 2012. This Plan is intended to meet all requirements of Part 246-290-100 WAC as further detailed in the DOH Water System Planning Handbook, as well as the needs and concerns of the City of DuPont. This Plan must be reviewed by and address any comments of neighboring utilities, Pierce County Planning Department, DOH, and Washington Department of Ecology (Ecology). Pursuant to Water Regulations, this Plan must receive approval by DOH and be adopted by the City of DuPont.

This Plan covers the following topics:

- Current and Projected Water System Capabilities and Demands
- Water Use Efficiency (Conservation)
- Water Source Protection Requirements
- Water System Operations Program Requirements
- Water System Design Standards
- Capital and Non-Capital Improvements
- Financing Plan

CHAPTER OBJECTIVE

The objective of this chapter is to present background information for the City of DuPont's Plan. Subjects covered include the following:

- Ownership and Management
- System Background
- Location
- Geography and Climate
- Existing Water System
- Related Planning Documents
- Service Area Characteristics
- Water System Policies

OWNERSHIP AND MANAGEMENT

The City of DuPont owns and operates the DuPont water system. The Washington State Department of Health (DOH) water system identification number for the City of DuPont water system is **20500P**. Figure 1-1 shows the location of the City of DuPont. A copy of the Water Facilities Inventory (WFI) form is included in Appendix A.

The City of DuPont is governed by an elected Mayor and a City Council. The City's current mailing address is:

City of DuPont
1700 Civic Drive
DuPont, Washington 98327

The City's water system is operated by the City's Public Works Department, Utility Division. The City's current zoning map divides the Urban Growth Area (UGA) and water service area into growth areas, which form general boundaries for neighborhoods, activity centers, and land use. The UGA and water system service area are the City's city limits. These areas include the City's Historic Village, El Rancho Madrona, Palisade Village, DuPont Station, Edmond Village, Manufacturing Research Park and Industry area, Yehle Park Village, Fort Lake Business and Technology Park, Civic Center, Sequalitchew Village, and Hoffman Village. Figure 1-2 shows the City's neighborhood boundaries and Land Uses.

SYSTEM BACKGROUND

WATER SYSTEM HISTORY

In 1906, the E.I. DuPont de Nemours Company began construction on a munitions and explosives plant on property previously owned by the United States Government for Fort Nisqually. What is now the Historic Village of DuPont was constructed in 1909 to provide homes for plant workers. The water distribution system in the Historic Village was constructed in the late 1920s and consisted primarily of 6-inch cast iron pipe. The original Historic Village water system included three wells and a 100,000-gallon ground level reservoir. The original reservoir, two wells and a pump house are located near the northwest corner of the Historic Village. A third well is located near the Village's southeast corner. The wells and reservoir are currently not in use, and the pump house was decommissioned, following the 1992 completion of two new wells, a storage reservoir, and pump station at Bell Hill, located northeast of the Historic Village. A third well was drilled in 1998 for purposes of blending with Well 2, which has experienced higher concentrations of manganese.



CITY OF DUPONT

WATER SYSTEM PLAN
FIGURE 1-1
LOCATION MAP

Gray & Osborne, Inc.
CONSULTING ENGINEERS

THE DUPONT VISION - A model small city known for its planned setting and hometown sense of community - a place that blends its natural beauty and rich Northwest history with a proactive approach to its future

DuPont • Washington

Welcoming for 5,000 Years

LEGEND:

LANDUSE:

- Residential Reserve
- Residential 3
- Residential 4
- Residential 5
- Residential 12
- Office
- Commercial
- Mixed Use
- Business Tech Park
- Manufacturing and Research
- Industrial
- Open Space/Sensitive Areas
- Community Park
- Neighborhood Park
- Military
- Village Boundary
- Mineral Resource Overlay
- (TC) Transit Center
- Streams
- Wetlands/Lakes

N

0 450 900 1,800 Feet

1 inch = 1,800 feet

PUGET SOUND

SOLO POINT ROAD

SEQUALITCHEW VILLAGE

WHARF ROAD

MANUFACTURING RESEARCH PARK AND INDUSTRY

CENTER DRIVE

FORT LAKE BUSINESS AND TECHNOLOGY PARK

EDMOND VILLAGE

CIVIC CENTER

1843 FT. NISQUALLY SITE

OLD FORT LAKE

EDMOND MARSH

STEILACOOM-DuPONT ROAD

PALISADE VILLAGE

BELL HILL

BELL MARSH

HISTORIC VILLAGE

BARKSDALE AVE

LAKE SELLERS

BOB'S HOLLOW LANE

POND LAKE

STRICKLAND LAKE

GRANT LAKE

McNEIL STREET

HOFFMAN HILL VILLAGE

HOFFMAN HILL BLVD.

YEHLE PARK VILLAGE

DuPONT STATION

(TC)

FT. LEWIS GOLF COURSE

INTERSTATE 5

EXIT 119

EXIT 118

EL RANCHO MADRONA VILLAGE

Amendments:

February 24, 2004	Bell Hill Comp Plan Amendment and Map Change, Ordinance #04-716
July 25, 2006	MRO Overlay Boundary Change, Ordinance #06-816
July 25, 2006	Fort Lake Comp Plan Amendment and Map Change, Ordinance #06-816
July 25, 2006	Civic Center Comp Plan Amendment and Map Change, Ordinance #06-816

Disclaimer:

Boundaries on this map are approximate. They have not been formally delineated or surveyed and are intended for planning purposes only. Additional site-specific evaluation may be necessary to confirm and verify information shown on this map.

CITY OF DuPONT

Comprehensive Plan Map

April 2011

CITY OF DUPONT

WATER SYSTEM PLAN

FIGURE 1-2

LAND USE MAP

Gray & Osborne, Inc.

CONSULTING ENGINEERS

The Bell Hill wells and reservoir currently serve the City water system. The Bell Hill storage reservoir has a total volume of 1.0 million gallons (MG). The three Bell Hill wells have a combined instantaneous water right for 2,900 gallons per minute (gpm).

In 1997, a new well was drilled at the Hoffman Hill location. A 3.5 MG reservoir was constructed at Hoffman Hill in 1999. The Hoffman Hill booster station was completed in 2003, and a second well was completed the same year, however, that well was not equipped until 2009.

The former El Rancho Madrona water system was located in the southwestern corner of the City of DuPont. This water system, serving 33 residential connections, was fully integrated into the main City of DuPont water system in 2010. The former El Rancho Madrona facilities included a single 50 gpm well, a 38,000 gallon concrete, ground level reservoir, and a booster pump station, all of which have been decommissioned and removed from the site. Water mains in the El Rancho Madrona subdivision were all replaced with new ductile iron pipe in 2012.

In 1976, the Weyerhaeuser Company purchased a 3,200 acre site where the DuPont Powder Company produced explosives until that same year. The site included a water system with three wells, a distribution system, and a ground level reservoir all constructed in 1908 to serve as water supply and fire protection at the DuPont Powder Company plant. The three wells have water right certificates totaling 2,320 gpm of instantaneous and 2,663 acre-feet per year of annual withdrawal water rights. Weyerhaeuser maintained this water system for fire protection for the old powder plant area and to meet current Weyerhaeuser Company needs. The wells are currently in a Consent Decree area pursuant to the Model Toxics Control Act, under which remedial cleanup activities for the site have been being conducted. As such, the wells may not be used for potable water supply. The water rights are in the process of being transferred to the City of DuPont and are discussed in greater detail in the Water Rights section of this chapter.

In 2017, Bell Hill Well 1 was rehabilitated by brushing the inside of the casing and surging the well screen to restore well capacity. A video inspection was performed and the well casing and screen were found to be in good condition. A drawdown test was performed and a hydrogeologic report was produced. It was determined that the well is capable of sustaining an output of 1,000 gpm. A new 100 hp well pump, capable of producing 1,000 gpm at 248 feet TDH, was installed.

In 2017, the Historic Village reservoir and booster pump station, which had been out of service for several years, were demolished, and Historic Village Well 2 (DOE #AEF218), which had been designated as Emergency Only for several years, was decommissioned. Following the decommissioning of Historic Village Well 2, Historic Village Well 1 was also decommissioned.

Table 1-1 provides a summary of the water system facilities and their ages.

TABLE 1-1

City of DuPont Water System History

Water System Facility	First Service Date
DuPont Powder Co. site wells (fire protection and irrigation) (1)	1908
Historic Village wells, 100,000-gallon reservoir, distribution (2)	Late 1920s
El Rancho Madrona well (S01) constructed (3)	1970s
El Rancho Madrona 38,000-gallon concrete reservoir constructed (3)	1970s
Bell Hill Well 1 (S03) constructed	1990
Bell Hill Well 2 (S04) constructed	1990
1,000,000 gal. Bell Hill reservoir constructed	1992
Bell Hill booster pump station constructed	1992
3,535,000-gallon Hoffman Hill reservoir constructed	1999
Hoffman Hill Well 1 (S05) constructed	1997
Bell Hill Well 3 (S06) constructed	1998
Hoffman Hill booster pump station constructed	2003
Hoffman Hill Well 2 (S05) constructed	2009
El Rancho Madrona water system Integrated into City water system (4)	2010
El Rancho Madrona Water mains replaced	2012
Historic Village Water mains replaced	2017
Hoffman Hill booster pump station upgrades	2017
Bell Hill booster pump station upgrades	2017
Bell Hill Well 1 rehabilitated and new pump	2017
Historic Village water facilities decommissioned	2017

(1) Water rights currently being transferred to the City of DuPont.
(2) Not in operation since 1992.
(3) El Rancho Madrona facilities decommissioned after 2010.
(4) The physical connection between the systems took place in 2010 at which time the El Rancho Madrona Water Facilities Inventory (WFI) was converted to the City of DuPont WFI and classified by DOH as a single water system. The old El Rancho Madrona reservoir and booster pump system were removed and the well was decommissioned in subsequent years.

PROJECTS COMPLETED SINCE THE 2011 PLAN

Table 1-2 is the Capital Improvement prioritized summary from the previous City of DuPont Water System Comprehensive Plan, 2011. The summary shows the estimated cost, anticipated date of completion, and date completed.

TABLE 1-2

2011 Capital Improvement Plan Summary

Improvement Project	Estimated Cost in 2011 Dollars	Scheduled Date to Complete (year)	Date Completed (year)
Install on-site generation sodium hypochlorite disinfection at Hoffman Hills.	$50,000	2012	2011
Replace El Rancho Madrona water mains.	$443,200	2012	2012
Replace all six control valves (Cla-valves) at the Bell Hill Booster Station.	$23,100	2013	2017
Install Variable Frequency Drives (VFDs) at the Bell Hill Booster Station.	$126,400	2013	2017
Upgrade telemetry system at the Bell Hill Booster Station.	$27,500	2013	2014
Transfer existing water rights from Historic Village Wells to another point of withdrawal.	$2,500	2013	In Process
Transfer existing water rights from El Rancho Madrona Well to another point of withdrawal.	$2,500	2013	In Process
Formalize Intertie agreement with Joint Base Lewis-McChord.	$5,000	2013	Not Done
Billing Software Upgrades.	$8,000	2013	2013
Upgrades to current GIS system components.	$15,000	2013	2015
Increased security measures to water system components.	$22,000	2013	Not Done
Install 100 lf of 8-inch waterline between Center Plaza – Building 2 and DuPont Steilacoom Road.	$20,500	2013	2013
Change from direct read meters to remote read meter technology.	$587,000	2013 - 2015	Not Done
Hoffman Hill Booster Pump Station Modifications Analysis	$3,500	2013	2016
Feasibility Study investigating operational alternatives for Bell Hill Well 2.	$12,500	2014	Not Done
Irrigation control/modifications to weather station and system reprogramming.	$27,500	2014	2015
Internal inspection and routine cleaning of Bell Hill Reservoir	$7,000	2015	2015
Internal inspection and routine cleaning of Hoffman Hill Reservoir	$7,000	2015	2015

TABLE 1-2 – (continued)

2011 Capital Improvement Plan Summary

Improvement Project	Estimated Cost in 2011 Dollars	Scheduled Date to Complete (year)	Date Completed (year)
Replace approximately 2,600 lf of AC water pipe in the Historic Village	$543,100	2015 - 2016	2016 - 2017
Update Water System Comprehensive Plan in year 2017	$75,000	2017	In Process
Repair/replace defective water meters	$32,100	Annually	Ongoing
Leak Detection Survey	$12,600	Annually	Ongoing
Conservation Program	$1,500	Annually	Ongoing
Annual Consumer Confidence Report	$1,500	Annually	Ongoing

LOCATION

The City of DuPont is located in western Pierce County between Tacoma and Olympia, Washington, north and west of Interstate 5. The Joint Base Lewis-McChord (JBLM) borders the City on the northeast, east, and southeast. The Nisqually National Wildlife Refuge is located in the tidal flats south and west of the DuPont Puget Sound shoreline. The Nisqually Reach of the Puget Sound is located approximately 2.5 miles west of the downtown DuPont area. Surrounding communities include Steilacoom and Lakewood, located approximately 5 miles to the north and northeast of the City, respectively. The location of DuPont and surrounding area is shown in Figure 1-1.

CITY BOUNDARIES

The City's Urban Growth Area and City limits are one and the same area. The City limits encompass approximately 3,773 acres. Development within the service area was originally projected to proceed in a sequence of growth areas, Village I, Village II, Village III, Village IV, Town Center, and Industry, as defined in the City's earlier Comprehensive Land Use Plans. The current Comprehensive Plan reverts to an earlier naming convention that utilizes descriptive names rather than village numbers. In most cases, the boundary lines have remained the same, just the names have been changed. Table 1-3 shows the correlation between 'Village' numbers and the descriptive names used in the current Comprehensive Plan. Land Use, Villages, and City limits are shown in Figure 1-2

TABLE 1-3

City of DuPont Village Names

Previous Village Designations	2015 Comprehensive Plan Designation
Village I	Palisade Village, DuPont Station, Edmond Village, Manufacturing Research Park and Industry
Village II	Yehle Park Village
Village III	Fort Lake Business and Technology Park
Village IV	Hoffman Hill Village (includes El Rancho Madrona)
Historic Village	Historic Village
Town Center	Civic Center, Fort Lake Business and Technology Park
Industry	Sequalitchew Village, Manufacturing Research Park and Industry

GEOGRAPHY AND CLIMATE

TOPOGRAPHY

The topography within the City limits ranges from sea level to 400 feet above mean sea level (MSL) with development occurring from approximately 140 feet to 400 feet. The City limits encompass approximately 5.8 square miles, which are comprised of undulating uplands or glacial drift plains. Bell Hill and Hoffman Hill rise above the uplands to elevations ranging from 260 to 400 feet, respectively. The ground surface drops off to Edmond Marsh north of the Historic Village and southwest of the Historic Village to Lake Sellers.

SOILS

The geology was studied in 1979 by the USDA Soil Conservation Service, which identified 10 soil types within the service area. Highly permeable Spanaway soils comprise about 70 percent of the soil within the service area, Alderwood soils comprise about 20 percent, and the remaining 10 percent is comprised of various other soil types including Everett, Kitsap and Nisqually soils (found in the southwest portion of the City), and DuPont Muck, which is associated with local marshy areas. Figure 1-3 delineates the various soil types in the service area.

Soils within production areas of the former DuPont Works site (in the area of the golf course) have been found to be contaminated with chemical compounds associated with former explosives manufacturing. In 1991, the Department of Ecology, the Weyerhaeuser Company, and the DuPont Company signed a Consent Decree pursuant to the Model Toxics Control Act (MTCA) under which remedial investigation/risk assessment/feasibility study would be conducted. The remedial investigation determined the nature, extent, and magnitude of site contamination. The risk assessment measured

the threats to human health and the environment. The feasibility study evaluated site cleanup alternatives. The site was divided into two main areas: Parcel 1 (the former production area, about 636 acres) and Parcel 2 (about 205 acres).

After numerous interim cleanup actions, Parcel 2 (the black powder area or Area 40) was cleaned up to industrial standards. It was removed from the 1991 Consent Decree in August 1997, after an opportunity for public review and comment. Lead and arsenic contaminated soil was removed around former building foundations and at one location along a former narrow gauge railroad corridor in Parcel 2.

The main contaminants of concern were lead and arsenic in soil. Lead was detected site-wide. Arsenic contamination was generally shallow (less than 1-foot deep) within 25 feet of the former narrow gauge railroad track, but was also located in other discrete areas (dry wells, production-related foundations, disposal areas). Other hazardous substances discovered were total petroleum hydrocarbons (TPH), mercury, di- and trinitrotoluenes (DNT/TNT), and benzo(a)pyrene. DNT was the only chemical of concern in groundwater and concentrations are generally low, often below drinking water standards.

A Draft Environmental Impact Statement (DEIS) was issued for public review and comment in February 2000 for a golf course/containment facility in Parcel 1, which would isolate and manage lead and arsenic contaminated soil. A golf course was constructed over the cap/containment structure. The final EIS was issued in July 2000. All work has on this project has been completed at this time.

SURFACE WATER

The surface water resources of the DuPont area consist of both fresh and marine waters. Freshwater resources include Sequalitchew Creek Springs and Sequalitchew Creek. Marine waters include the Nisqually Delta and Nisqually Reach of Puget Sound. A brief description of the surface waters follow below. Surface water resources and wetlands are shown in Figure 1-4.

Sequalitchew Creek Springs

One major spring and several smaller seeps are located along the north and south banks of the Sequalitchew Creek Canyon. Flows originate from the Vashon Drift Aquifer; discharge from the spring has not been gauged.

Sequalitchew Creek

Sequalitchew Creek is formed by the overflow outlet of Sequalitchew Lake and enters the Nisqually Reach of Puget Sound in the northeast corner of the Nisqually basin. The creek drains a watershed of 38.4 square miles, including the waters of Kinsey Marsh, Murray Creek, American Lake, Sequalitchew Lake, Hamer Marsh, MacKay Marsh, and Edmond Marsh. Flows in Sequalitchew Creek typically range from 0 to 20 cubic feet per

PUGET SOUND

N

0 900 1,800 3,600

SCALE: 1"=1,800'

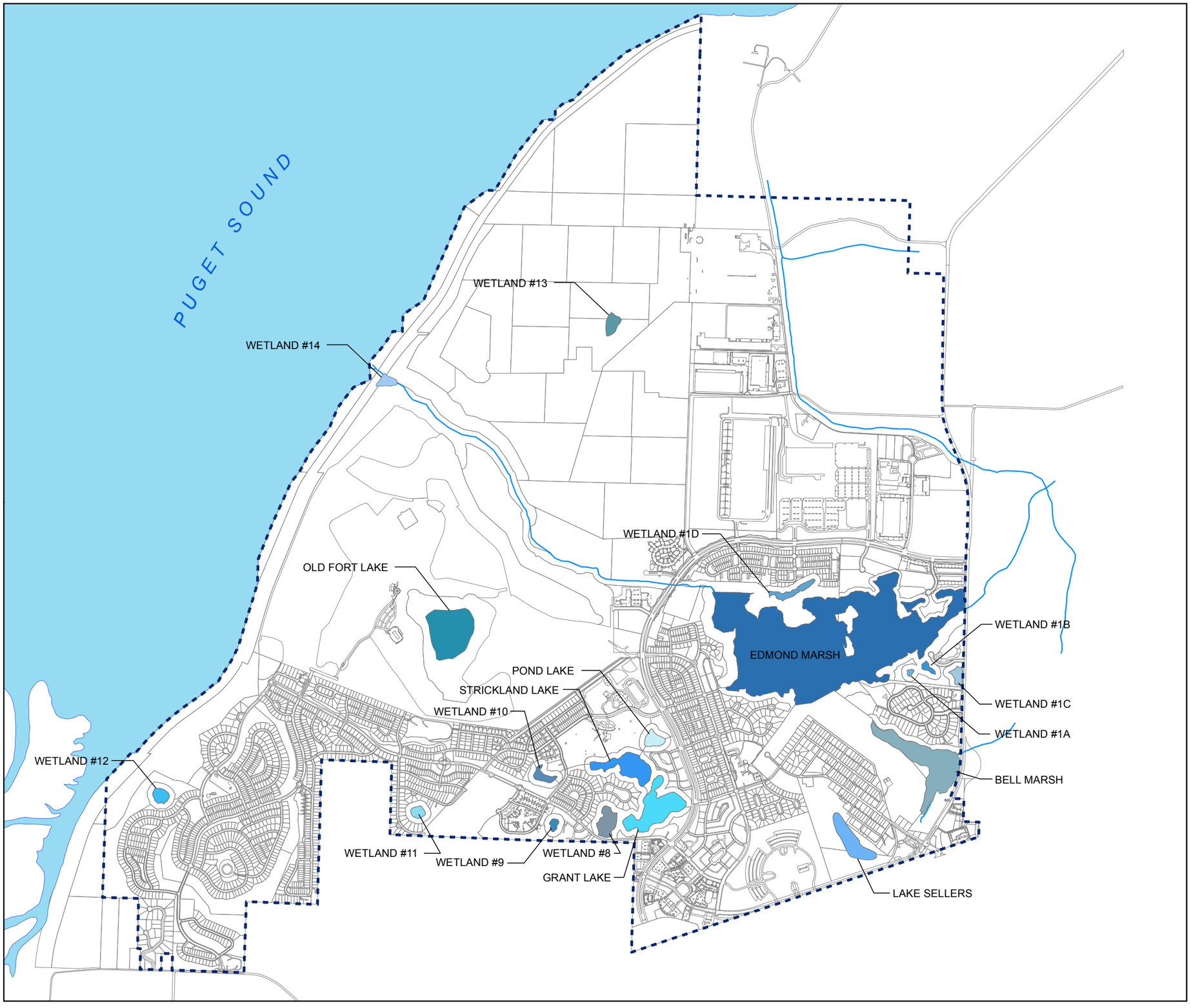
SOILS:

- ALDERWOOD GRAVELLY SANDY LOAM, 0 TO 6 PERCENT SLOPES
- ALDERWOOD GRAVELLY SANDY LOAM, 15 TO 30 PERCENT SLOPES
- ALDERWOOD GRAVELLY SANDY LOAM, 6 TO 15 PERCENT SLOPES
- DUPONT MUCK
- EVERETT GRAVELLY SANDY LOAM, 15 TO 30 PERCENT SLOPES
- EVERETT GRAVELLY SANDY LOAM, 6 TO 15 PERCENT SLOPES
- KITSAP SILT LOAM, 15 TO 30 PERCENT SLOPES
- KITSAP SILT LOAM, 30 TO 65 PERCENT SLOPES
- KITSAP SILT LOAM, 8 TO 15 PERCENT SLOPES
- NISQUALLY LOAMY SAND
- PITS
- PUYALLUP FINE SANDY LOAM
- SPANAWAY GRAVELLY SANDY LOAM
- WATER
- XEROCHREPTS, 45 TO 70 PERCENT SLOPES
- CITY LIMITS (UGA)

CITY OF DUPONT

WATER SYSTEM PLAN
FIGURE 1-3
SOILS MAP

Gray & Osborne, Inc.
CONSULTING ENGINEERS



N

0 900 1,800 3,600

SCALE: 1"=1,800'

WETLANDS:

- BELL MARSH
- EDMOND MARSH
- GRANT LAKE
- LAKE SELLERS
- OLD FORT LAKE
- POND LAKE
- STRICKLAND LAKE
- WETLAND # 1A
- WETLAND # 1B
- WETLAND # 1C
- WETLAND # 1D
- WETLAND # 8
- WETLAND # 9
- WETLAND # 10
- WETLAND # 11
- WETLAND # 12
- WETLAND # 13
- WETLAND # 14
- CITY LIMITS (UGA)

CITY OF DUPONT

WATER SYSTEM PLAN
FIGURE 1-4
WETLANDS MAP

Gray & Osborne, Inc.
CONSULTING ENGINEERS

second (cfs). During summer months, flows in the Creek between Edmond Marsh and Puget Sound are routinely absorbed into the ground and flow subterranean before reaching Sequalitchew Canyon.

According to the City of DuPont Comprehensive Land Use Plan, water quality is generally good to excellent during moderate and high flow conditions. During the summer when stream flows are low, violations of Class AA water standards for fecal coliform bacteria, pH, and dissolved oxygen have been observed. Elevated nitrate concentrations have also been recorded in spring and stream waters.

Intertidal Springs

Several seeps are located along the Nisqually Reach bluff. Flow for these springs originates from the Sequalitchew Delta Aquifer. A large intertidal spring is located about 800 feet north of the mouth of Sequalitchew Creek and a smaller seep is located south of the mouth of Sequalitchew Creek.

Miscellaneous Small Water Bodies

A number of small water bodies are also located within the City and include Strickland Lake, Grant Lake, Lake Sellers, and Pond Lake. Old Fort Lake, which is 14 acres in size, is the largest lake within the City; its depth varies with the groundwater level. These are fed by groundwater and have no inlet or outlet.

GROUND WATER AND AQUIFER RECHARGE

Aquifers identified as underlying portions of the City of DuPont include the Vashon Drift, Sequalitchew Delta, Salmon Springs (Flett Creek), Stuck (Lakewood) glacial Drift, Orting (Lone Star), and an Unnamed Glacial Aquifer (Qugl). In general, several low permeability soil layers (aquitards) and other aquifers separate the near surface aquifers (Vashon Drift and Sequalitchew Delta) from the deeper aquifers (such as the Stuck, Orting, and Qugl). The City of DuPont's four primary water supply wells are developed in the Upper Salmon Springs aquifer (Bell Hill Wells 1 and 3 and Hoffman Hill Wells 1 and 2). Bell Hill Well 2 is not developed in the same aquifer as Wells 1 and 3 and Hoffman Hill Wells 1 and 2. Bell Hill Well 2 is developed in the undifferentiated outwash of the Stuck (Lakewood) glacial Drift aquifer.

CLIMATE

The City of DuPont area has a relatively mild, marine influenced climate, which is typical of Washington's Puget Sound region. Table 1-4 lists climatological data, including temperature, precipitation, and snowfall averaged over a 64-year period. Data was acquired from the Puyallup 2 West Experimental Station, the closest long-term climatological monitoring site to the City of DuPont.

TABLE 1-4

City of DuPont (Puyallup 2 West Experimental Station) Climatological Data

Month	Average Maximum Temperature, °F	Average Minimum Temperature, °F	Average Precipitation, Inches	Average Total Snow Fall, Inches
January	46.3	32.0	5.59	2.9
February	50.5	33.6	4.50	1.0
March	54.8	35.3	4.01	0.4
April	60.9	38.5	2.84	0.0
May	68.1	43.1	1.94	0.0
June	72.6	47.9	1.78	0.0
July	78.2	50.3	0.82	0.0
August	78.0	50.1	1.10	0.0
September	72.2	46.5	1.87	0.0
October	62.3	41.6	3.55	0.0
November	51.9	36.1	5.67	0.5
December	47.0	33.4	6.16	1.3
Annual Average	**61.9**	**40.7**		
Annual Total			**39.84**	**6.3**

GEOLOGIC HAZARD AREAS

Geologically hazardous areas are areas that, because of their susceptibility to erosion, sliding, earthquakes, or other geological events, are not suited to siting critical public facilities, commercial, residential, or industrial developments consistent with public health or safety concerns. Typically, the Puget Sound region is highly susceptible to damaging earthquakes. Two types of surficial geologic units are particularly prone to earthquake hazards: alluvial deposits and recessional outwash. Significant seismic hazards (i.e., those with the greatest risk of earthquake damage) coincide with the alluvial plain of the Nisqually River. Soils in this area are unconsolidated, making them susceptible to liquefaction hazards associated with large earthquake events. Recessional outwash is located throughout the entire DuPont area. The Coastal Atlas developed by the Shorelands and Coastal Zone Management Program, Washington Department of Ecology indicates slope stability is stable for upland areas and modified along the coast. Modified slopes are highly modified by human activity and include areas of significant excavation or filling. Slope response to a combination of natural processes and human activities may be unpredictable. Along the bluffs above the shoreline and the Sequalitchew Creek ravine, the slope stability is classified as Intermediate. These slopes are generally steeper than 15 percent except where conditions such as weaker material and/or abundant groundwater exist.

FLOOD HAZARD AREAS

The 100-year flood plain is shown in Figure 1-5. These boundaries have been established in accordance with guidelines promulgated by the Federal Emergency Management Agency (FEMA). FEMA highly recommends against the placement of any structure within the 100-year flood plain; if a structure is built within the flood plain's boundaries, provisions for adequate protection against the 100-year flood must be made (i.e., structures within the floodplain are constructed at a minimum of one foot above the flood plain elevation). However, there are currently no structures in the City of DuPont within a 100-year floodplain. The 100-year flood plain boundaries surround the existing lakes and wetlands in the City of DuPont. Seasonally, water elevations fluctuate in these wetland areas, but City development codes require buffers of 100 to 200 feet from these areas, which eliminates potential problems and places structures outside the 100-year flood plain.

WETLANDS

Wetlands are defined as those areas that are inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

The National Wetlands Inventory documents numerous wetlands areas in and around the City of DuPont. Figure 1-4 illustrates the wetlands identified by the National Wetlands Inventory. A total of 14 wetlands, including forested swamp, scrub/scrub swamp, and emergent marsh wetlands, are located throughout the City. Some of these wetlands are associated with the Sequalitchew Creek system (e.g., Edmond Marsh) and are fed by the Vashon Drift Aquifer. Edmond Marsh is the largest wetland with an area of 134 acres. A small, fresh-water wetland is located in a glacial kettle north of Sequalitchew Creek (in the existing industrial area). The glacial kettle wetland is also fed by the Vashon Drift Aquifer. A number of smaller, seasonally wet, kettle depressions are located throughout the City. A saltwater influenced marsh is located at the mouth of Sequalitchew Creek.

UTILITY SERVICES

Puget Sound Energy (PSE) supplies both electrical power and natural gas to residents of the City of DuPont. Qwest Communications provides telecommunication services to residents of the City of DuPont. Cable services are provided by Comcast Cable.

Domestic water and storm drain systems are provided by the City of DuPont. Sanitary sewer service is provided by Pierce County Utilities.

Solid waste management is contracted by LeMay Industries and includes a recycling program.

EXISTING WATER SYSTEM

Figure 1-6 is an isometric schematic of the entire City of DuPont water system. The figure denotes the system's pressure zones and the locations of the major facilities including reservoirs, wells, and booster stations.

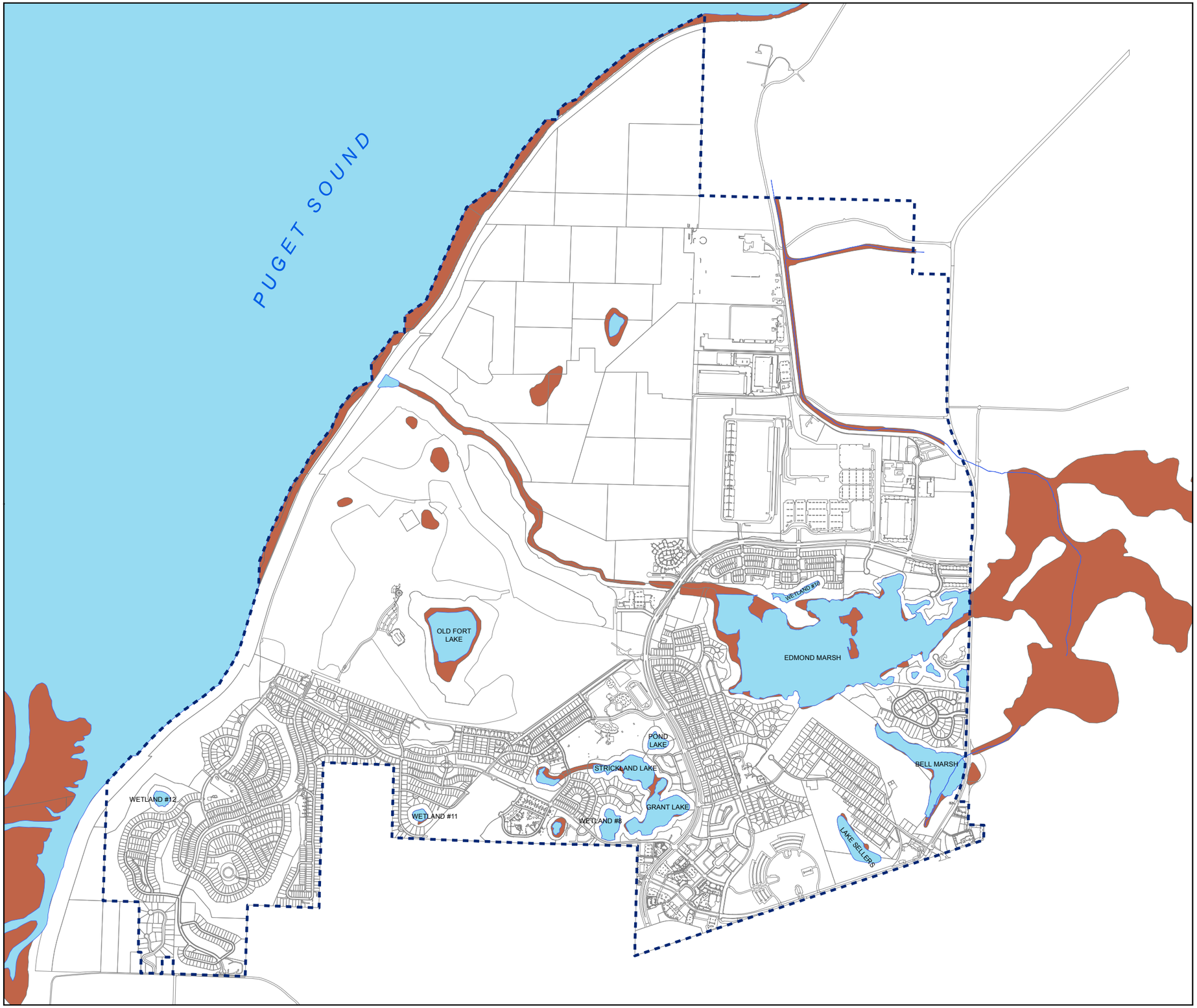
SYSTEM INVENTORY

As part of a water system rate study conducted in 2018, a comprehensive inventory of all of the City of DuPont water system facilities was compiled, together with year constructed, value at time of construction, estimated 2018 value, useful life, 2018 depreciation cost, remaining life, and estimated replacement cost. Tables from the rate study are include in Appendix B of this water system plan. Based on the rate study tables, Table 1-5 summarizes water systems facilities by the ten-year interval in which it is anticipated that they are going to need to be replaced or rehabilitated, and the estimated cost of replacement or rehabilitation in 2018 dollars.

TABLE 1-5

Estimated Facilities Replacement/Rehabilitation Costs

System Component	Quantity	Estimated Replacement Cost (2018 $)
From 2018 to 2028		
Bell Hill Well 2	1	$1,100,000
Bell Hill Well 3	1	$1,000,000
Hoffman Hill Well 1	1	$1,100,000
Hydrants	107	$845,300
Sampling Stations	11	$33,000
Water Meters	2,652	$2,921,500
Subtotal 2018 - 2028		**$6,999,800**
From 2028 to 2038		
Hoffman Hill Well 2	1	$1,100,000
Hydrants	251	$1,982,900
Sampling Stations	21	$63,000
Water Meters	444	$553,500
Subtotal 2028 - 2038		**$3,699,400**



N

0 900 1,800 3,600

SCALE: 1"=1,800'

CITY LIMITS (UGA)

FLOODPLAIN

100-YEAR

CITY OF DUPONT

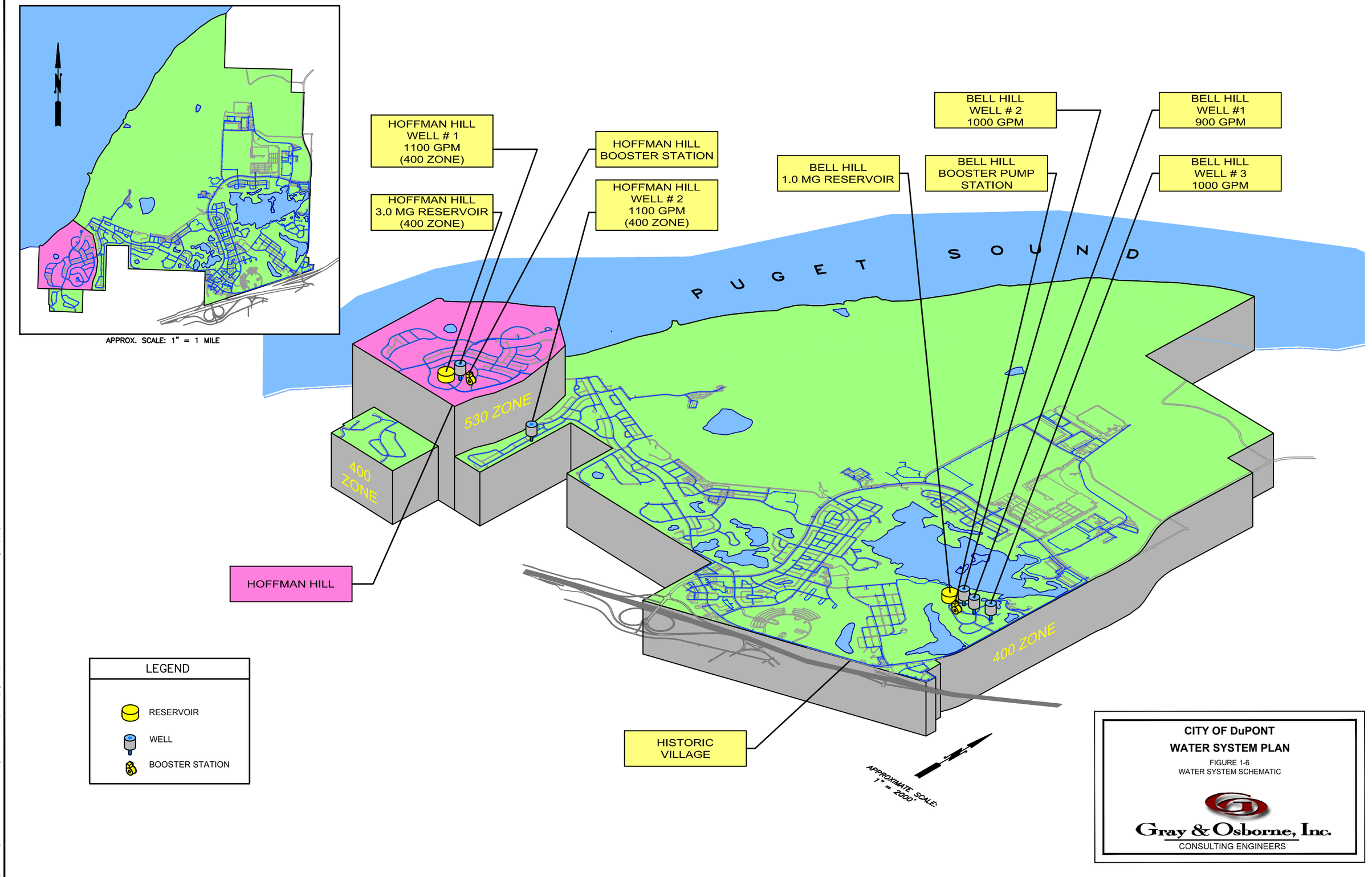
WATER SYSTEM PLAN

FIGURE 1-5

FEMA 100-YEAR FLOODPLAIN MAP

Gray & Osborne, Inc.

CONSULTING ENGINEERS



L:\DUPONT\18249.00 2018 Water System Plan Update\Figures\3D Water Pressure Schematic.dwg, 7/11/2019 11:21 AM, JOSH FINLEY

TABLE 1-5 – (continued)

Estimated Facilities Replacement/Rehabilitation Costs

System Component	Quantity	Estimated Replacement Cost (2018 $)
After 2038		
Bell Hill Reservoir	1	$1,200,000
Hydrants	90	$711,000
Sampling Stations	2	$6,000
Service Connections	3,093	$5,882,000
Valves	1,337	$3,468,700
Hoffman Hill Reservoir	1	$2,100,000
Water Mains, lineal feet, all sizes	256,714	$35,770,623
Subtotal After 2038		**$49,138,323**

SOURCE OF SUPPLY

The City of DuPont currently utilizes only groundwater sources for its water supply. The City holds water rights for two decommissioned wells in the Historic Village, three active wells at Bell Hill, two active wells at Hoffman Hill, and one decommissioned well in El Rancho Madrona. (Historic Village Wells 1 and 2 and the El Rancho Madrona well have been decommissioned pursuant to Ecology regulations.)

The three Bell Hill wells and two Hoffman Hill wells supply the City water system from deeper aquifers that have low susceptibility to contamination. Bell Hill Wells 1 and 2 are equipped with an auxiliary power generator for continuous operation during power outages. Bell Hill Wells 1 and 2 are developed in different aquifers, with Well 2 experiencing a high concentration of manganese. In order to utilize Well 2, blending with Well 1 is required, however this does not allow for full utilization of the City's water right. Consequently, a third well, Bell Hill Well 3 was drilled in the same aquifer as Well 1 in order to maximize the blending potential of Well 2 and allow for more full utilization of the water right. Bell Hill Well 3 is located approximately 1,150 feet east of the previously installed Bell Hill Wells 1 and 2.

The two Hoffman Hill wells are situated in the southwest portion of the City in the vicinity of the El Rancho Madrona neighborhood. Both wells utilize a single water right. Under normal operating conditions, the Hoffman Hill wells act as the primary source for the water system. The proposed operation strategy is discussed in Chapter 3, System Analysis.

Wellhead protection is discussed in detail in Chapter 5, Wellhead Protection, of this Plan. The City of DuPont's active well sources are summarized in Table 1-6.

TABLE 1-6

Existing Sources

DOH Source Number	Well	Depth, feet	Aquifer	Static Water Level, feet below top of casing	Well Pumping Capacity, gpm
S03	Bell Hill Well 1	300	Upper Salmon Springs	186	900
S04	Bell Hill Well 2	516	Undifferentiated/Outwash/Lakewood Glacial	187	1,000
S06	Bell Hill Well 3	282.5	Upper Salmon Springs	186	1,000
S05	Hoffman Hill Well 1	497	Upper Salmon Springs	323	1,100
S09	Hoffman Hill Well 2	375	Upper Salmon Springs	221	1,100
Total Pumping Capacity					**5,100**

Bell Hill

Bell Hill Well 1, which is completed in the Upper Salmon Springs Aquifer, was originally drilled in 1988 to a depth of 554 feet to allow for testing of a deeper Older Undifferentiated Outwash Aquifer. The upper 300 feet of Bell Hill Well 1 was drilled with 16-inch casing. An additional 254 feet was drilled with 12-inch casing to penetrate the deeper aquifer. Following testing of the deep aquifer, the 12-inch casing was removed and the lower 254 feet of the well was filled with pea gravel and with bentonite where aquitards were present. The well was subsequently completed in the Upper Salmon Springs Aquifer. The static water level in Well 1 provides approximately 62 feet of available drawdown to the top of the screen assembly. As previously noted under the heading *Water System History*, Bell Hill Well 1 was rehabilitated in 2017 by brushing the casing and surging the well screen, and a new pump was installed.

The upper 362 feet of Bell Hill 2 was drilled in 1990 with a 20-inch casing. The remaining 154 feet was drilled with 16-inch casing for completion in the Undifferentiated Outwash/Lakewood Glacial Aquifer. The static water level provides about 269 feet of available drawdown. The maximum usable drawdown based on mean sea level is approximately 98 feet below the static water level. No drawdown was observed in Well 1 during pump testing of Well 2. The Bell Hill facility control system operates the wells according to operator selected water level set points in the adjacent Bell Hill reservoir. Bell Hill 2 has a high manganese concentration and must be blended in order to reduce the level of manganese below the maximum contaminant level (MCL) and utilize the full water right.

Bell Hill Well 3 was completed in 1998 in the same aquifer as Well 1. The 20-inch cased well is screened between 197 and 261 feet below ground surface, which is 18 to 46 feet above mean sea-level (MSL). This well was drilled to provide additional, high quality water for blending to allow optimum utilization of Well 2.

There is a noticeable hydrogeological interference between Wells 1 and 3. To manage this interference, Well 3 has been equipped with Well Saver© software so that when the water level in Well 3 drops below an adjustable set point the pump control valve is throttled reducing flow. Well 1 is equipped with a low well shut off feature.

Hoffman Hill

Hoffman Hill Well 1 is located next to the Hoffman Hill reservoir at a surface elevation of approximately 385 feet. This well was completed in 1998 to a depth of 497 feet, with a screened between depths of 415 and 490 feet, which is between elevations of 30 feet to 105 feet below sea level.

Hoffman Hill Well 2 is located near the intersection of Hoffman Hill Boulevard and Burnside Place, approximately 1,900 feet east northeast of Hoffman Hill Well 1, at a surface elevation of approximately 288 feet. This well was completed in 2003 to a depth of 375 feet, with a screened interval between depths of 295 and 375 feet, which is between elevations of 7 feet to 87 feet below sea level.

Both Hoffman Hill wells are completed in a geological strata known as the Salmon Springs Aquifer.

WATER RIGHTS

All appropriations of water for public use within Washington State must be made in accordance with established water rights procedures, which govern the withdrawal and use of water. The City of DuPont's existing water rights include maximum instantaneous and total annual withdrawal limitations, and are summarized in Table 1-7 along with the nominal pumping capacities for the City's active wells. Copies of the City's water right certificates and the Water Right Self-Assessment forms are included in Appendix C.

TABLE 1-7

City of DuPont Water Rights

Water Right Number	Points of Withdrawal	Current Well Pumping Capacity, gpm	Priority Date	Maximum Instantaneous Withdrawal, gpm	Maximum Additive Annual Withdrawal, acre-ft/yr	Maximum Non-Additive Annual Withdrawal, acre-ft/yr
G2-27326C	Bell Hill Well 1	900	22-Apr-88	900	1,149	0
G2-27450P	Bell Hill Well 2 (1)	1,000	7-Nov-88	1,000	1,237	0
G2-29489	Bell Hill Well 3	1,000	25-Apr-97	1,000	0 (2)	1,210 (2)
G2-27663	Hoffman Hill Well 1	1,100	1-Dec-89	2,200	774 (3)	1,922 (3)
	Hoffman Hill Well 2	1,100				
Subtotals, Active Sources				**5,100**	**3,160**	
G2-00800S (636)	Historic Village Well 1 (4)	--	11-Nov-25	60	44	0
G2-00799S (635)	Historic Village Well 2 (4)	--	11-Nov-25	150	138	0
G2-20970C	El Rancho Madrona Well	--	27-Apr-73	80	18	0
Subtotals, Decommissioned Sources				**290**	**200**	
TOTALS				**5,390**	**3,360**	
Pending Water Rights						
G2-30221 - New	2 Future Wells		15-Dec-04	3,150	3,811	
G2-GWC170 @ 2 - Change	Hoffman Hill Wells 1 and 2		22-Jun-09	450	320	

(1) Bell Hill Well 2 is capable of producing 1,000 gpm, however, due to high manganese concentrations the well is limited to a withdrawal rate of approximately 600 gpm for blending with Bell Hills Wells 1 and 3.

(2) The annual quantity permitted under right G2-29489 is entirely Supplemental (Non-Additive). According to the Record of Examination, the annual quantity permitted under this right is based on a 18-hour-per-day pumping schedule at a rate of 1,000 gpm. The water right document does not state which rights this amount it is supplemental to. Therefore, it is assumed to be supplemental to all prior rights held by the City of DuPont.

(3) The annual quantity permitted under right G2-27663 is Partially Supplemental (Non-Additive). According to the Record of Examination, the annual quantity permitted from these wells is based on a 12 to 14-hour-per-day pumping schedule at a rate of 2,200 gpm. The permit authorizes 774 acre-feet per year as a primary allocation, and 1,922 as supplemental to rights already held by the City of DuPont.

(4) Certificates 635 and 636 were issued as municipal water rights and are thus not automatically subject to relinquishment for non-use.

The water rights summary describes the maximum instantaneous withdrawal and the maximum annual withdrawal. An instantaneous water right represents the maximum pumping capacity of a well or maximum diversion rate for a spring or surface water source. As shown in Table 1-7, the nominal well pumping capacities for each of the City's active well sources are in compliance with the maximum instantaneous withdrawal limitations of associated water rights.

All of the City's wells operate under municipal water rights that are not automatically subject to relinquishment for non-use. However, a water right could be deemed to be abandoned if no valid point of withdrawal currently exists for the right. For this reason, the City intends to pursue designation of one or more of its existing wells as a point or points of withdrawal under the El Rancho Madrona and Historic Village water rights.

In 2004 the City of DuPont applied for an additional water right in the amount of 3,150 gpm and 3,811 ac-ft/yr. The application was assigned the number G2-30221, but to date no action has been taken on that application.

Other Water Rights in the Area

Additional water rights within the DuPont service area, including those held by CalPortland and Weyerhaeuser, are described in Table 1-8. Three Weyerhaeuser water rights were consolidated in April 2002 and are utilized for irrigation purposes on the golf course. The City submitted an Application for Change/Transfer for this water right (see Table 1-7 and Appendix C).

TABLE 1-8

Additional DuPont Area Water Rights

Source	Water Right Numbers	Priority Dates	Maximum Instantaneous Withdrawal, gpm	Maximum Annual Withdrawal, acre-ft/yr
Weyerhaeuser	G2-08070C	May 20, 1948	1,250	690.5
CalPortland	G2-27716A	March 12, 1990	600	960

CalPortland (formerly Lonestar NW and Glacier NW) owns and operates a large gravel pit and a small concrete batch plant in the City of DuPont, which both require large quantities of water that are withdrawn under their water rights.

TREATMENT

Bell Hill Well 2 exceeds the secondary maximum contaminant level (MCL) for manganese. This problem has been mitigated by blending this source with Bell Hill Wells 1 and 3. Wells 1 and 3 have excellent water quality. Blending is accomplished by adjusting pump run time cycles. To provide for adequate blending the flow rate from

Bell Hill Well 2 is generally limited to about 600 gpm. When needed, Bell Hill Well 2 can pump up to 1,000 gpm, but the result it a temporary rise in the amount of iron and manganese in the Bell Hill reservoir. After blending, the water is chlorinated prior to storage in the one million-gallon (MG) Bell Hill Reservoir. A 12 percent liquid sodium hypochlorite feed system is utilized at the Bell Hill site.

Water pumped via the vertical turbine pumps at the Hoffman Hill Wells is chlorinated prior to storage in the approximate 3.5 MG Hoffman Hill Reservoir. An on-site chlorine generation system is utilized at the Hoffman Hill site.

The operation and maintenance of the treatment system is discussed in more detail in Chapter 6.

INTERTIES

The City of DuPont has one emergency intertie with Joint Base Lewis-McChord (JBLM). The JBLM intertie, which is fed from a higher pressure zone, feeds into the DuPont water system's 400-foot pressure zone. A 6-inch meter is installed at the intertie located on 8-inch water mains between the City of DuPont and JBLM. The maximum design flow rate for the intertie is estimated as 1,000 gpm. Since the hydraulic gradeline (HGL) of the JBLM water system is normally slightly above the HGL of the DuPont system, intertie flow would normally be from JBLM to DuPont. There is no pump at the intertie, however, in an emergency situation where the JBLM gradeline falls below that of the DuPont system, water from DuPont could also be used to supply JBLM.

Both the City of DuPont and JBLM must open separate valves to activate the intertie system. In order to activate the intertie, the City of DuPont must contact JBLM and JBLM personnel must physically open their secondary valve. The City of DuPont and Fort Lewis (prior to merger of Fort Lewis and McCord Airforce Base into JBLM) developed an Interlocal Agreement in 1997 to formalize the conditions and requirements to access water, and the City and JBLM have operated under this agreement since 1997, but the agreement has never been finalized. The City and Fort Lewis also developed a *Memorandum of Understanding for Sale of Utilities Services* regarding the intertie in 1989, which was signed February 1, 1989. A Draft copy of the *Inter-Governmental Agreement between the City of DuPont and Fort Lewis for Emergency Water Supply Interties* and *the Memorandum of Understanding for Sale of Utilities Services* dated February 1, 1989 are included in Appendix D.

STORAGE

The City of DuPont currently owns and operates two storage facilities: the 1.0 million gallon (MG) reservoir located at Bell Hill and the 3.5 MG Hoffman Hill Reservoir. The reservoirs both serve the main 400-foot HGL pressure zone.

Bell Hill

The 1.0 MG precast, post-tensioned concrete reservoir at Bell Hill was constructed in 1991 to provide storage for the City's LID #88-1 area. The Bell Hill Reservoir's interior diameter is 85 feet with a height of 23.75 ft. The base elevation of the reservoir is approximately 250 feet MSL, providing an overflow elevation of 273.75 feet. The reservoir is served by the three adjacent Bell Hill wells. The reservoir supplies the City water system via the Bell Hill Pump Station, which boosts the pressure to the approximate 400-foot HGL.

Hoffman Hill

The 3.5 MG steel reservoir at Hoffman Hill was constructed in 1999 to provide storage capacity for the planned expansion of the City of DuPont. The Hoffman Hill Reservoir's interior diameter is 160 feet with a height of 24 feet. The base elevation of the reservoir is approximately 378 feet MSL, and the overflow elevation is 401.5 feet. The reservoir is served by the two adjacent Hoffman Hill wells. The reservoir supplies the City water system via the distribution system along the McNeil Street extension.

Table 1-9 is a summary of the City's water storage facilities.

TABLE 1-9

Storage Facilities

Name	Type	Zone	Nominal Capacity, gallons	Year Constructed	Height to Overflow, feet	Diameter, feet	Overflow Elevation, feet
Bell Hill	Concrete	400	1,010,000	1991	23.75	85	273.75
Hoffman Hill	Steel	400	3,530,000	1999	21.50	160	401.50

PRESSURE ZONES

The City of DuPont water system operates on two pressure zones. The 400-foot Hydraulic Gradeline (HGL) zone provides service to the Palisade Village, DuPont Station, Edmond Village, Manufacturing Research Park, Industry, and portions of the Civic Center, Fort Lake Business and Technology Park, Historic Village, and Sequalitchew Village. The Hoffman Hill Booster Pump Station supplies water to the 530-foot HGL zone, a closed zone, which includes portions of the Hoffman Hill Village in the vicinity of the Hoffman Hill Reservoir. Water from the Bell Hill Booster Pump Station and Hoffman Hill Reservoir serves the areas listed above at a nominal 400-foot HGL zone, controlled by the water level in the Hoffman Hill Reservoir. The Historic Village was formerly a third pressure zone, with a 360-foot HGL, served from the 400-foot pressure zone through two pressure reducing valves (PRVs). However, the

PRVs have been removed and the Historic Village is now part of the 400-foot pressure zone. Figure 1-6 shows the pressure zones and service areas.

BOOSTER STATIONS

The City of DuPont owns and operates two booster pump stations. The Bell Hill Booster Pump Station pumps from the Bell Hill Reservoir into the 400-foot pressure zone, and the Hoffman Hill Booster Pump Station pumps from the Hoffman Hill Reservoir into the 530-foot pressure zone.

Bell Hill

The Bell Hill Booster Pump Station is equipped with six vertical turbine pumps, which supply the 400-foot pressure zone of the City water system from the 1.0 MG Bell Hill Reservoir. Pumps 1, 2, and 3 each have a nominal capacity of 1,350 gpm and are driven by 50-hp motors. Pumps 4 and 5 are 500 gpm in capacity with 20-hp motors. Pump 6 is driven by a 15-hp motor with a 350 gpm capacity. The pump station is fully operational via an auxiliary power generator in the event of a power outage.

An improvement project in 2017 included removal of the former cable-actuated valves on the discharge of Bell Hill Booster Pumps 1 through 6, installation of new hydraulic pressure sustaining valves on Booster Pumps 1 through 3, and installation of new globe style silent check valves on Booster Pumps 4 through 6. The work also included installation of a new Motor Control Center (MCC) containing reduced voltage soft starters for Bell Hill booster pumps 1 through 3, and variable frequency drives for booster pumps 4 through 6. A new control panel for the Bell Hill booster pump station was also installed as part of this project.

The Bell Hill control system activates the Bell Hill Booster Pump Station pumps according to an operator specified sequence when low pressures are detected in the 400-foot pressure zone. The control system deactivates pumps sequentially as appropriate when the combined nominal flow rate of the operating pumps exceeds the net pump station demand from the water system.

Hoffman Hill

The Hoffman Hill Booster Pump Station is a skid mounted modular unit installed inside a building structure at the Hoffman Hill Reservoir site. This booster pump station was modified in 2017 to increase its capacity by replacing two 25-hp pumps with two 40-hp pumps. In total, four variable speed pumps are incorporated into the station to serve existing and future connections in the 530-foot pressure zone. Two of these pumps provide for peak day demands and are each capable of delivering 600 gpm at 150 feet of Total Dynamic Head (TDH). The other two variable speed pumps provide fire flow and are each capable of delivering 500 gpm at 150 feet of TDH, for a total installed capacity

of 2,200 gpm. With one of the largest pumps out of service (600 gpm), the remaining three pumps are capable of supplying up to 1,600 gpm.

Control of the Hoffman Hill Booster Pump station is maintained via a SCADA system similar to the Bell Hill facility with a Master Programmable Control (MPC) at City Hall and a Programmable Logic Control (PLC) at the booster station. The monitoring points for the booster station are integrated with the City of DuPont water telemetry system. In the event normal power service is interrupted, the station is equipped with a standby generator to keep the system operational until power service is restored.

Table 1-10 is a summary inventory of the City's booster pump station facilities.

TABLE 1-10

Booster Station Inventory

Booster Station	Date of Construction	Number of Pumps	Capacity per Pump, gpm	Motor
Bell Hill Booster Station	1992			
Bell Hill Pumps 1, 2, and 3		3	1,350	50 hp
Bell Hill Pumps 4 and 5		2	500	20 hp
Bell Hill Pump 6		1	350	15 hp
Total Rated Capacity		**6**	**5,400**	
Reliable Capacity (1)		**5**	**4,050**	
Hoffman Hill Booster Station	2003			
Hoffman Hill Pumps 1 and 2		2	600	30 hp
Hoffman Hill Pumps 3 and 4		2	500	30 hp
Total Rated Capacity		**4**	**2,200**	
Reliable Capacity (1)		**3**	**1,600**	

(1) Reliable Capacity is the capacity with the largest pump out of service.

DISTRIBUTION SYSTEM

The existing distribution system in the Northwest Landing portion of the City water system includes primarily 8-, 12-, and 16-inch-diameter ductile iron (DI) mains, which have primarily been installed subsequent to construction of the various Bell Hill (1992) and Hoffman Hill (1999) facilities.

Significant upgrades to the Historic Village system were made in 2016 and 2017, which, combined, have replaced essentially all of the distribution facilities in the Historic Village area. Piping improvements have also included the completion of a small number of loops to complete the piping grid in the Historic Village.

The original El Rancho Madrona distribution system was constructed as a separate water system in the late 1960s and was primarily comprised of 6-inch-diameter AC pipe. The

system was connected to the DuPont water system in 2010 and all the AC pipe was replaced in 2012 with new ductile iron water pipe.

In 1997, construction of an emergency intertie with the adjacent Joint Base Lewis-McChord (formerly Fort Lewis) water system was completed. Figure 1-7 depicts the City of DuPont water distribution system layout.

Table 1-11 is an inventory of the pipes in the City of DuPont water system including pipe diameter, material, ownership, and approximate length as of year 2018, based on available comprehensive GIS mapping of the system. The total of 374,847 feet is almost 71 miles of water pipe. Approximately 14.3 percent of the water pipe listed in Table 1-11 is owned by private parties. These are primarily water mains that feed fire hydrants around private industrial and commercial properties. Water pipes listed under 3 inches in diameter are primarily water service lines, blow-off lines, sample station lines, and air/vac assembly lines. Over 72 percent of the water mains (by length) are Ductile Iron (DI). The table lists DI and CI (Cast Iron) together for convenience, but of the 270,447 feet of ductile and cast iron pipe, only 292 feet (0.11 percent) is cast iron. There are still some small areas that have a total of 819 feet (0.2 percent) of AC pipe. The table lists 50,219 feet (13.4 percent) of "other" pipe. This is primarily pipe that has no designation in the records as to what type of pipe it is, but also includes small amounts of galvanized and steel pipe.

LEGEND:

WATER LINES

- 3"
- 4"
- 6"
- 8"
- 10"
- 12"
- 16"

Pipes of diameter smaller than 3" not shown for clarity

- WATER VALVES
- WATER WELLS
- DuPONT CITY LIMITS
- PROPERTY LINES

PUGET SOUND

N

WHARF ROAD

WATERLINE ACCESS ROAD

DUPONT-STEILACOOM RD

POWERLINE RD.

CENTER DR.

INTERNATIONAL WAY

WETLAND #10

EDMOND MARSH

OLD FORT LAKE

BELL HILL BOOSTER PUMP STATION

WELL #3

WELL #2

BELL HILL RSERVOIR

WELL #1

DAVIS PL.

BELL HILL PL.

DUPONT AVE.

LOWER DR.

HASKELL ST.

BELL MARSH

REGIONAL STORMWATER FACILITIES

MARTIN ST.

MAXEL ST.

HYLAND ST.

WALLACE ST.

ARNOLD ST.

METER ST.

MCNEIL ST.

EHRLES ST.

BOB'S HOLLOW LN.

POND LAKE

STRICKLAND LAKE

GRANT LAKE

WETLAND #11

WETLAND #8

GARDEN OAKS AVE.

HAMMOND AVE

PALISADE BLVD

THOMPSON ST.

WILMINGTON DR.

LAKE SELLERS

BARKSDALE AVE.

WETLAND #12

RIDGE VIEW DR.

SHELTAIR DR.

BEACHVIEW RIDGE AVE.

HOFFMAN HILL BLVD.

BURNSIDE PL.

HOFFMAN HILL WELL #2

HOFFMAN HILL WELL #1 AND BOOSTER PUMP STATION

HOFFMAN HILL RESERVOIR

LARSEN DR.

MADRONA DR.

MOUNTS RD.

0 600 1,200 2,400

SCALE: 1"=1,200'

CITY OF DUPONT

WATER SYSTEM PLAN

FIGURE 1-7

WATER SYSTEM FACILITIES

Gray & Osborne, Inc.

CONSULTING ENGINEERS

L:\DUPONT\16249.00 2018 Water System Plan Update\Figures\Draft Figures\FIG 1-7 Water System Facilities.mxd

TABLE 1-11

Pipe Length (feet) by Size (inches), Material, and Ownership

Pipe Size	City of DuPont Owned							Private Owned						Totals
	HDPE/ PE	Copper	DI/CI	AC	PVC/ CPVC	Other	Subtotal, City	HDPE/ PE	Copper	DI/CI	PVC/ CPVC	Other	Subtotal, Private	
0.5	0	0	0	0	0	0	0	168	0	0	0	0	168	168
0.75	2,436	1,957	0	0	0	371	4,764	268	0	0	49	12	329	5,093
1	19,999	4,647	0	0	0	21,381	46,027	1,406	551	0	46	262	2,266	48,293
1.25	640	0	0	0	0	190	830	191	0	0	0	0	191	1,021
1.5	343	79	145	0	23	195	785	490	114	12	364	134	1,114	1,899
2	6,943	657	155	0	99	3,234	11,087	2,562	0	1,153	6,383	4,196	14,294	25,381
2.5	0	0	0	0	127	0	127	239	0	0	0	52	290	417
3	0	0	58	0	555	105	718	0	0	221	1,416	372	2,009	2,726
4	0	0	1,089	552	0	417	2,057	0	0	3,818	0	899	4,717	6,773
6	3	0	17,693	0	0	1,758	19,454	0	0	5,628	608	2,637	8,872	28,326
8	0	0	141,797	267	0	3,261	145,325	0	0	3,084	0	908	3,991	149,316
10	0	0	119	0	0	0	119	0	0	5,954	0	0	5,954	6,073
12	0	0	53,817	0	0	5,714	59,532	0	0	5,233	0	4,123	9,356	68,888
16	0	0	30,471	0	0	0	30,471	0	0	0	0	0	0	30,471
Totals	30,364	7,340	245,344	819	804	36,624	321,295	5,325	665	25,103	8,866	13,594	53,552	374,847
Percents	8.1%	2.0%	65.5%	0.2%	0.2%	9.8%	85.7%	1.4%	0.2%	6.7%	2.4%	3.6%	14.3%	100.0%

ADJACENT PURVEYORS

The City of DuPont's only adjacent water purveyor is the Joint Base Lewis-McChord. Currently, an emergency intertie exists between the City water system and JBLM. Use of the intertie is for emergency purposes only and is accessed by both the City of DuPont and JBLM opening valves. Figure 1-8 shows the JBLM water system boundary with the City of DuPont water system.

RELATED PLANNING DOCUMENTS

The following previous engineering studies and planning documents were consulted in the preparation of the 2018 Water System Comprehensive Plan:

- **The City of DuPont Water System Comprehensive Plan, Gray & Osborne, Inc., August 2011 (DOH approved in December 2012)**

  This document discussed planning issues such as historical development, population projections, and existing and proposed land use. A hydraulic evaluation of the DuPont's two separate water systems, the City system and El Rancho Madrona was conducted. Design standards were presented followed by recommended improvements. Improvements were recommended to source capacity by adding a new production well or well field. Storage improvements were recommended that included reservoir inspections and cleaning. A majority of the capital improvement recommendations were water line replacements, connection of the El Rancho Madrona water system to the City of DuPont and booster station upgrades.

- **Pierce County Coordinated Water System Plan and Regional Supplement 2001, Pierce County Department of Public Works and Utilities Water Programs Division, (April 2001)**

  This document is the "Regional Supplement of the Pierce County Coordinated Water System Plan" (CWSP). The CWSP consists of two parts' the "Regional Supplement," which presents an assessment of water supply needs in Pierce County and a program to meet those needs; and individual "Water System Plans" prepared by the utilities for their designated service area. The Plan affects only public water supply systems. The individual water system plans are prepared within established guidelines and must be consistent with the policies and procedures of this "Regional Supplement." Those individual water system plans that have been reviewed by the County and approved by the Washington State Department of Health (DOH) are incorporated by reference as part of this Plan and are on file with the County. As of

LEGEND:

WATER LINES

- 3"
- 4"
- 6"
- 8"
- 10"
- 12"
- 16"

Pipes of diameter smaller than 3" not shown for clarity

- WATER VALVES
- PRV
- WATER WELLS
- RETAIL SERVICE AREA (RSA)
- DuPONT CITY LIMITS
- PROPERTY LINES

N

0 900 1,800

SCALE: 1"=1800'

PUGET SOUND

JBLM GOLF COURSE

JBLM

OLD FORT LAKE

REGIONAL STORMWATER FACILITIES

POND LAKE

STRICKLAND LAKE

GRANT LAKE

EDMOND MARSH

BELL MARSH

WETLAND #12

WETLAND #11

WETLAND #8

WETLAND #70

HOFFMAN HILL WELL #2

HOFFMAN HILL WELL #1 AND BOOSTER PUMP STATION

HOFFMAN HILL RESERVOIR

BELL HILL BOOSTER PUMP STATION

WELL #2

WELL #3

BELL HILL RESERVOIR

WELL #1

WHARF ROAD

WATERLINE ACCESS ROAD

POWERLINE RD.

DUPONT-STEILACOOM RD.

CENTER DR.

INTERNATIONAL AVE.

MARTIN ST.

McNEIL ST.

CHARLES ST.

BOB'S HOLLOW LN.

HAMMOND AVE.

PALISADE BLVD.

DUPONT AVE.

LOUTSIS AVE.

HASKELL ST.

BELL HILL PL.

DAVIS PL.

BARKSDALE AVE.

LAKE SELLERS

WILMINGTON DR.

THOMPSON ST.

HYLAND

WALLACE

ARNOLD ST.

MEYER ST.

LINDSON AVE.

GARRY OAK AVE.

RIDGEVIEW DR.

SINCLAIR DR.

BACKENRIDGE AVE.

PINE MEADOW AVE.

BURNS DELL PL.

LARSLEY DR.

MADRONA PL.

MOUNTS RD.

INTERSTATE 5

August 2018 the County is beginning the process of updating the Coordinated Water System Plan, a process that the County anticipates may take one to two years.

- **City of DuPont 2015 Comprehensive Plan Periodic Update, City of DuPont, (October 2015 with subsequent amendments)**

  This document was prepared in accordance with the Growth Management Act (GMA) to provide guidance for future legislative and administrative actions concerning such issues as land use, zoning, population, employment, and utilities. The Plan establishes goals and policies for land use, environmental systems, open space, parks, and recreation, transportation, housing, capital facilities, utilities, and the natural environment.

RETAIL SERVICE AREA CHARACTERISTICS

RETAIL SERVICE AREA

The City's 2015 Comprehensive Plan Periodic Update established 20-year land use and growth projections for the City limits. Figure 1-2 shows the land use map from that Plan. The City limits encompass approximately 3,773 acres. According to the City's Comprehensive Plan, development within the service area was projected to occur in the following areas: Palisade Village (completed), DuPont Station, Edmond Village (completed), Manufacturing Research Park and Industry, Yehle Park Village (completed), Fort Lake Business and Technology Park, Hoffman Hill Village (including the former El Rancho Madrona), Historic Village (completed), Civic Center, and Sequalitchew Village.

The City of DuPont has identified its Retail Service Area (RSA) in Figure 1-8. (The City's Water Service Area is the same as its Retail Service Area.) The City's RSA is mostly coincident with the City Limits, but does include one parcel immediately outside the southwest portion of the City Limits (18505 Mounts Road SW), as well as various facilities which are located on the JBLM Golf Course. The City does not currently provide service outside the City Limits, but does plan to do so in the future within its RSA. It is anticipated that there will be no significant impacts to the City's water system associated with providing service to 18505 Mounts Road SW or the JBLM Golf Course facilities. Service to the JBLM Golf Course will be to facilities requiring potable water and will not include a significant amount of water for irrigation. Furthermore, the JBLM Golf Course will be solely responsible for any new water infrastructure required on its property as part of receiving service from the City. It is anticipated that a master meter will be installed within City Limits near the future connection point between the City and JBLM Golf Course water infrastructure.

As outlined in DOH's *Duty to Provide Service Requirement* fact sheet (DOH 331-366), the City has a duty to provide service to all requests within its RSA unless the City can describe how a situation does not meet one or more of the following four threshold factors bulleted below.

- **Capacity**: The City must have sufficient capacity to serve water in a safe and reliable manner.
- **Consistency**: The service request must be consistent with adopted local plans and development regulations.
- **Water Rights**. The City must have sufficient water rights to provide service.
- **Timely and Reasonable**. The City must be able to provide service in a timely and reasonable manner.

ZONING AND FUTURE LAND USE

The City of DuPont 2015 Comprehensive Plan Periodic Update with Amendments lists zoning and future land use area by village. The City's comprehensive Plan does not distinguish between zoning and future land use, the assumption being that future land use will follow current zoning. Table 1-12 shows land use areas by zoning category for all of the City's villages.

The water system will continue to expand as development occurs within the City limits. The City of DuPont is expected to reach build out in the next 20 years according to the Comprehensive Plan.

TABLE 1-12

Land Use Zoning by Village

Zoning	Bell Hill	Civic Center	DuPont Station	Edmonds	El Rancho Madrona	Fort Lake BTP	Historic	Hoffman Hill	MRP&I	Palisade	Sequal-itchew	Yehle Park	Totals
Residential 3, acres	0.00	0.00	0.00	0.00	18.00	0.00	53.35	0.00	0.00	0.00	0.00	0.00	71.35
Residential 4, acres	30.99	0.00	0.00	0.00	0.00	0.00	0.00	241.28	0.00	0.00	0.00	0.00	272.27
Residential 5, acres	0.00	0.00	0.00	44.65	0.00	0.00	0.00	0.00	0.00	122.98	0.00	201.90	369.53
Residential 12, acres	0.00	12.57	0.00	5.59	0.00	0.00	3.00	21.14	0.00	26.10	0.00	18.07	86.47
Reserve Residential, acres	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	413.81	0.00	413.81
Mixed Use, acres	0.00	18.36	60.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	79.07
Office, acres	0.00	0.00	54.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	54.89
Commercial, acres	0.00	0.00	5.76	0.00	0.00	0.00	22.04	0.00	0.00	0.00	0.00	0.00	27.80
Business Technology Park, acres	0.00	0.00	0.00	0.00	0.00	509.40	0.00	0.00	0.00	0.00	0.00	0.00	509.40
Manufacturing and Research, acres	2.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	243.62	0.00	233.31	0.00	479.78
Industry, acres	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	182.42	0.00	0.00	0.00	182.42
Military, acres	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	290.42	0.00	0.00	0.00	290.42
Neighborhood Park, acres	0.43	0.00	0.00	1.36	0.00	0.00	9.35	8.67	0.00	0.00	0.00	11.16	30.97
Community Park, acres	3.34	3.26	3.96	0.00	0.00	4.56	0.00	0.00	0.00	1.22	20.37	27.84	64.55
Open Space, acres	25.08	22.22	9.96	2.46	0.00	142.55	78.41	119.21	186.46	13.83	177.76	62.35	840.29
Total, acres	62.69	56.41	135.28	54.06	18.00	656.51	166.15	390.30	902.92	164.13	845.25	321.32	3,773.02

SERVICE AREA POLICIES AND CONDITIONS OF SERVICE

The Department of Health has established a list of policies that should be addressed in a water system comprehensive plan. Table 1-12 provides a list of these policies, description, and associated sections of City code that address the policy. The referenced City codes are included in Appendix E. In addition, in 1983 the Pierce County Council declared the entire County to be a Critical Water Supply Service Area. As such the Pierce County Coordinated Water Supply Plan (CWSP) was developed pursuant to RCW 70.116 (The Public Water System Coordination Act) and requires the signing of a Standard Service Area Agreement in order to establish a water service area. In 1994, the City of DuPont submitted such a Standard Service Area Agreement to the County. A copy of this agreement is included in Appendix E. In addition, Pierce County adopted Ordinance 2003-69, which adopted the 2001 Coordinated Water System Plan and Regional Supplement, and was codified as Chapter 19D.120 PCC in 2003. A copy of the Ordinance is included in Appendix E.

TABLE 1-13

City of DuPont Service Area Policies

Policy Name	Description	Current City Policy
Water Service Connections	Application for service. Conditions applicable to all water service connections, including new residential, commercial, and industrial connection fees	Chapter 21.01, 130, 140, 150, 160,170
Extensions Policy	Non-standard water service extension	Chapter 21.01, 190
Service Specifications	Owner's service piping specifications, plumbing specifications, lawn sprinkler specifications	Chapter 21.01, 200, 210, 220
Service Requirements	New installation for service, turn-on and turn-off charges, liability disclaimer, disconnection of service	Chapter 21.01, 240, 250, 260, 270, 280, 290
Meters Policy	Ownership and installation, exchange and reinstallation, maintenance and repair, tests and adjustment of bill	Chapter 21.01, 300, 310, 320, 330
Service Rates	Monthly water service rates and service trip charge	Chapter 21.01, 340, 350, 360

TABLE 1-14 – (continued)

City of DuPont Service Area Policies

Policy Name	Description	Current City Policy
Main Extensions	When required, application, preparation of plans and specifications, plan review, inspection fee (deposits), construction, acceptance, construction drawings, and deeds to the City	Chapter 21.01, 370, 380, 390, 400, 410, 420, 430, 440
Duty to Serve	Per Municipal Water Law (MWL), the City has a duty to provide Timely and Reasonable Water Service to all new connections within its Water System Retail Service Area (RSA), subject to certain conditions. Timelines and appeals procedures associated with City review of applications for development are described in the City's Land Use Code.	Chapter 25.175, 020, 060

CHAPTER 2

BASIC PLANNING DATA

OBJECTIVE

Basic planning data essential for the assessment of the City of DuPont's ability to meet future water demands is presented in this chapter. Information includes historical population growth and water demands, population projections by the Washington State Office of Financial Management (OFM), and projections of future water demand. Information is used to evaluate the capability of the existing system and determine future needs based on projected trends for the next 20 years.

HISTORIC POPULATION AND SERVICE CONNECTIONS

POPULATION

OFM intercensal and postcensal estimates of the population of DuPont are shown in Figure 2-1 for the period from 1990 through 2017. In 1992 the estimated population of DuPont was 592. Beginning in about 1996 the population of DuPont began to increase rapidly. By the year 2000 the population had increased to 2,452, and by 2010 the population had increased to 8,199. The estimated population for 2017 was 9,385.

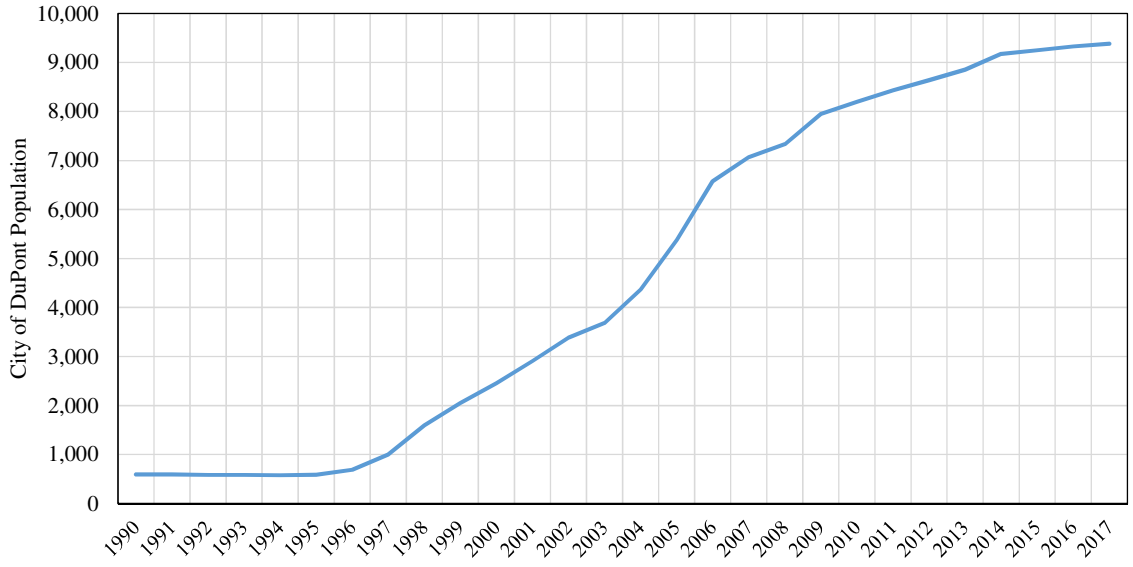


FIGURE 2-1

Historic DuPont Population

Annual OFM official April 1 population estimates for DuPont from 2010 through 2017 are shown in Table 2-1.

TABLE 2-1

OFM Official April 1 Population Estimates for DuPont

Year	OFM Official Estimated Population	Percent Growth Rate
2011	8,430	-
2012	8,640	2.49%
2013	8,855	2.49%
2014	9,175	3.61%
2015	9,250	0.82%
2016	9,330	0.86%
2017	9,385	0.59%
Average Annual Growth Since 2010		**1.80%**

Annual percent population increases since 2011 have ranged from a high of 3.61 percent between 2013 and 2014 to a low of 0.59 percent between 2016 and 2017. From Figure 2-1 as well as from Table 2-1 it appears that growth in DuPont has slowed over the past few years. The overall annual growth rate from 2011 to 2017 has been 1.80 percent per year.

SERVICE CONNECTIONS

Service connection data for this Plan is based on billing data from 2011 through 2017. The utility billing software breaks down water service by customer class and meter size. Table 2-2 shows the City's customer classes meter sizes and the number of active service connections as of the end of 2017. All City of DuPont services are metered. However, it should be noted that the billing data includes only the active water connections. The number of active connections can change from billing period to billing period due not only to addition of new connection, but also due to inactivation of existing connections and connections that have more than one billing account due to change of ownership during a billing cycle.

TABLE 2-2

Number of Service Connections by Meter Size (2017)

Water Service Description	No. of Connections (2017)
Single Family	2,780
Life Line [(1)]	4
Multi-Family 1-Inch	2
Multi-Family 1-1/2-Inch	29
Multi-Family 2-Inch	25
Multi-Family 4-Inch	3
Commercial 5/8-Inch	9
Commercial 1-Inch	20
Commercial 1-1/2-Inch	19
Commercial 2-Inch	28
Commercial 3-Inch	10
Commercial 4-Inch	1
Commercial 6-Inch	1
Hydrant Permit	11
Industrial 3-Inch	2
Industrial 6-Inch	1
Irrigation 1-Inch	43
Irrigation 1-1/2-Inch	20
Irrigation 2-Inch	32
Irrigation 3-Inch	2
Irrigation 6-Inch	0
Fire line 1-Inch	56
Fire line 1-1/2-Inch	2
Fire line 2-Inch	40
Fire line 3-Inch	1
Fire line 6-Inch	4
Fire line 10-Inch	2
Totals	**3,147**

(1) Life Line is a designated reduced rate for a single-family residence.

Table 2-3, consolidates the meter size data from Table 2-2 into six customer classes plus hydrant permit. Life Line accounts are counted as Single Family Residential. The number of active billing accounts is taken from the last billing cycle of each year. Note that the total number of active billing accounts may not represent the total number of service connection on the water system because some accounts are inactive if homes or businesses are vacant, and sometimes a service connection may have more than one billing account if the connection changed ownership during the billing period.

TABLE 2-3

Year-End Service Connections by Customer Class (2011-2017)

Year	Single Family Residential (1)	Multi-Family Residential (2)	Commercial (3)	Industrial (4)	Irrigation (5)	Fire Line (6)	Hydrant Permit (7)	Totals
2011	2,793	53	61	3	125	87	3	3,125
2012	2,763	55	68	3	126	92	5	3,110
2013	2,775	56	77	3	131	97	4	3,142
2014	2,779	59	81	3	136	101	4	3,163
2015	2,772	59	82	3	139	103	5	3,163
2016	2,799	60	85	3	137	104	9	3,197
2017	2,784	59	88	3	97	105	11	3,147
Average Percent	88.3%	1.8%	2.5%	0.1%	4.0%	3.1%	0.2%	100.0%

(1) Life Line connections are included in Single-Family Residential totals.
(2) Multi-Family Residential connections include all Multi-Family meter sizes.
(3) Commercial connections include all Commercial meter sizes.
(4) Industrial connections include all Industrial meter sizes.
(5) Irrigation connections include all Irrigation meter sizes.
(6) Fire Line connections include all Fire Line meter sizes.
(7) Hydrant permits are temporary and can be used on any hydrant designated by the City

HISTORIC WATER SYSTEM DEMANDS

In this section historic system demands are examined in terms of production by source and sales per connection by customer class in the City of DuPont. This information is later used to project future water system demands and evaluate water use efficiency.

WATER PRODUCTION

Water production data is collected by two methods: (1) Daily telemetry recordings from source meters at the wells, and (2) a totalizer meter located at each wellhead and read on a monthly basis. Monthly water production is from totalizer meter readings. Daily maximum production is from telemetry data.

Monthly water production by source is shown in Figure 2-2. From the chart it can be seen that Hoffman Hill Wells 1 and 2 have been producing the bulk of the water supply for the City. Bell Hill Well 1 has been contributing a significant share. Bell Hill Well 3 produced a significant share of the supply in June through August 2015 and in January through November 2017 while other wells were out of service. Bell Hill Well 2 production has been so small that it is practically invisible on this chart. It can also be seen that total production for the years 2015 through 2017 is higher than for previous years.

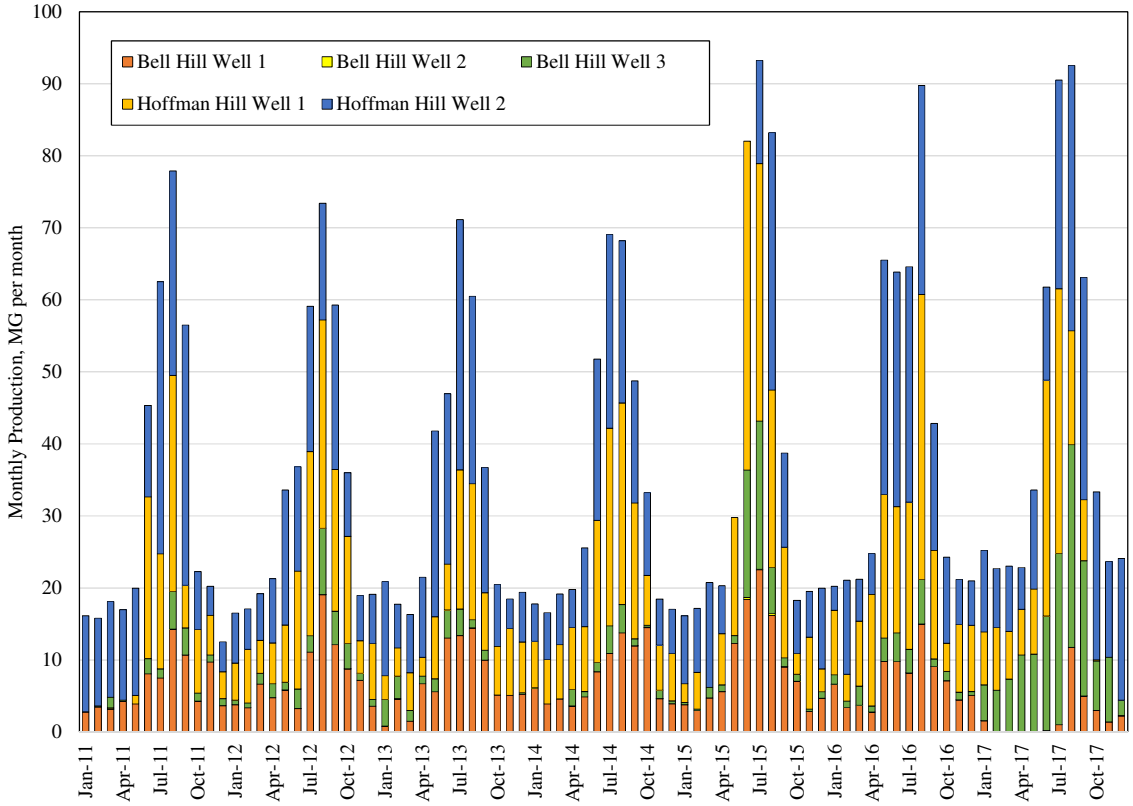


FIGURE 2-2

Monthly Water Production by Source

Table 2-4 shows total annual water production history by source and average daily total production from 2011 through 2017. It can be clearly seen from the table that Hoffman Hill Wells 1 and 2 have been the City's most productive sources. Bell Hill Well 1 has been producing about half of the volume of either Hoffman Hill well, and Bell Hill Well 3 has been producing about half of the volume of Bell Hill Well 1. Bell Hill Well 2 has generally contributed only a small percentage of the total well production. It can also be seen in the table, as in Figure 2-2, that water production in 2015 through 2017 was greater than for previous years. Average daily well production for all wells ranged from a low of 1.053 million gallons per day (MGD) for 2011, to a high of 1.415 MGD for 2017. Average daily production for 2011 through 2017 was 1.192 MGD, whereas average day production for 2016 and 2017 averaged 1.363 MGD.

TABLE 2-4

Annual Metered Water Production

Year	Bell Hill Well 1, MG	Bell Hill Well 2, MG	Bell Hill Well 3, MG	Hoffman Hill Well 1, MG	Hoffman Hill Well 2, MG	Totals, MG	Average Daily Production, MGD
2011	75.54	0.22	17.37	93.60	197.49	384.22	1.053
2012	89.30	0.04	30.08	148.53	142.37	410.31	1.121
2013	85.42	0.12	21.56	99.22	185.58	391.88	1.074
2014	90.93	0.21	14.99	151.45	147.71	405.29	1.110
2015	110.01	0.61	52.17	168.58	127.70	459.06	1.258
2016	84.96	0.05	26.29	172.17	196.68	480.15	1.312
2017	25.98	0.15	144.20	132.00	214.06	516.38	1.415
Average, 2011 - 2017	80.30	0.20	43.81	137.93	173.08	435.33	1.192
Average, 2015 - 2017	73.65	0.27	74.22	157.58	179.48	485.198	1.328
Avg. Percent, 2011 - 2017	18.4%	0.0%	10.1%	31.7%	39.8%	100.0%	
Avg. Percent, 2015 - 2017	15.2%	0.1%	15.3%	32.5%	37.0%	100.0%	

Maximum Day Production

Daily production records were reviewed for the most recent 7-year period, January 2011 through December 2017. The maximum production day date, maximum production day volume, annual average, and ratio of maximum to average day production for each year are shown in Table 2-5. The annual maximum day to average day ratios range from a low of 2.30 in 2016 to a high of 3.07 in 2017, with an average of 2.56. The highest production day was July 11, 2017 at 4.345 MGD. 2017 was also the highest average day demand over the data period and had the highest maximum to average day ratio.

The average for the 7-year period of maximum to average day ratios is 2.56, whereas the average for the last 3 years, 2015 through 2017 is 2.62. **For planning purposes the average maximum day to average day ratio for 2015 through 2017, 2.62, will represent the maximum day to average day demand ratio.**

TABLE 2-5

Highest Water Production Days for 2011-2017

Date	Maximum Day Production, MGD	Average Day for Year, MGD	Maximum Day to Average Day Ratio
8/19/2011	2.816	1.053	2.68
8/20/2012	2.924	1.121	2.61
8/9/2013	2.577	1.074	2.40
8/9/2014	2.679	1.110	2.41
7/31/2015	3.124	1.258	2.48
8/22/2016	3.021	1.312	2.30
7/11/2017	4.345	1.415	3.07
	Average 2011 - 2017		2.56
	Average 2015 - 2017		2.62

WATER CONSUMPTION

The City of DuPont reads water service meters bimonthly (every two months). The City's bimonthly water consumption by customer class is shown in Figure 2-3. It can be seen that the majority of the water usage is single family residential and the second highest water is irrigation. During warm summer months irrigation water use sometimes exceeds single family residential water use, while during the winter, irrigation water use goes practically to zero. Multi-family, Commercial and Industrial water use constitute a small portion of the total water use, while Fire Line and Hydrant Permit water use are practically invisible on the chart.

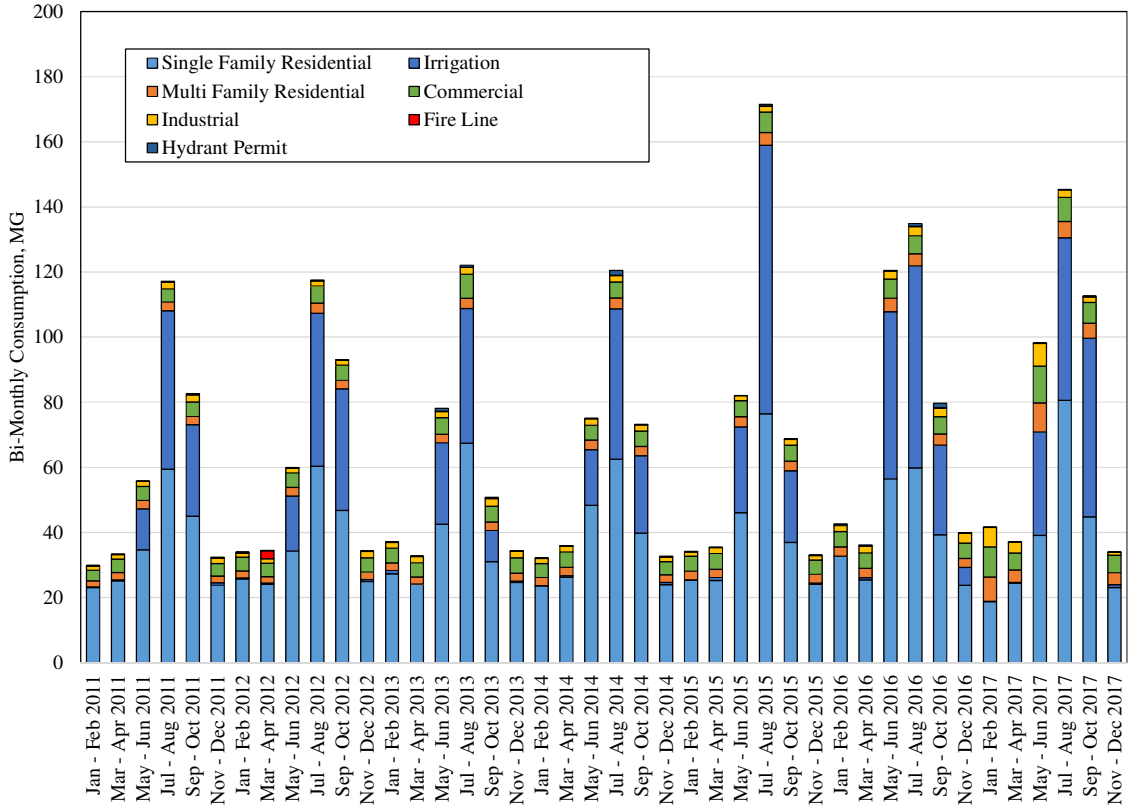


FIGURE 2-3

Bimonthly Water Consumption by Customer Class

The City's annual water consumption history is presented in Table 2-6. Again it can be seen that the majority of water usage is single family residential, with irrigation, on an annual basis, about half of single family residential, multi-family residential, commercial, and industrial representing minor total volumes of usage, and fire line and hydrant permits representing a small portion of the total.

Table 2-6 shows a range of average day consumption over the data period. The average over that period was 1.094 MGD, whereas the average for 2015 through 2017 was 1.229 MGD. The increases evident in both water production and consumption are primarily attributable to growth in the City, and the associated additional demands resulting from construction, irrigation, and customer use.

TABLE 2-6

Metered Water Consumption

Year	Single Family Resi-dential, MG	Multi-Family Resi-dential, MG	Com-mercial, MG	Indus-trial, MG	Irri-gation, MG	Fire Line, MG	Hydrant Permit, MG	Total Annual Consump-tion, MG	Average Daily Consump-tion, MGD
2011	211.08	13.94	23.98	10.15	90.71	0.95	0.22	351.04	0.962
2012	216.08	14.81	27.09	8.96	102.62	3.33	0.35	373.23	1.020
2013	216.92	15.24	31.01	12.11	77.58	0.59	1.78	355.22	0.973
2014	224.45	16.54	27.23	10.63	88.39	0.59	1.80	369.62	1.013
2015	234.04	18.02	29.77	9.73	132.33	0.41	0.50	424.81	1.164
2016	237.41	19.66	30.94	15.07	147.24	0.40	3.00	453.72	1.240
2017	230.80	33.55	44.92	21.18	137.72	0.42	0.12	468.71	1.284
Avg. (1)	224.40	18.82	30.71	12.55	110.94	0.96	1.11	399.48	1.094
3-yr Avg. (2)	234.08	23.75	35.21	15.33	139.10	0.41	1.20	449.08	1.229

(1) Avg. is the seven-year average from 2011 through 2017.
(2) 3-yr. Avg. is the average for the last three years, 2015 – 2017.

Table 2-7 presents a breakdown of percent consumption by customer class for the 7-year period (2011-2017) and for the 3-year period from 2015 through 2017. While total consumption increased in 2015 through 2017, Single Family Residential water consumption declined as a percent of the total while most other water uses increased as a percent of the total.

TABLE 2-7

Average Percent Consumption by Customer Class

Customer Class	Average Percent Consumption of Total, 2011 - 2017	Average Percent Consumption of Total, 2015 - 2017
Single Family Residential	56.2%	52.1%
Multi-Family Residential	4.7%	5.3%
Commercial	7.7%	7.8%
Industrial	3.1%	3.4%
Irrigation	27.8%	31.0%
Fire Line	0.2%	0.1%
Hydrant Permit	0.3%	0.3%
Totals	100.0%	100.0%

DISTRIBUTION SYSTEM LEAKAGE RATE

The difference between total water production and total water consumption is defined by WAC 246-290-820 as Distribution System Leakage, or DSL. Part of the difference may be attributable to inaccuracies in water production and water service meters, as well as unmetered water use that has not been accurately estimated or has not been accounted-for, and accounting errors, and may not entirely represent actual water main leakage, but by regulation this is all defined as DSL. Figure 2-4 shows the annual water production, annual water consumption and annual DSL from 2011 through 2017. The height of the green bar represents water consumption, the height of the blue bar represents DSL, and the combined height of the green and blue bars represents production. It can be seen that the total amount of DSL has remained a fairly low proportion of water production over this time period.

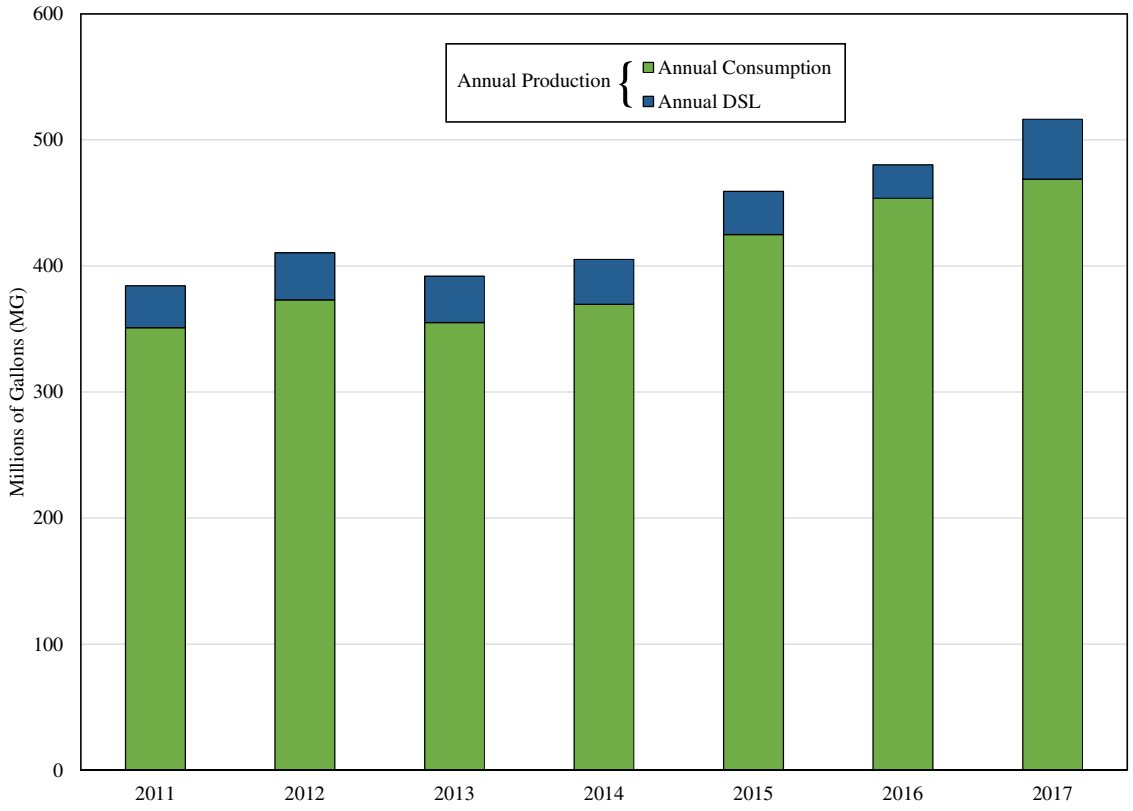


FIGURE 2-4

Total Production, Consumption and DSL (2011-2017)

WAC 246-290-820 (1)(b)(i) sets the DSL standard for all water systems in the State of Washington at 10 percent or less, based on a 3-year running average of DSL. Table 2-8 shows the annual total production, total consumption, DSL, annual percent DSL and 3 year running average percent DSL based on the City of DuPont water system

production and consumption records. Annual percent DSL has remained below 10 percent, while the 3-year running average was under 8 percent as of the end of 2017.

TABLE 2-8

Annual Water Production, Water Use and DSL

Year	Total Annual Production, MG	Total Annual Consumption, MG	Distribution System Leakage, MG	Annual Percent DSL	3-Year Running Average Percent DSL
2011	384.22	351.04	33.19	8.64%	
2012	410.31	373.23	37.08	9.04%	
2013	391.88	355.22	36.66	9.36%	9.01%
2014	405.29	369.62	35.67	8.80%	9.06%
2015	459.06	424.81	34.25	7.46%	8.48%
2016	480.15	453.72	26.44	5.51%	7.17%
2017	516.38	468.71	47.68	9.23%	7.44%
			Averages	8.24%	8.23%

EQUIVALENT RESIDENTIAL UNITS

An Equivalent Residential Unit (ERU) is the amount of water, in gallons, equivalent to the average day water usage by an average single-family residential customer. The amount of water attributed to an ERU is calculated by dividing the total volume of water utilized in the single-family residential customer class over a time period by the average number of single-family residential connections during that time period and the number of days in that time period. The average number of connections is the annual average of the number of water services billed based on bimonthly billing records. Table 2-9 summarizes the annual average water use per single family residential connection over the data period.

TABLE 2-9

Annual Average Water Use per Residential Connection

Year	Total Residential Water Use, MG	Average Residential Connections (1)	Average Residential Water Use per Connection, gpd
2011	211.08	2,758	210
2012	216.08	2,761	214
2013	216.92	2,770	215
2014	224.45	2,781	221
2015	234.04	2,771	231
2016	237.41	2,780	233
2017	230.80	2,786	227
		Average, 2011 - 2017	222
		Average, 2015 - 2017	**231**

(1) Average residential connections is the annual average of the number of water services billed in bimonthly water billing records.

As shown in Table 2-9, average water use per single-family residence from 2011 through 2017 was 222 gpd per single-family residence, whereas the average for the last 3 years of this period, 2015 – 2017, was 231 gpd per single-family residence. Because the average day residential use increased over the last 3 years of the data, the average of the last 3 years will be used for planning purposes. **This average day water usage rate of 231 gpd represents the current value of an ERU.** This figure does not include DSL or non-residential water use.

Using this ERU definition, the volume of water used by the other customer classes and by DSL can be converted to equivalent numbers of residential services. Non-residential uses are assigned residential equivalents based on total water use under each non-residential water use category. Using water demands for 2017, total ERUs served by DuPont are estimated in Table 2-10.

TABLE 2-10

ERUs for the Year 2017

Water Use Category	2017 Annual Water Use, MG	Average Number of Meters in 2017	ERUs (1)
Single Family Residential	230.80	2,786	2,786
Multi-Family Residential	33.55	59	398
Commercial	44.92	86	533
Industrial	21.18	3	251
Irrigation	137.72	120	1,633
Fire Line	0.42	105	5
Hydrant Permit	0.12	9	1
DSL	47.68	0	565
Totals	516.38	3,168	6,172

(1) Single family residential ERUs are one ERU per connection. ERUs are assigned to other water uses and DSL by dividing the usage by 231 gpd per ERU.

As shown in Table 2-9, the average single family residential water use in 2017 was below the 2015 – 2017 average of 231 gpd per ERU. At 231 gpd per ERU the 230.80 MG of Single Family Residential Water Use in 2017 would be 2,737 ERUs. However, each single family residential unit counts as one ERU, regardless of the water use rate for the given year. So regardless of the 2017 water use rate, there were 2,786 single family residential ERUs in 2017.

The average of 59 Multi-Family water service connections in 2017 was equivalent to 398 single family residential connections. According to the current Comprehensive Plan the City has a total of 1,116 MFR units served by these 59 Multi-Family water service connections, which is an average of 19 MFR units per Multi-Family water service connection. At that rate, each MFR unit has an average water demand approximately equivalent to 0.36 ERU.

MAXIMUM DAY DEMAND PER ERU

As discussed above under the heading, *Maximum Day Production*, the estimated maximum day to average day ratio is 2.62. With an average day demand per ERU of 231 gpd, the **maximum day demand (MDD) is estimated at 605 gpd per ERU** (231 x 2.62).

PEAK HOUR DEMAND

Peak Hour Demand (PHD) is a value that applies to the system as a whole, not to any individual service, and is estimated using Equation 5-3 from the Water System Design Manual. This formula estimates peak hour system demands, *not including fire flow*:

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

Where

PHD = Peak Hour Demand, gallons per minute
C = Coefficient from Water System Design Manual Table 5-1
N = Number of ERUs served
F = Factor from Water System Design Manual Table 5-1
MDD = Maximum Day Demand per ERU, gpd

For a system with more than 500 service connection, C and F are: 1.6 and 225, respectively. As derived above, the updated MDD for DuPont is 605 gpd per ERU. Inserting these numbers into the above equation yields the following:

$$PHD = (605/1440)[(1.6)(N)+225]+18$$

This equation simplifies to the following:

$$PHD = 0.67 \times N + 113$$

Using 6,172 current estimated ERUs from Table 2-9, the estimated peak hour demand for 2017 would be 4,248 gpm. The above formula will be used to estimate projected peak hour demands.

Table 2-11 includes a summary of water demand parameters for the City of DuPont.

TABLE 2-11

Summary of Water Demand Statistics

Demand Factor	Value
Average Day Demand per ERU, gpd	231
Maximum Day Demand per ERU, gpd	605
Maximum Day to Average Day Factor	2.62
Peak Hour Demand (system-wide), gpm	0.67 x N + 113 (1)

(1) N is the number of ERUs served.

PROJECTED LAND USE, FUTURE POPULATION, AND WATER DEMANDS

PROJECTED LAND USE

Projected land use for the City of DuPont is established in the current Comprehensive Plan. Table 2-12 presents projected land use as shown in Table 11 of the 2015 Comprehensive Plan.

TABLE 2-12

Projected Land Use

Land Use Designation	Land Use Acres
Residential 3	71
Residential 4	520
Residential 5	370
Residential 12	87
Reserve Residential	166
Mixed Use	79
Office	55
Commercial	28
Business Technology Park	509
Manufacturing and Research	480
Industry	182
Military	290
Neighborhood Park	31
Community Park	65
Open Space	840
Total	**3,773**

Source: City of DuPont Comprehensive Plan.

HOUSING UNIT PROJECTIONS

Table 1 of the Comprehensive Plan projects housing units by SFR and MFR category for 2014, 2035 and Buildout. The table shows 2,166 SFR units and 1,000 MFR units in 2014, 3,999 SFR units and 1,804 MFR units in 2035, and 4,109 SFR and 1,826 MFR units at Buildout. The 2015 Comprehensive Plan does not estimate when Buildout will occur.

Sequalitchew Village

The City of DuPont is divided into 12 geographic development areas based on topography, type of development, and development history. These development areas are called villages. Most of the villages are currently close to fully developed, with the exception of the Sequalitchew Village. The Sequalitchew Village area is currently occupied by a gravel mining operation. The current schedule is for the gravel mining operation to complete gravel extraction and site restoration by the end of 2025, after which the Sequalitchew Village will develop. Table 31 of the Comprehensive Plan shows that Sequalitchew Village has a buildout potential of 1,100 SFR units and 763 MFR units, and currently none of these are built yet. Therefore, 1,100 SFR units and 763 MFR units will not be able to develop until after the year 2025.

Projected Housing Units

Until Sequalitchew Village can develop after 2025, the City is limited to an interim buildout limit of 3,009 SFR Units and 1,063 MFR units. Based on billing records there were a total of 2,786 SFR units in 2017. Therefore an additional 223 SFR units can be built before the Sequalitchew Village develops. Estimating that 112 SFR units can be built in 2018 and 111 SFR units can be built in 2019, the interim buildout of 3,009 SFR units can be reached by the end of 2019.

The number of MFR units is not available from billing records because each MFR metered connection serves different multiple numbers of MFR units. To estimate the number of MFR units in 2017, is it assumed that MFR units will also reach their interim buildout limit in 2019, and a straight line interpolation is made between 1,000 MFR units in 2014 and 1,063 MFR units in 2019. On this basis we estimate 1,038 MFR units in 2017.

SFR and MFR housing units are assumed to be at an interim buildout and, therefore, static from 2019 through 2025. SFR and MFR units are projected in the Comprehensive Plan to be 3,999 and 1,804, respectively, in 2035, and 4,109 and 1,826, respectively, at Buildout. This is an increase from 2035 to Buildout of 110 SFR units and 22 MFR units. Since there are this few remaining units after 2035, it is assumed that buildout may occur by 2038, the end of the planning period for this Water System Plan. On this basis, SFR and MFR housing units are projected in Table 2-13. This projection represents a 47 percent increase in SFR units, a 76 percent increase in MFR units and an overall increase of 55 percent in total housing units between 2017 and 2038.

TABLE 2-13

Projected Housing Units

Year	SFR Units	MFR Units	Total Residential Units
2017	2,786	1,038	3,824
2018	2,898	1,050	3,948
2019	3,009	1,063	4,072
2020	3,009	1,063	4,072
2021	3,009	1,063	4,072
2022	3,009	1,063	4,072
2023	3,009	1,063	4,072
2024	3,009	1,063	4,072
2025	3,009	1,063	4,072
2026	3,108	1,137	4,245
2027	3,207	1,211	4,418
2028	3,306	1,285	4,591
2029	3,405	1,359	4,764
2030	3,504	1,434	4,938
2031	3,603	1,508	5,111
2032	3,702	1,582	5,284
2033	3,801	1,656	5,457
2034	3,900	1,730	5,630
2035	3,999	1,804	5,803
2036	4,036	1,811	5,847
2037	4,072	1,819	5,891
2038	4,109	1,826	5,935

The housing-units projection in Table 2-13 is shown graphically in Figure 2-5.

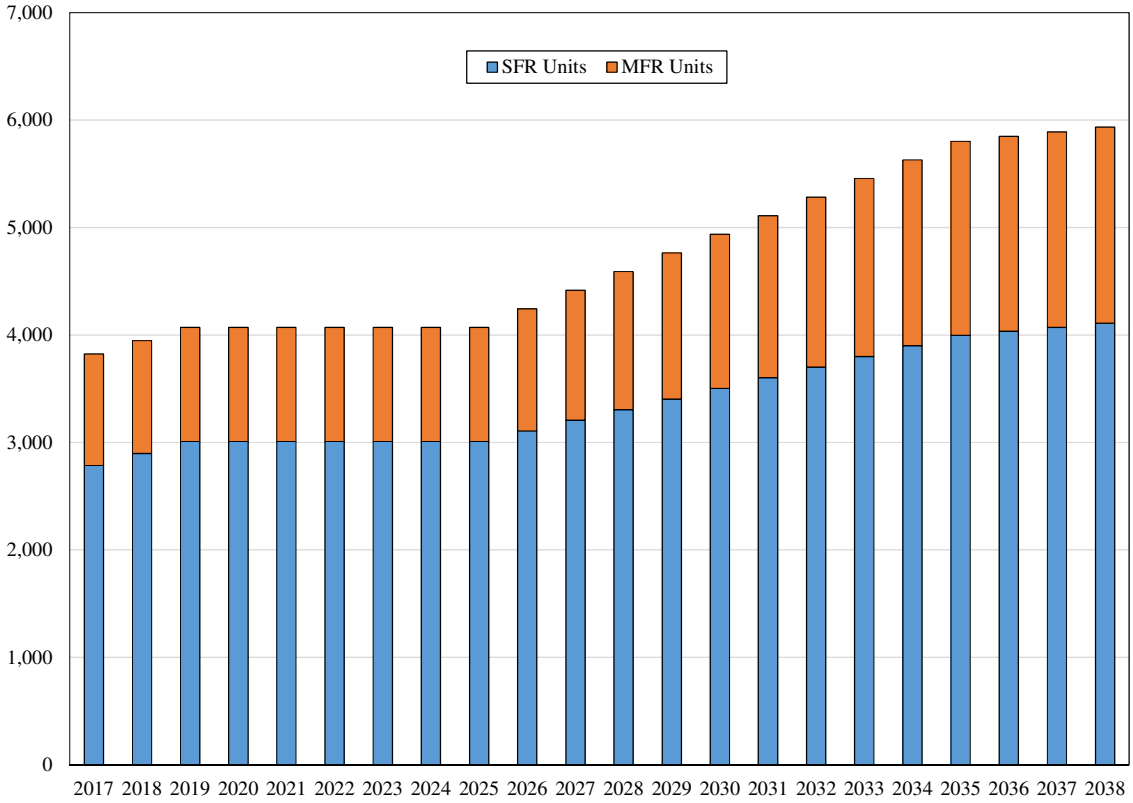


FIGURE 2-5

Projected Housing Units

PROJECTED POPULATION

The Comprehensive Plan update does not explicitly include population projections. It does state in several places that the estimated Buildout population is 12,100. That estimated buildout represents a 28.9 percent increase over the 2017 OFM population estimate of 9,385 as shown in Table 2-1. However, that percent increase in population is inconsistent with the projected 55 percent increase in housing units described in the previous section. If the buildout population were to increase proportionately to the total residential units, the projected buildout population would be 14,547. However, that number is probably an over-estimate, because the number of MFR units is projected to increase by a greater percentage than the number of SFR units, and MFR units generally house fewer persons per unit than SFR units. SFR and MFR occupancy rate are included in the Comprehensive Plan.

The previous Water System Plan estimated 2.92 persons per SFR and 2.0 persons per MFR. However, at that rate the 2,786 SFR units and 1,038 MFR units in 2017 would yield a 2017 population of 10,211, which exceeds the OFM estimate by 8.8 percent. Therefore, the previous Water System Plan occupancy rates are too high for the current

population and housing data. If the SFR occupancy rate were 2.92 persons per household, then the MFR occupancy rates would have to be 1.2 persons per household to match the 2017 population record. Or if the MFR occupancy rate were 2.0 persons per household, then the SFR occupancy rate would have to be 2.62 persons per household. If we assume occupancy rates of 2.7 persons per SFR and 1.8 persons per MFR then the 2017 housing units would calculate to a 2017 population of 9,391, which is close to the 2017 OFM population of 9,385. For purposes of this plan the projected population will be based on 2.7 persons per SFR unit and 1.8 persons per MFR unit. On that basis, the projected population is shown in Table 2-14.

TABLE 2-14

Projected Population

Year	Population Projection	Annual Increase	Annual Percent Growth Rate
2017	9,385	-	-
2018	9,715	330	3.52%
2019	10,038	323	3.32%
2020	10,038	0	0.00%
2021	10,038	0	0.00%
2022	10,038	0	0.00%
2023	10,038	0	0.00%
2024	10,038	0	0.00%
2025	10,038	0	0.00%
2026	10,438	400	3.98%
2027	10,839	401	3.84%
2028	11,239	400	3.69%
2029	11,640	401	3.57%
2030	12,042	402	3.45%
2031	12,443	401	3.33%
2032	12,843	400	3.21%
2033	13,244	401	3.12%
2034	13,644	400	3.02%
2035	14,045	401	2.94%
2036	14,157	112	0.80%
2037	14,269	112	0.79%
2038	14,381	112	0.78%

The projected population is graphically shown in Figure 2-6.

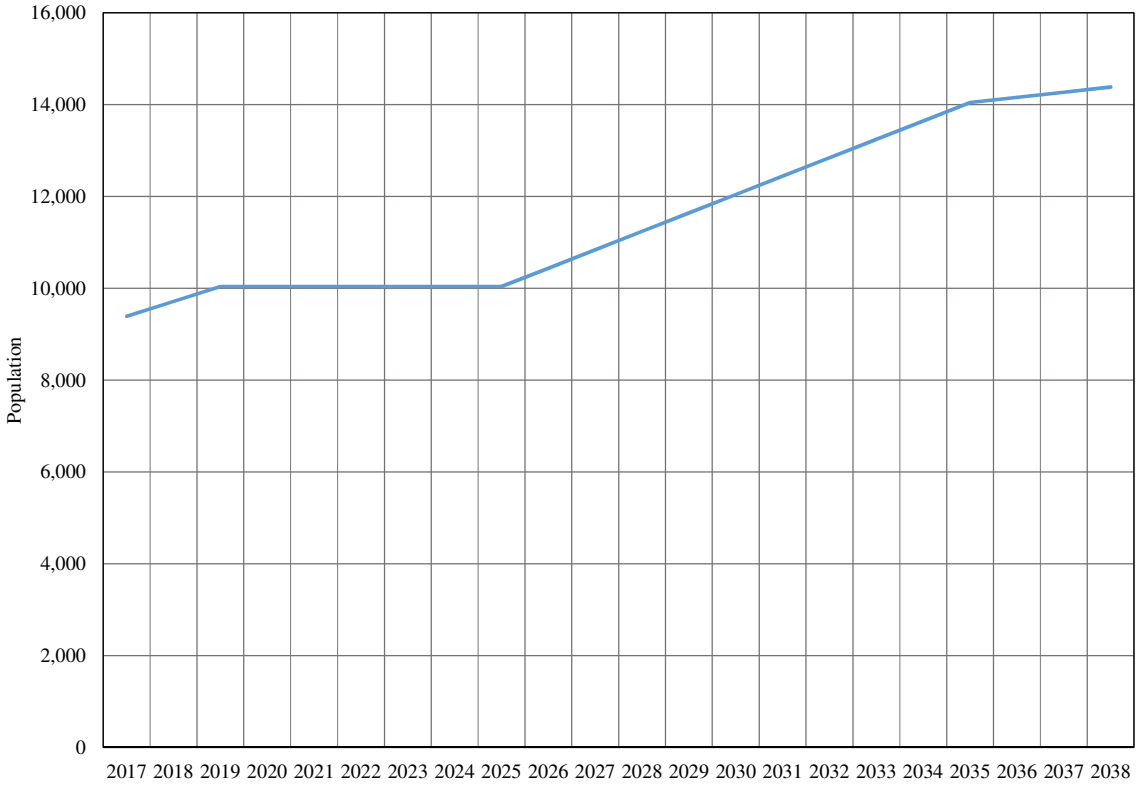


FIGURE 2-6

Projected Population

PROJECTED SYSTEM DEMANDS

ERUs for each identified water use are projected forward at a growth rate that reflects past trends, current conditions, and future buildout. SFR ERUs are by definition one ERU per SFR, as shown in Table 2-13. The 1,038 MFR units in 2017, as shown in Table 2-13, had a demand of 398 ERUs, as shown in Table 2-10. MFR ERUs are projected forward from the MFR units in Table 2-13 on this basis.

Table 1 in the current Comprehensive Plan projects that land used for commercial and industrial purposes will expand from 11 percent of the City's land area in 2014 to 33 percent of the City's land area by 2035, and to 35 percent of the City's land area by buildout. It is assumed that commercial and industrial water demand will expand in proportion to the land area being used for these purposes. Therefore, ERUs representing commercial and industrial water use are projected forward by a straight line interpolation from 2017 values shown in Table 2-10 to these percent increases for 2035 and buildout in 2038.

It is assumed that park area will increase proportionately with single family and multi-family residential development, and that water use for park irrigation will increase in the same proportion. Water use by fire lines and hydrant permits is assumed to remain at the 2017 level. Finally, DSL is projected forward at the 2017 value of 9.23 percent shown in Table 2-8.

Based on these assumptions, the projected number of ERUs is shown in Table 2-15.

TABLE 2-15

Projected ERUs

Year	SFR ERUs (1)	MFR ERUs (2)	Com-mercial ERUs (3)	Indus-trial ERUs (3)	Irri-gation ERUs (4)	Fire Line ERUs (5)	Hydrant Permit ERUs (5)	DSL ERUs (6)	Total ERUs
2017	2,786	398	533	251	1,633	5	1	570	6,177
2018	2,898	403	592	279	1,693	5	1	597	6,468
2019	3,009	408	651	307	1,753	5	1	624	6,758
2020	3,009	408	711	335	1,753	5	1	633	6,855
2021	3,009	408	770	363	1,753	5	1	642	6,951
2022	3,009	408	829	390	1,753	5	1	651	7,046
2023	3,009	408	888	418	1,753	5	1	659	7,141
2024	3,009	408	948	446	1,753	5	1	668	7,238
2025	3,009	408	1,007	474	1,753	5	1	677	7,334
2026	3,108	436	1,066	502	1,818	5	1	706	7,642
2027	3,207	464	1,125	530	1,883	5	1	734	7,949
2028	3,306	493	1,184	558	1,948	5	1	762	8,257
2029	3,405	521	1,244	586	2,014	5	1	791	8,567
2030	3,504	550	1,303	614	2,079	5	1	819	8,875
2031	3,603	578	1,362	641	2,144	5	1	848	9,182
2032	3,702	607	1,421	669	2,210	5	1	876	9,491
2033	3,801	635	1,481	697	2,275	5	1	905	9,800
2034	3,900	663	1,540	725	2,340	5	1	933	10,107
2035	3,999	692	1,599	753	2,406	5	1	962	10,417
2036	4,036	694	1,631	768	2,426	5	1	973	10,534
2037	4,072	697	1,664	784	2,446	5	1	984	10,653
2038	4,109	700	1,696	799	2,466	5	1	994	10,770

(1) SFR ERUs are, by definition, one ERU per SFR. Therefore they are taken directly from Table 2-13.

(2) MFR ERUs are proportioned to MFR units in Table 2-13 based on the ratio of 2017 Multi-Family Residential water use in Table 2-10 to the number of MFR units in 2017 shown in Table 2-13.

(3) Commercial and Industrial ERUs are increased in proportion to the projected increases in land used for commercial and industrial purposes in Table 1 of the current Comprehensive Plan.

(4) Irrigation ERUs are increased in proportion to the combined increase in SFR and MFR housing ERUs

(5) Fire line and Hydrant Permit ERUs are a relatively small portion of overall water use and are projected to remain at their 2017 usage levels.

(6) DSL ERUs are projected forward at 9.23 percent of the total based on the DSL for 2017 shown in Table 2-8.

Total projected ERUs from Table 2-13 are used together with historic water demand factors from Table 2-10 to estimate projected water demands in Table 2-16.

TABLE 2-16

Projected Water Demands

Year	ERUs (1)	Average Day Demand, MGD (2)	Maximum Day Demand, MGD (3)	Peak Hour Demand, gpm (4)	Annual Demand, MG (5)	Annual Demand, Acre-Feet (6)
2017	6,177	1.427	3.737	4,252	520.8	1,598
2018	6,468	1.494	3.913	4,447	545.3	1,674
2019	6,758	1.561	4.089	4,641	569.8	1,749
2020	6,855	1.584	4.147	4,706	579.6	1,779
2021	6,951	1.606	4.205	4,770	586.1	1,799
2022	7,046	1.628	4.263	4,834	594.1	1,823
2023	7,141	1.650	4.320	4,897	602.1	1,848
2024	7,238	1.672	4.379	4,962	611.9	1,878
2025	7,334	1.694	4.437	5,027	618.4	1,898
2026	7,642	1.765	4.623	5,233	644.3	1,977
2027	7,949	1.836	4.809	5,439	670.2	2,057
2028	8,257	1.907	4.995	5,645	698.1	2,142
2029	8,567	1.979	5.183	5,853	722.3	2,217
2030	8,875	2.050	5.369	6,059	748.3	2,296
2031	9,182	2.121	5.555	6,265	774.2	2,376
2032	9,491	2.192	5.742	6,472	802.4	2,463
2033	9,800	2.264	5.929	6,679	826.3	2,536
2034	10,107	2.335	6.115	6,885	852.2	2,615
2035	10,417	2.406	6.302	7,092	878.3	2,695
2036	10,534	2.433	6.373	7,171	890.6	2,733
2037	10,653	2.461	6.445	7,251	898.2	2,756
2038	10,770	2.488	6.516	7,329	908.1	2,787

(1) ERUs come directly from Table 2-15.
(2) Average Day Demand is ERUs times the Average Day Demand per ERU from Table 2-11, expressed in MGD.
(3) Maximum Day Demand is ERUs times the Maximum Day Demand per ERU from Table 2-11, expressed in MGD.
(4) Peak Hour Demand is from the Peak Hour Demand formula in Table 2-11 using ERUs for N.
(5) Annual Demand, MG, is average day demand times 365 days per year, 366 days in leap years.
(6) Annual Demand, Acre-Feet, is Annual Demand, MG, converted to acre-feet by the factor 325,851 gallons per acre-foot.

CHAPTER 3

WATER SYSTEM ANALYSIS

OBJECTIVE

The objective of this chapter is to determine if system improvements are necessary to meet water quality standards and to meet projected demands. This chapter includes the following elements:

- System Design Standards
- Water Quality Analysis
- System Facilities Analysis
- Water System Capacity Limits
- Summary of System Needs and Concerns

Based on these analyses, a summary of deficiencies and options to improve compliance with the required standards are identified. Project costs and prioritization of recommended improvements are presented in Chapter 8, Capital Improvement Program.

SYSTEM DESIGN AND CONSTRUCTION STANDARDS

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

DESIGN STANDARDS

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

DOH relies on various publications, agencies and the utility itself to establish design criteria. The following gives a brief description of the most widely recognized performance and design standards.

- **WAC 246-290, Group A Public Water Systems, Washington State Department of Health (December 2016).**

  This is the primary drinking water regulation utilized by the Washington State Department of Health (DOH) to assess capacity, water quality, and overall compliance with drinking water standards.

- **Water System Design Manual, Washington State Department of Health (December 2009).**

  These standards serve as guidance for estimating system demands and sizing various system facilities, and set reliability standards for Group A public water system in compliance with WAC 246-290.

- **Recommended Standards for Water Works (RSWW), A Committee Report of the Great Lakes - Upper Mississippi River Board of State Public Health and Environmental Managers (2003).**

  Commonly known as the Ten States Standards, this document formalizes the design standards recommended by a water supply committee representing ten Midwestern and upper Great Lake States and the Province of Ontario. The report of the Water Supply Committee was first published in 1953, and subsequently revised and published in 1962, 1968, 1976, 1982, 1992, 1997, 2003, 2007 and 2012. The report presents recommendations for both design and construction standards; however, the construction standards are somewhat general in nature with minor emphasis on materials specifications. Since surface water treatment is quite common in the Midwest and Upper Great Lakes, the Committee report tends to concentrate on water treatment plant design and operation. However, the Ten State Standards do address a number of water distribution construction standards that have become generally accepted standards of the industry.

- **Standard Specifications for Road, Bridge, and Municipal Construction, Washington State Department of Transportation, American Public Works Association (2018).**

  These standards include detailed specifications for materials and workmanship of a wide variety of public works projects, including installation of public water supply facilities and restoration or facilities impacted by water main construction and repair.

- **City of DuPont Public Works Standards, (2011).**

  These standards include detailed specifications for materials and workmanship for installation of water main extensions, including piping installation details, thrust blocking, in-line valves, fire hydrants, air release valves, service connections of various types, sample stations, blowoffs, and pavement restoration applicable to developer extensions.

Table 3-1 lists the suggested DOH Water System Design Manual guidance and the City of DuPont's policies with regard to each standard for general facility requirements.

TABLE 3-1

General Facility Requirements

Standard	DOH Water System Design Manual (December 2009)	City of DuPont Water System Standard
Average Day and Maximum Day Demand	Average Day Demand (ADD) should be determined from previous metered water consumption and production data. Maximum Day Demand (MDD) should be determined by metered production.	Average day consumption per ERU is **231 gpd**. The maximum day to average day factor is 2.62, and the maximum day consumption per ERU is **605 gpd**, as developed in Chapter 2 of this Plan.
Peak Hour Demand	Peak hour demand is determined using the following equation: PHD = (MDD/1440)[(C)(N) + F] + 18 C = Coefficient from DOH Table 5-1 N = Number of connections, ERUs F = Factor of range from Table 5-1	Peak hour demand is determined by applying the DOH Water System Design Manual Formula where MDD=605, C=1.6, and F=225, which simplifies to the equation: **PHD=0.67 x N+113**
Fire Flow Standard	The minimum fire flow shall be determined by the local fire authority.	The City lists fire flow standards in Municipal Code Chapters 13.05.010 and 13.05.060
Minimum System Pressure	The system should be designed to maintain a minimum of 30 psi in the distribution system under peak hour demand and 20 psi under fire flow conditions during MDD.	The system requires 45 psi for mandatory fire sprinkler activation in new development.
Maximum System Pressure	Regulations do not address maximum system pressure. The Water System Design Manual, Chapter 8, part 8.1.7, recommends that pressures should not exceed 100 psi.	DuPont's goal is to maintain distribution system pressures below 100 psi.
Source	18 hours of source pumping to meet maximum day demand. Redundancy in all critical pumping systems. Backup power supply for all critical pumping systems.	Same as DOH Standard.

TABLE 3-1 – (continued)

General Facility Requirements

Standard	DOH Water System Design Manual (December 2009)	City of DuPont Water System Standard
Storage	The sum of: Operational Storage Volume sufficient to prevent pump re-cycling. Equalizing Storage $V_{ES} = (Q_{PH} - Q_S) * 150$ Standby Storage $V_{SB} = (2 * ADD * N) - t_m * (Q_S - Q_L)$ Fire Suppression Storage V_{FSS} (if required) = NFF * T ADD = average day demand, gpd/ERU N = number of ERU's Q_{PH} = peak hour demand, gpm Q_S = capacity of all sources, excluding emergency sources, gpm Q_L = capacity of largest source, gpm t_m = daily pump source run time,min (1440) NFF = needed fire flow, gpm T = fire flow duration, min	Same as DOH Water System Design Manual, using the formulas provided in the manual, Chapter 9.
Minimum Pipe Sizes	The diameter of a transmission line shall be determined by hydraulic analysis. The minimum size distribution system line shall be 6-inches in diameter, except for dead end lines not providing fire flow and only as justified by a hydraulic analysis.	Same as DOH Water System Design Manual, Chapter 8.

TABLE 3-1 – (continued)

General Facility Requirements

Standard	DOH Water System Design Manual (December 2009)	City of DuPont Water System Standard
Reliability Recommen-dations	• Sources capable of supplying MDD within an 18-hour period • Sources meet ADD with largest source out of service • Back-up power equipment for pump stations unless there are two independent public power sources • Provision of multiple storage tanks • Standby storage equivalent to ADD x 2, with a minimum of 200 gpd/ERU • Low and high level storage alarms • Looping of distribution mains when feasible • Pipeline velocities not > 8 fps at PHD • Flushing velocities of 2.5 fps for all pipelines	Same as DOH Water System Design Manual, Chapter 5. The City of DuPont Public Works Standards (2011).
Valve and Hydrant Spacing	Sufficient valving should be placed to keep a minimum of customers out of service when water is turned off for maintenance or repair. Fire hydrants on laterals should be provided with their own auxiliary gate valve.	The City lists valve and hydrant spacing standards in detail in the City of DuPont Public Works Standards (2011).

Fire Suppression Standards

The International Fire Code sets minimum building standards based on fire flows available, but does not specifically set fire flow standards for water systems. The City of DuPont adopted the 2015 International Fire Code fire flow standards. Additionally, the WAC 246-293-601, et seq., sets state minimum fire flow standards for water systems with 1,000 or more service connections, or located within a critical water supply service area. The City of DuPont Water System has more than 1,000 service connections so this regulation does apply. Table 3-2 provides the City of DuPont development

classifications, minimum fire flows and durations adapted from Table B105.1 of the International Fire Code.

TABLE 3-2

City of DuPont Fire Flow Standards

Development Classification	Minimum Fire Flow (gpm)	Duration (hours)
Single-Family Residential	1,000	2
Schools	2,500	3
Multi-Family Residential and Commercial	2,500	3
Industrial	4,000	4

Fire suppression in the City of DuPont is provided by full-time, part-time, and volunteer Fire Department staff. Their mission is to provide quality, cost effective, emergency services for the preservation of life and property. This service shall be compatible with the needs of the community and at levels reasonably permitted by publicly approved funding.

Fire hydrants standards and spacing are provided in the City of DuPont Public Works Standards, 2011. In single family residential areas, fire hydrants shall be installed at intervals not to exceed 600 feet and/or located no more than 350 feet from the back of any proposed lot. In all other areas, fire hydrants shall be installed at intervals not to exceed 300 feet or as required by the City Fire Chief.

Storage Standards

The DOH Water System Design Manual identifies the following components of reservoir storage volume:

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

Storage standards are discussed further under the System Component Analysis section of this chapter.

CONSTRUCTION STANDARDS

Construction standards set forth the actual materials and construction standards that contractors, developers, and the City must follow when constructing water system facility improvements. The City of DuPont Development Standards, including developer extension requirements, comprises a separate document entitled *City of DuPont Public Works Standards*, 2011.

WATER QUALITY STANDARDS

The DuPont Water System is a public water supply system regulated by the Washington State Department of Health Drinking Water Regulations, WAC 246-290, the latest edition of which is dated December 14, 2016, as well as sections of Code of Federal Regulation (CFR) Title 40, Parts 141 and 143, adopted by reference in WAC 246-290. Water quality regulations are found in Part 4 of the Drinking Water Regulations, including WAC 246-290-300, Monitoring Requirements, WAC 246-290-310, Maximum Contaminant Levels, and WAC 246-290-320, Follow-up Actions. Since DuPont is supplied by only groundwater sources, only the groundwater regulations apply.

WATER QUALITY ANALYSES

The following sections evaluate the record of water quality for the City of DuPont. Water quality analysis is divided into the categories of Source Water Quality, Delivered Water Quality, Water Quality Reporting, and Water Quality Complaints. Water quality standards that apply to the water sources, including inorganic chemicals, volatile organic chemicals, synthetic organic chemicals, and radionuclides, are discussed under the heading Source Water Quality. Water quality standards that apply to the water distribution system, including coliform, lead and copper, disinfectant byproducts, and asbestos, are discussed under the heading of Delivered Water Quality. A review of water quality monitoring requirements relative to water quality monitoring completed is included under the heading Water Quality Reporting, and a review of water quality problems and complaints is included under the heading Water Quality Complaints.

SOURCE WATER QUALITY

As described in Chapter 1, the water sources for the City of DuPont water system consist of five well sources, plus an intertie with JBLM. All sources are chlorinated prior to distribution. Following is a summary of water quality testing of the City's wells.

Inorganic Chemical and Physical Water Quality

General IOC Tests

Inorganic chemical and physical (IOC) water quality monitoring results for the most recent DuPont source water sampling are summarized in Table 3-3. The Maximum Contaminant Level (MCL) for all inorganic chemical and physical water quality parameters for which there are MCLs are listed in the right hand column.

Samples from Bell Hill Well 2 on October 16, 2013 and July 19, 2016 exceeded the secondary MCL for manganese, and the sample on July 19, 2016 also exceeded the secondary MCL for iron. These exceedances have been observed previously and were

expected. The City is blending water from Bell Hill Well 2 with water from Bell Hill Wells 1 and 3 to mitigate this secondary MCL exceedance, and the resultant water entering the distribution system does not exceed the MCL for either iron or manganese. This methodology has been approved by DOH as an acceptable treatment technique for these wells.

The sample from source S-06, Bell Hill Well 3, taken on August 22, 2012 had elevated levels of Barium, Sodium, and Hardness when compared with all other samples from that well and from other wells in the vicinity. We checked with the laboratory and they verified that the testing records do support the reported test results. It is not known how this sample had such different levels of these constituents, but it appears that those sample results are not a fair representation of water quality from this source. Possible explanations for these anomalous test results include possibilities of a contaminated sample bottle, contamination of the sample during the sampling process, mixup of sample bottles in the laboratory, or a transient groundwater contamination issue. In any case, the sample results did not exceed any MCL value, and these elevated levels do not seem to have persisted. Therefore, no action is recommended in regard to this. However, if in the future similar results occur in samples from this or other wells in the area, further investigation may be warranted at that time.

Per- and Polyfluoralkyl Substances (PFAS)

Per- and polyfluoroalkyl substances (PFAS) have become a groundwater contaminant of increased concern over the last few years. DOH is currently in the process of setting standards for allowable levels of PFAS in drinking water. The City is conducting ongoing testing for PFAS in its source water and is currently investigating options for removing it. A memorandum discussing potential PFAS treatment facilities is included in Appendix N, and the construction of these facilities is included in the Capital Improvement Program discussed in Chapter 8.

TABLE 3-3

Inorganic Chemical Sampling Results

Source	S-03, Bell Hill Well 1	S-04, Bell Hill Well 2		S-05, Hoffman Hill Well 1	S-06, Bell Hill Well 3		S-09, Hoffman Hill Well 2		
Sample Date	**7/25/2016**	**10/16/2013**	**7/19/2016**	**7/19/2016**	**8/22/2012**	**7/25/2016**	**9/18/2012**	**7/19/2016**	**MCL**
Primary Contaminants – All results mg/L unless otherwise noted (1)									
Antimony	<0.003	<0.003	<0.003	<0.003	<0.006	<0.003	<0.006	<0.003	0.006
Arsenic	0.002	0.005	0.005	0.002	<0.003	0.001	<0.003	0.001	0.0104
Barium	<0.1	<0.01	<0.1	<0.1	1.28 (2)	<0.1	0.374	<0.1	2
Beryllium	<0.0003	<0.0003	<0.0003	<0.0003	<0.0008	<0.0003	<0.0008	<0.0003	0.004
Cadmium	<0.001	<0.0001	<0.001	<0.001	<0.002	<0.001	<0.002	<0.001	0.005
Chromium	<0.007	<0.007	<0.007	<0.007	<0.02	<0.007	<0.02	<0.007	0.1
Copper	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	1.3 (3)
Cyanide	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.2
Fluoride	<0.2	0.2	0.2	<0.2	<0.5	<0.2	<0.5	<0.2	4 (4)
Lead	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.015 (3)
Mercury	<0.0002	<0.0002	<0.0002	<0.0002	0.0005	<0.0002	<0.0004	<0.0002	0.002
Nickel	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.1	<0.003	0.1
Nitrate-N	0.4	<0.2	<0.2	1	<0.2	0.4	0.725	0.8	10
Nitrite-N	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.2	<0.1	1
Selenium	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.01	<0.002	0.05
Sodium	6	9	8	6	**46.8** (2)	6	7.32	6	20 (5)
Thallium	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.002	<0.001	0.002
Total Nitrate/ Nitrite	0.4	<0.4	<0.4	1	<0.5	0.4	0.725	0.8	10
Turbidity, NTU (6)	0.3	<0.1	0.1	<0.1	<0.1	0.3	<0.1	<0.1	NA

TABLE 3-3 – (continued)

Inorganic Chemical Sampling Results

Source	S-03, Bell Hill Well 1	S-04, Bell Hill Well 2		S-05, Hoffman Hill Well 1	S-06, Bell Hill Well 3		S-09, Hoffman Hill Well 2		
Sample Date	**7/25/2016**	**10/16/2013**	**7/19/2016**	**7/19/2016**	**8/22/2012**	**7/25/2016**	**9/18/2012**	**7/19/2016**	**MCL**
Secondary Contaminants – All results mg/L unless otherwise noted (1)									
Chloride	3	2	2	4	<20	3	<20	3	250
Color	<5	<5	<5	<5	<15	<5	<15	<5	15
Conductivity, µmho/cm (7)	143	86	89	139	178	143	187	148	700
Hardness	61	32	30	65	636 (2)	61	63.7	64	0
Iron	<0.1	0.24	**0.33**	<0.1	<0.1	<0.1	<0.1	<0.1	0.3
Manganese	<0.01	**0.24**	**0.26**	<0.01	0.017	<0.01	<0.01	<0.01	0.05
Silver	<0.01	<0.01	<0.01	<0.01	<0.1	<0.01	<0.1	<0.01	0.1
Sulfate	9	2	2	10	<50	9	<50	9	250
TDS	NT (8)	NT (8)	NT (8)	NT (8)	116	NT (8)	110	NT (8)	500
Zinc	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	5

(1) The abbreviation mg/L indicates milligrams per liter. 1 mg/L is equivalent to 1 part per million (ppm).

(2) The sample from source S-06, Bell Hill Well 3, taken on August 22, 2012 had elevated levels of Barium, Sodium, and Hardness when compared with all other samples from that well and from other wells in the vicinity. The laboratory was contacted about these results, and it was verified that the testing records do support the reported test results. It is not known how this sample had such different levels of these constituents, but it appears that those sample results are not a fair representation of water quality from this source.

(3) The standards for Lead and Copper are distribution system action levels based on 90th percentile distribution sample values.

(4) Fluoride has both a primary and a secondary MCL. Concentrations above the secondary MCL of 2.0 mg/L cause aesthetic problems, while concentrations above the primary MCL of 4.0 mg/L are a public health concern.

(5) Sodium does not actually have an MCL, but EPA has established a level of 20 mg/L as a level of concern for individuals on low sodium diet.

(6) NTU is Nephelometric Turbidity Unit, a measurement of the cloudiness of the water. The turbidity MCL of 1 NTU applies only to surface water sources. Since DuPont sources are all groundwater, the turbidity MCL is not applicable (NA).

(7) A µmho/cm is a micro-mho per centimeter. A mho is a unit of electrical conductance.

(8) NT indicates that the indicated contaminant was not tested for in the indicated sample.

Annual Nitrate Tests

Annual nitrate samples are required from each water source. In years when IOC samples are taken at a source a separate nitrate sample is not required from that source. Table 3-4 summarizes the nitrate sampling results since 2011, including those taken as part of an IOC analysis as summarized in Table 3-3. **All nitrate test results are well below the MCL of 10 mg/L, and there are no apparent trends of increasing nitrate.**

TABLE 3-4

Nitrate Monitoring Results [(1) (2)]

Sample Date	Bell Hill Well 1	Bell Hill Well 2	Bell Hill Well 3	Hoffman Hill Well 1	Hoffman Hill Well 2
12/15/2017			0.5		
12/14/2017		<0.2			
10/11/2017	0.4			1.1	0.9
10/7/2016	<0.2		0.4	1.0	0.8
7/19/2016		<0.2		1.0	0.8
7/25/2016	0.4		0.4		
10/23/2015	0.8	<0.2	0.4	1.0	0.8
10/10/2014	0.4	<0.2	0.4	1.0	0.8
12/5/2013			0.3		0.8
10/16/2013	0.3	<0.2		1.0	
10/16/2012	<0.2			0.6	<0.2
9/18/2012					0.7
8/22/2012			<0.2		
5/29/2012		<0.2			
10/4/2011	0.4	<0.2	0.4	1.0	0.8
8/3/2011		<0.2	0.4		

(1) The MCL for Nitrate is 10 mg/L
(2) All sample results are mg/L.

Radionuclides

Results of all radionuclide testing since 2009 are shown in Table 3-5. The only sample reporting any detected radionuclide was the Bell Hill Well 3 sample taken on August 22, 2012. The 0.8 pCi/L (picocuries per liter) reported in that sample is actually below the regulatory reporting limit of 1.0 pCi/L, and as such should perhaps have been reported as <1 pCi/L. 0.8 pCi/L is certainly less than 1.0 pCi/L, and is well below the MCL of 5 pCi/L. **All radionuclide test results are well below their respective MCLs.**

TABLE 3-5

Test Results for Radionuclides [(1)]

Date	Test, pCi/L	Bell Hill Well 1	Bell Hill Well 2	Bell Hill Well 3	Hoffman Hill Well 1	Hoffman Hill Well 2	MCL
8/16/2017	Gross Alpha					<3.0	15
	Radium 228					<1.0	5
12/10/2015	Gross Alpha	<3.0	<3.0		<3.0		15
	Radium 228	<1.0	<1.0		<1.0		5
8/22/2012	Gross Alpha			<3.0			15
	Radium 228			0.8			5
8/3/2011	Gross Alpha					<3.0	15
	Radium 228					<1.0	5
7/14/2011	Gross Alpha					<3.0	15
	Radium 228					<1.0	5
12/8/2009	Gross Alpha				<3.0		15
	Radium 228				<1.0		5

(1) All radionuclide test results are picocuries per liter (pCi/L).

Volatile Organic Chemicals

Source Volatile Organic Chemicals (VOC) samples were collected on the dates indicated in Table 3-6 and included all sampling since 2011. **No VOCs were detected in any samples.**

TABLE 3-6

VOC Sampling History

Date	Bell Hill Well 1	Bell Hill Well 2	Bell Hill Well 3	Hoffman Hill Well 1	Hoffman Hill Well 2
6/14/2017				ND [(1)]	ND [(1)]
6/13/2017	ND [(1)]	ND [(1)]	ND [(1)]		
7/24/2015		ND [(1)]			
3/19/2015	ND [(1)]				
10/25/2013				ND [(1)]	
12/21/2012					ND [(1)]
8/22/2012			ND [(1)]		

(1) ND indicates that no VOC exceeded the detection limit in the indicated sample

Synthetic Organic Chemicals

Synthetic Organic Chemical (SOC) samples that have been collected by the City of DuPont since 2010 are indicated in Table 3-7. Samples were collected from each source on the dates indicated, and analyzed for general pesticides (PEST1), general herbicides (HERB1), and insecticides (INSECT1), as indicated in the table. No SOCs were detected in any of the source SOC samples.

TABLE 3-7

SOC Sampling History

Date	Bell Hill Well 1	Bell Hill Well 2	Bell Hill Well 3	Hoffman Hill Well 1	Hoffman Hill Well 2
11/12/2013				PEST1	
10/25/2013	PEST1 HERB1			HERB1	
8/22/2012			PEST1 HERB1		
5/29/2012		PEST1 HERB1			
10/14/2010					PEST1 HERB1 INSECT1
8/13/2010					PEST1 HERB1 INSECT1

DELIVERED WATER QUALITY

Delivered water quality applies to a number of water quality monitoring requirements of the water distribution system. Monitoring of delivered water quality is necessary because some water quality parameters have been demonstrated to change in the distribution system, or even in the plumbing of buildings. The following sections summarize delivered water quality monitoring by the City of DuPont.

Coliform Bacteria Monitoring

The Revised Total Coliform Rule (RTCR)

WAC 246-290-300 (3) sets distribution system coliform monitoring requirements, and WAC 246-290-310 (2) sets coliform bacteria maximum contaminant levels. Prior to implementation of the Revised Total Coliform Rule (RTCR) on April 1, 2016, a coliform MCL violation was considered to have occurred when two or more coliform samples in one sampling period have detectable coliform bacteria, and an Acute MCL was

considered to have occurred if any of the coliform positive samples were positive for Fecal Coliform or E. Coli. A Non-Acute MCL was considered to have occurred when none of the coliform positive samples were positive for Fecal Coliform or E. Coli. This standard has been changed by the RTCR as of April 1, 2016.

Under the RTCR, as of April 1, 2016, the non-acute MCL designation has been eliminated, and the use of the Fecal Coliform test has been eliminated in favor of the E. Coli test. Under the RTCR what was formerly referred to as an Acute Coliform MCL Violation is now an E. Coli MCL Violation, with similar significance and follow-up requirements to what was formerly referred to as an Acute Coliform MCL violation. Under the RTCR, the detection of coliform bacteria but not E. Coli, does not trigger an MCL violation or public notification requirements. Instead, detection of coliform bacteria, but not E. Coli, triggers a Level 1 Assessment, which is an evaluation of the water system to determine how coliform bacteria may have gotten into the system, including source water testing, and to recommend actions to prevent any further coliform bacteria from entering the water distribution system. A level 1 assess is a written report that can be prepared by the water system operator. Detection of E. Coli, or repeated detections of total coliform, lead to a Level 2 Assessment. A level 2 assessment is a more thorough system evaluation that must be completed by an individual meeting DOH requirements. Level 1 and Level 2 Assessments must be submitted to DOH for approval, as soon as possible, and no later than within 30 days after determination that the assessment is required.

The RTCR changed some of the follow-up actions required in the event of coliform detections. For that reason, the DOH coliform monitoring plan template was revised to reflect those rule changes, and all water systems were required to update their coliform monitoring plans.

Additional information regarding the RTCR is included in Appendix F.

Coliform Monitoring Record

The number of coliform samples required per monitoring period is based on the population served during the monitoring period. Each monitoring period is a calendar month. The number of samples required was not changed by the RTCR. The City of DuPont is required to take ten distribution system coliform samples per month year round. As the population grows, the monitoring requirements will increase also. A copy of the City's current Coliform Monitoring Plan (CMP) is included in Appendix F.

The distribution system coliform monitoring record was reviewed for this Plan. A total of 1,116 coliform samples were taken between January 1, 2010 and May 14, 2018. None of those samples tested positive for any coliform bacteria.

Disinfectant Byproduct Monitoring

Disinfectant byproduct (DBP) monitoring requirements include Total Trihalomethanes (TTHM) and Haloacetic Acids (five) (HAA5). WAC 246-290-300(7)(b)(ii)(A) requires monitoring in accordance with 40 CFR 141.132(b)(1)(i). WAC 246-290-300(7)(b)(ii)(B) allows reduced monitoring with DOH approval in accordance with 40 CFR 141.132(b)(1)(ii). 40 CFR 141.132(b)(1)(i) requires 1 sample per year per chemically disinfected groundwater source for systems serving fewer than 10,000 persons. Multiple wells drawing from the same aquifer may be treated as one groundwater source for determining monitoring requirements under this rule. 40 CFR 141.132(b)(1)(ii) allows reduction of monitoring frequency to one sample per 3 years per chemically disinfected groundwater source if the average annual TTHM is less than 40 µg/L and the average annual HAA5 is less than 30 µg/L. Samples are required to be taken at a point of maximum residence time in the water distribution system.

The Stage 2 DBP Rule revised residual disinfectant concentrations and maximum contaminant levels for disinfection byproducts. The Stage 2 rule requires that each individual sample location meet the running annual average MCL, rather than a system-wide annual average. The final rule for Stage 2 compliance states the system must meet 80 µg/L and 60 µg/L as the Locational Running Annual Averages (LRAAs) for TTHMs and HAA5s, respectively. Systems were required (unless waived) to identify new high TTHM and HAA5 locations by conducting an Initial Distribution System Evaluation (IDSE). The final rule also requires population-based monitoring for all systems. DuPont is required to collect one sample per year for TTHMs and HAA5s, based on the City's population and the source water type (groundwater).

Table 3-8 shows all the sampling results from the City of DuPont. No samples were above the MCLs.

TABLE 3-8

TTHM and HAA5 Sampling History [(1)]

Sample	1175 Center Drive		4301 Pioneer Ave		Lapsley Dr. at Mounts Rd.		Sinclair Dr. near Hoffman Hill Bl.	
Date	HAA5	TTHM	HAA5	TTHM	HAA5	TTHM	HAA5	TTHM
7/27/2017	<6.0	ND [(2)]	<6.0	0.6				
7/25/2016			<15.0	1.8				
7/27/2015			<15.0	1.8				
3/2/2015	<15.0	0.3	<15.0	1.9				
10/28/2014	<15.0	0.3	<15.0	3.2				
7/23/2014	<15.0	2.6	<15.0	ND [(2)]				
6/19/2014	<15.0	ND [(2)]	<15.0	1.5				
4/24/2014	<15.0	0.3	<15.0	1.0				

TABLE 3-8 – (continued)

TTHM and HAA5 Sampling History [1]

Sample	1175 Center Drive		4301 Pioneer Ave		Lapsley Dr. at Mounts Rd.		Sinclair Dr. near Hoffman Hill Bl.	
Date	HAA5	TTHM	HAA5	TTHM	HAA5	TTHM	HAA5	TTHM
1/22/2014	<15.0	ND [2]	<15.0	1.0				
10/25/2013			<15.0	1.7				
10/16/2013	<15.0	0.3						
7/25/2013	<15.0	ND [2]	<15.0	1.7	<15.0	0.3	<15.0	ND [2]
7/28/2011	<15.0	ND [2]	<15.0	ND [2]	<15.0	ND [2]	<15.0	ND [2]

(1) All sample results are µg/L (micrograms per liter). One µg/L is equivalent to one part per billion.
(2) ND means that the contaminant was Not Detected in the water sample.

Asbestos Monitoring

Asbestos fibers are measured as million fibers per liter greater than 10 micrometers in length (MFL>10 µm). The MCL is 7 MFL>10 µm. WAC 246-290-300(2)(b)(v) requires distribution system monitoring for asbestos in accordance with 40 CFR 141.23(b). The Federal regulation requires one sample during the first 3 years of each 9-year sampling cycle, unless the state grants a waiver to asbestos sampling based on a demonstrated lack of vulnerability to asbestos in both the source water and the distribution system. If an asbestos sample is required, it is to be taken under conditions where asbestos contamination is most likely to appear.

Since the City of DuPont water distribution system has less than 10 percent asbestos cement pipe installed, an asbestos sample is not required by DOH to be collected from the distribution system. The City of DuPont distribution system consists of less than 1,000 lineal feet of asbestos cement pipe for the entire system. The former El Rancho Madrona water system previously had AC pipe, however all water mains in the former El Rancho Madrona water system were replaced with PVC pipe in 2012.

Lead and Copper Monitoring

Lead and copper monitoring is to determine if lead or copper are leaching out of water lines at a rate that produces concentrations that are a health concern. The rule requires that 90 percent of the representative samples do not exceed the action levels for either lead or copper. If more than the allowable number of samples exceed the action level for either lead or copper, then the water system owner must take action to reduce the corrosivity of the water, or take other actions such as water service line replacement, to reduce the level of lead and copper at the tap. The action level for lead is 0.015 mg/L and the action level for copper is 1.3 mg/L.

The City's collected lead and copper samples in August 2013 and in August 2016 from service connection taps within the water distribution system. 34 samples were collected in 2013 and 34 samples were collected in 2016. Table 3-9 summarizes DuPont's lead and copper monitoring results. **The data shows that DuPont water system is in compliance with the lead and copper standards.**

TABLE 3-9

Lead and Copper Monitoring Results

Year	Maximum Lead	90th Percentile Lead	Maximum Copper	90th Percentile Copper
2013	0.004	0.002	0.19	0.16
2016	0.008	0.001	0.34	0.14
Action Levels		0.015		1.3

WATER QUALITY MONITORING SCHEDULE

Water quality monitoring is required for regulatory compliance and to monitor water system conditions. DOH posts annual Water Quality Monitoring Schedules for each water system on their Sentry Internet site. Table 3-10 summarizes the 2018 monitoring schedule for the City of DuPont Water System.

TABLE 3-10

City of DuPont Water System Water Quality Monitoring

Parameter	Sample Location	Frequency	Notes	Consequence of Exceeding Standard
Routine Coliform	Distribution System	10 samples per month.	See Coliform Monitoring Plan in Appendix F for routine and follow-up sample site locations.	Follow-up and repeat sampling, public notification, investigation and correction of source of coliform
Inorganic Chemicals	Source (S03)	9-Year Waiver	Sampled 7/25/2016, No sample due	Resample, public notification, treatment.
	Source (S04)	9-Year Waiver	Sampled 7/19/2016, No sample due	Resample, public notification, treatment.
	Source (S05)	9-Year Waiver	Sampled 7/19/2016, No sample due	Resample, public notification, treatment.
	Source (S06)	9-Year Waiver	Sampled 7/25/2016, No sample due	Resample, public notification, treatment.
	Source (S09)	9-Year Waiver	Sampled 7/19/2016, No sample due	Resample, public notification, treatment.

TABLE 3-10 – (continued)

City of DuPont Water System Water Quality Monitoring

Parameter	Sample Location	Frequency	Notes	Consequence of Exceeding Standard
Nitrates	Source (S03)	One sample every year (1)	Sampled 10/11/2017, Next sample due 10/2018	Resample, public notification, treatment.
	Source (S04)	One sample every year (1)	Sampled 12/14/2017, Next sample due 10/2018	Resample, public notification, treatment.
	Source (S05)	One sample every year (1)	Sampled 10/11/2017, Next sample due 10/2018	Resample, public notification, treatment.
	Source (S06)	One sample every year (1)	Sampled 12/15/2017, Next sample due 10/2018	Resample, public notification, treatment.
	Source (S09)	One sample every year (1)	Sampled 10/11/2017, Next sample due 10/2018	Resample, public notification, treatment.
VOCs	Source (S03)	6-Year Waiver	Sampled 6/13/2017, No sample due	Resample, public notification, treatment.
	Source (S04)	6-Year Waiver	Sampled 6/13/2017, No sample due	Resample, public notification, treatment.
	Source (S05)	6-Year Waiver	Sampled 6/14/2017, No sample due	Resample, public notification, treatment.
	Source (S06)	6-Year Waiver	Sampled 6/13/2017, No sample due	Resample, public notification, treatment.
	Source (S09)	6-Year Waiver	Sampled 6/14/2017, No sample due	Resample, public notification, treatment.
SOC Herbicides	Source (S03)	9-Year Waiver	Sampled 10/25/2013, Next sample due 10/2022	Resample, public notification, treatment.
	Source (S04)	9-Year Waiver	Sampled 5/29/2012, Next sample due 5/2021	Resample, public notification, treatment.
	Source (S05)	9-Year Waiver	Sampled 10/25/2013, Next sample due 10/2022	Resample, public notification, treatment.
	Source (S06)	9-Year Waiver	Sampled 8/22/2012, Next sample due 8/2021	Resample, public notification, treatment.
	Source (S09)	9-Year Waiver	Sampled 10/14/2010, Next sample due 10/2019	Resample, public notification, treatment.

TABLE 3-10 – (continued)

City of DuPont Water System Water Quality Monitoring

Parameter	Sample Location	Frequency	Notes	Consequence of Exceeding Standard
SOC General Pesticides	Source (S03)	9-Year Waiver	Sampled 10/25/2013, Next sample due 10/2022	Resample, public notification, treatment.
	Source (S04)	9-Year Waiver	Sampled 5/29/2012, Next sample due 5/2021	Resample, public notification, treatment.
	Source (S05)	9-Year Waiver	Sampled 11/12/2013, Next sample due 10/2022	Resample, public notification, treatment.
	Source (S06)	9-Year Waiver	Sampled 8/22/2012, Next sample due 8/2021	Resample, public notification, treatment.
	Source (S09)	9-Year Waiver	Sampled 10/14/2010, Next sample due 10/2019	Resample, public notification, treatment.
SOC Insecticides	All Sources	Statewide Waiver	No Samples Due	Resample, public notification, treatment.
SOCs – EDB and other soil fumigants	Source (S03)	3-Year Waiver	No Samples Due	Resample, public notification, treatment.
	Source (S04)	3-Year Waiver	No Samples Due	Resample, public notification, treatment.
	Source (S05)	3-Year Waiver	No Samples Due	Resample, public notification, treatment.
	Source (S06)	3-Year Waiver	No Samples Due	Resample, public notification, treatment.
	Source (S09)	3-Year Waiver	No Samples Due	Resample, public notification, treatment.
SOCs – Dioxin, Endothall, Diquat, Glyphosphate	All Sources	Statewide Waiver	--	Resample, public notification, treatment.
Lead and Copper	Distribution System	One set of 30 samples every 3 years	Sampled 9/25/2016, Next samples due 8/2019	Resample, public notification, treatment.
Disinfectant Byproducts, TTHM, HAA5	Distribution System, per DBP Sample Plan	Sample two sites once per year	Last Sampled 7/24/2017, Next sample due 7/2018	Resample, public notification, treatment.

TABLE 3-10 – (continued)

City of DuPont Water System Water Quality Monitoring

Parameter	Sample Location	Frequency	Notes	Consequence of Exceeding Standard
Asbestos	Distribution System	9-Year Waiver	No Samples Due	Resample, public notification, treatment.
Radionuclides (Gross Alpha, Radium 228)	Source (S03)	One Sample every 6 years	Sampled 12-10-2015, No samples due	Resample, public notification, treatment.
	Source (S04)	One Sample every 6 years	Sampled 12-10-2015, No samples due	Resample, public notification, treatment.
	Source (S05)	One Sample every 6 years	Sampled 12-10-2015, No samples due	Resample, public notification, treatment.
	Source (S06)	One Sample every 6 years	Sampled 8-22-2012, Next sample due 8/2018	Resample, public notification, treatment.
	Source (S09)	One Sample every 6 years	Sampled 8-16-2017, No samples due	Possible Treatment Modifications

(1) Nitrate analysis is included as a part of inorganic chemical analysis. This test need not be duplicated in years when inorganic chemicals are tested.

WATER QUALITY COMPLAINTS

The City of DuPont Water Manager handles water quality complaints by investigating the validity of the complaint, correcting the issue if found and documenting the response to the complaint. Under normal operating conditions, the City of DuPont water system rarely receives complaints.

SYSTEM COMPONENT ANALYSIS

The following sections evaluate the existing water system facilities in terms of their capacities, physical conditions, and performance capabilities. Facilities are evaluated relative to existing and projected requirements based on growth and demand projections from Chapter 2.

SOURCE OF SUPPLY

A description of the City's source of supply was presented in Chapter 1. The City of DuPont is supplied by a total of five wells at two locations.

According to Department of Health Design Standards, source production capacity must be sufficient to supply maximum day demands. Maximum day and average day demands

must also comply with the maximum instantaneous and maximum annual withdrawal limitations of associated water rights.

Water Rights Analysis

Instantaneous Rights vs. Installed Capacity

A summary of the City's existing water rights is provided in Table 1-6 of Chapter 1. The City of DuPont has a total instantaneous water right capacity of 5,390 gpm and an annual water right capacity of 3,360 acre feet per year. The instantaneous water right capacity includes 210 gpm for the two Historic Village Wells and 80 gpm for the El Rancho Madrona Well. These wells are no longer in service but the City still holds the rights for them.

TABLE 3-11

Instantaneous Production Capacity versus Water Right Analysis

Source	Current Pumping Capacity, gpm	Instantaneous Water Rights, gpm	Water Right Surplus/(Deficit), gpm
Active Wells			
Bell Hill 1	900	900	0
Bell Hill 2	1,000	1,000	0
Bell Hill 3	1,000	1,000	0
Hoffman Hill 1	1,100	2,200 (1)	0
Hoffman Hill 2	1,100		
Subtotal, Active Wells	**5,100**	**5,100**	**0**
Inactive Wells			
Historic Village Well 1	0 (2)	60	60
Historic Village Well 2	0 (3)	150	150
El Rancho Madrona Well	0 (4)	80	80
TOTALS	**5,100**	**5,390**	**290**

(1) 2,200 gpm requires both Hoffman Hill wells 1 and 2 to be operating.
(2) Historic Village Well 1 remains operational but is disconnected from the public water supply system and is now only used for park irrigation.
(3) Historic Village Well 2 has been decommissioned by pressure grouting.
(4) El Rancho Madrona Well has been decommissioned by pressure grouting.

Instantaneous Rights vs. Projected Demands

An analysis of the City's instantaneous water rights versus projected source capacity needs is presented in Table 3-12. This analysis includes comparisons to water rights just for active sources, and to all of the City's water rights.

TABLE 3-12

Projected Instantaneous Water Right Analysis

Year	Recommended Minimum Source Capacity, gpm	Active Instantaneous Water Rights, gpm (2)	Active Water Instantaneous Rights Surplus/(Deficit), gpm (3)	Total Instantaneous Water Rights, gpm (4)	Total Instantaneous Water Rights Surplus/(Deficit), gpm
2018	3,623	5,100	1,477	5,390	1,767
2019	3,786	5,100	1,314	5,390	1,604
2020	3,840	5,100	1,260	5,390	1,550
2021	3,894	5,100	1,206	5,390	1,496
2022	3,947	5,100	1,153	5,390	1,443
2023	4,000	5,100	1,100	5,390	1,390
2024	4,055	5,100	1,045	5,390	1,335
2025	4,108	5,100	992	5,390	1,282
2026	4,281	5,100	819	5,390	1,109
2027	4,453	5,100	647	5,390	937
2028	4,625	5,100	475	5,390	765
2029	4,799	5,100	301	5,390	591
2030	4,972	5,100	128	5,390	418
2031	5,144	5,100	(44)	5,390	246
2032	5,317	5,100	(217)	5,390	73
2033	5,490	5,100	(390)	5,390	(100)
2034	5,662	5,100	(562)	5,390	(272)
2035	5,835	5,100	(735)	5,390	(445)
2036	5,901	5,100	(801)	5,390	(511)
2037	5,968	5,100	(868)	5,390	(578)
2038	6,033	5,100	(933)	5,390	(643)

(1) Recommended Minimum Source Capacity is Maximum Day Demand from Table 2-16 (including DSL) divided by 1,080 (minutes in 18 hours of pumping).
(2) Active Instantaneous Water Rights is from Table 1-6.
(3) Active Instantaneous Water Rights Surplus/(Deficit) is Active Instantaneous Water Rights minus Recommended Minimum Source Capacity.
(4) Total Instantaneous Water Rights is from Table 1-6.
(5) Total Instantaneous Water Rights Surplus/(Deficit) is Total Instantaneous Water Rights minus Recommended Minimum Source Capacity.

Table 3-12 shows that existing instantaneous water rights for active sources are projected to be adequate through 2030, but will have a deficit of 933 gpm by 2038. This is based on meeting maximum day demand in 18 hours per day of source production. At a total active instantaneous water right of 5,100 gpm, the projected 2038 maximum day demand of 6.516 MGD from Table 2-16 can be met in 21 hours and 18 minutes. With all water rights considered, including those for wells that are not currently active, the City has

adequate water rights through 2032, but will have a deficit of 643 gpm by 2038, based again on meeting maximum day demand in 18 hours. With all water rights the 2038 projected maximum day demand of 6.516 MGD can be met in 20 hours and 9 minutes. **To avoid a potential water right shortfall, and to protect the City's inactive water rights, it is recommended that one or more of the City's active wells be added as a point of withdrawal on each of the City's water rights for their inactive wells, as well as pursue additional water rights.**

Annual Rights vs. Projected Demands

Table 3-13 compares the projected annual water supply needs with existing annual water rights, both for water rights for active source, and for all water rights.

TABLE 3-13

Projected Annual Water Right Analysis

Year	Projected Annual Production, acre-ft (1)	Active Annual Water Rights, acre-ft/yr (2)	Active Surplus/ (Deficit), acre-ft/yr (3)	Total Annual Water Rights, acre-ft/yr (4)	Total Surplus/ (Deficit), acre-ft/yr (5)
2018	1,674	3,160	1,486	3,360	1,686
2019	1,749	3,160	1,411	3,360	1,611
2020	1,779	3,160	1,381	3,360	1,581
2021	1,799	3,160	1,361	3,360	1,561
2022	1,823	3,160	1,337	3,360	1,537
2023	1,848	3,160	1,312	3,360	1,512
2024	1,878	3,160	1,282	3,360	1,482
2025	1,898	3,160	1,262	3,360	1,462
2026	1,977	3,160	1,183	3,360	1,383
2027	2,057	3,160	1,103	3,360	1,303
2028	2,142	3,160	1,018	3,360	1,218
2029	2,217	3,160	943	3,360	1,143
2030	2,296	3,160	864	3,360	1,064
2031	2,376	3,160	784	3,360	984
2032	2,463	3,160	697	3,360	897
2033	2,536	3,160	624	3,360	824

TABLE 3-13 – (continued)

Projected Annual Water Right Analysis

Year	Projected Annual Production, acre-ft [(1)]	Active Annual Water Rights, acre-ft/yr [(2)]	Active Surplus/ (Deficit), acre-ft/yr [(3)]	Total Annual Water Rights, acre-ft/yr [(4)]	Total Surplus/ (Deficit), acre-ft/yr [(5)]
2034	2,615	3,160	545	3,360	745
2035	2,695	3,160	465	3,360	665
2036	2,733	3,160	427	3,360	627
2037	2,756	3,160	404	3,360	604
2038	2,787	3,160	373	3,360	573

(1) Projected Annual Production is taken directly from Table 2-16
(2) Active Annual Water Rights is from Table 1-6, and includes water rights for Hoffman Hill and Bell Hill Wells but not Historic Village or El Rancho Madrona Wells.
(3) Active Surplus/(Deficit) is Active Annual Water Rights minus Projected Annual Production.
(4) Total Annual Water Rights is from Table 1-6 and includes water rights for Hoffman Hill, Bell Hill, Historic Village, and El Rancho Madrona Wells.
(5) Total Surplus/(Deficit) is Total Annual Water Rights minus Projected Annual Production.

Based on these projections it appears that the City of DuPont has adequate annual withdrawal water rights to cover the projected demands for the 20-year planning period.

The City's Water Rights Self-Assessment form is included in Appendix C.

Source Capacity Analysis

The Water System Design Manual recommends that source production capacity meet or exceed Maximum Day Demand (MDD) of the water system. The Department of Health recommends that source(s) capacity should be capable of supplying MDD within an 18-hour period. Table 3-14 shows the source capacity necessary to meet projected maximum day demands from Table 2-16 in 18 hours per day of source production and compares this to the existing source capacity. Since the existing source capacity is equal to the active existing instantaneous water rights, the Source Capacity Surplus/(Deficit) values in Table 3-14 are identical to the Active Water Rights Surplus/(Deficit) values in Table 3-12. As stated in the Water Rights Analysis section, the existing installed source capacity can meet projected 2038 system demands in 21 hours and 18 minutes. To meet the projected 2038 system demands in 18 hours the City would need an additional 933 gpm of source capacity.

TABLE 3-14

Projected Demand Versus Source Capacity Analysis

Year	Recommended Minimum Source Capacity, gpm (1)	Existing Source Capacity, gpm (2)	Source Capacity Surplus/(Deficit), gpm (3)
2018	3,623	5,100	1,477
2019	3,786	5,100	1,314
2020	3,840	5,100	1,260
2021	3,894	5,100	1,206
2022	3,947	5,100	1,153
2023	4,000	5,100	1,100
2024	4,055	5,100	1,045
2025	4,108	5,100	992
2026	4,281	5,100	819
2027	4,453	5,100	647
2028	4,625	5,100	475
2029	4,799	5,100	301
2030	4,972	5,100	128
2031	5,144	5,100	(44)
2032	5,317	5,100	(217)
2033	5,490	5,100	(390)
2034	5,662	5,100	(562)
2035	5,835	5,100	(735)
2036	5,901	5,100	(801)
2037	5,968	5,100	(868)
2038	6,033	5,100	(933)

(1) Recommended Minimum Source Capacity is Maximum Day Demand from Table 2-16 (including DSL) divided by 1,080 (minutes in 18 hours of pumping).
(2) Existing Source Capacity is from Table 1-5.
(3) Source Capacity Surplus/(Deficit) is Existing Source Capacity minus Recommended Minimum Source Capacity.

STORAGE ANALYSIS

In this section we first examine the City's existing storage facilities to determine how much effective water storage capacity the City currently has, then we apply the storage standards from the DOH Water System Design Manual to the system to determine how much effective storage the standard recommend that the City have.

Existing Effective Storage

The nominal reservoir volumes indicated in Table 1-8 are used to identify reservoirs and provide a general idea of their volumes. However, there is no rule as to how nominal volumes are defined, and the nominal volume generally overstates the actual usable, or

effective reservoir volumes. Generally, the nominal volume is based on the diameter of the reservoir and either the wall height or the overflow height. In this case it appears that the referenced nominal capacities are the capacity to the reservoir overflow.

The effective volume of a reservoir is the volume of water that is reliably available for withdrawal at the design pressure and flow rates. Reservoirs are often used as devices for turning source water supplies on and off, with a higher level turning source water supply off, and a lower level turning source water supply on. Since the water level in the reservoir at any given time may be anywhere between the source water-on level and the source water-off level, regardless of system demand, water above the source water-on level cannot be relied on as available when needed. The volume of water between the source water-on level and the source water-off level is referred to as pump-cycle storage or operational storage, and serves the function of allowing source water pumps and/or treatment systems to run for a period of time and shut off for a period of time. This is useful, because if pumps and/or treatment systems turn on and off too frequently that can cause undue wear on the pumps and the pump control systems, and can cause problems with treatment systems. However, because it is not reliably available when needed, operational storage is not considered effective storage.

Reservoirs are also not generally filled to the top of the wall or to the top of the overflow, but source pumps turn off below these levels to avoid overflowing and wasting water. Also, seismic design considerations require a certain amount of freeboard between the high water level and the top of the wall to allow for waves in the reservoir that may be created by seismic events. The reservoir volume above the high water level and the overflow or the top of the wall is referred to as "dead storage" and is also not considered effective storage.

Finally, not all water in the reservoir can usually be withdrawn at the pressure and/or rate necessary to meet system demands, and sometimes a volume of water must be maintained in a reservoir to meet water treatment requirements. In the case of a tall reservoir where the water elevation is used to maintain system pressure, there may be a minimum water level below which minimum regulatory water distribution system pressures may not be met. In a case where the reservoir is used to provide disinfectant contact time, a minimum volume may be required to be maintained in the reservoir to provide effective disinfection.

And even if there are not pressure or minimum retention limitations, there is some level of water that must be present above the reservoir outlet in order for the design flow to exit through the reservoir outlet. Also, reservoirs typically have outlets that extend above the reservoir flow to prevent silt that accumulates in the reservoir from going out the reservoir outlet.

All water that cannot be withdrawn from the reservoir at the required pressure and flow rate, and/or must be retained in the reservoir for other reason, such as disinfectant detention time, is also termed "dead storage." In the case of the DuPont reservoirs, there

is no minimum water level to meet pressure requirements because water is pumped from the reservoirs, and there is no minimum volume that must be retained for treatment purposes, so the minimum operating level is just the level of the outlet plus the height of water over the outlet required to meet the maximum design flow rate. Assuming that the reservoir outlets of both reservoirs are 16-inch diameter and extend one foot above the reservoir floor, a weir equation was used to estimate that eight inches of water is required over the outlet to meet the maximum design withdrawal rate. Effective storage calculations are shown in Table 3-15.

TABLE 3-15

Existing Effective Storage

Parameter	Bell Hill Reservoir		Hoffman Hill Reservoir	
Nominal Capacity, Gallons	1,010,000		3,530,000	
Diameter, feet	85		160	
Gallons per foot of water depth	42,448		150,405	
Wall Height, feet	25		24	
Capacity to Top of Wall, gallons	1,061,000		3,610,000	
Total Volume to Top of Wall, gallons	4,671,000			
Overflow Height, feet	23.75		21.50	
Capacity to overflow, gallons	1,008,000		3,234,000	
Total Volume to Overflow, gallons	4,543,000			
Elevations, feet	Above Base	Above Sea Level	Above Base	Above Sea Level
Top of Wall, feet	25.00	275.00	24.00	404.00
Overflow, feet	23.75	273.75	21.50	401.50
High Level Alarm, feet	23.50	273.50	21.25	401.25
Wells Off, feet	23.25	273.25	21.00	401.00
Wells On, feet	18.25	268.25	16.00	396.00
Operating Interval, feet	5.00		5.00	
Low Level Alarm, feet	16.25	266.25	14.00	394.00
Minimum Operating Level, feet	1.67	251.67	1.67	381.67
Outlet, feet	1.00	251.00	1.00	381.00
Base, feet	0.00	250.00	0.00	380.00
Pump Cycle Volume, gallons	212,000		752,000	
Total Pump Cycle Volume, gallons	964,000			
Effective Storage Depth, feet	16.58		14.33	
Effective Storage Volume, gallons	704,000		2,156,000	
Total Effective Storage Volume, gallons	2,860,000			
Total Effective Storage Volume, MG	**2.860**			

These storage elements are depicted schematically in Figure 3-1.

It should be noted that the total effective storage volume is impacted by the 5-foot interval between the wells on and the wells off levels. That interval can be easily adjusted by the operator if additional effective storage is needed by simply raising the well pumps-on level. Reducing the operating interval reduces the pump cycle volume, which means that well pumps would turn on and off more often, but the existing pump cycle volume of 0.964 MG is much more than needed to control well pump cycling. The 5-foot operating interval is more for the purpose of providing for water turnover in the reservoirs than for pump cycle control. If system demand were to increase to the point where additional effective storage is needed, that additional demand would also reduce the need for a large operating interval to create reservoir turnover. At a pump cycling interval of 1.9 feet in both reservoirs the pump cycle volume would be 0.367 MG, and the total effective storage volume would be 3.485 MG.

Storage Requirements

Storage requirements for the City of DuPont were determined by applying criteria specified in Chapter 9 of the DOH Water System Design Manual. The effective storage recommended according to this guidance document is based on the sum of the following:

- Equalizing Storage
- Standby Storage
- Fire Suppression Storage

Equalizing Storage

Equalizing storage is typically used to meet diurnal demands which exceed the average day and maximum day demands. The volume of equalizing storage required depends on peak system demands, the magnitude of diurnal water system demand variations, the source production rate, and the mode of system operation. Sufficient equalizing storage must be provided in combination with available water sources and pumping facilities such that peak system demands can be satisfied. The DOH Water System Design Manual recommends that equalizing storage be calculated using the following equation:

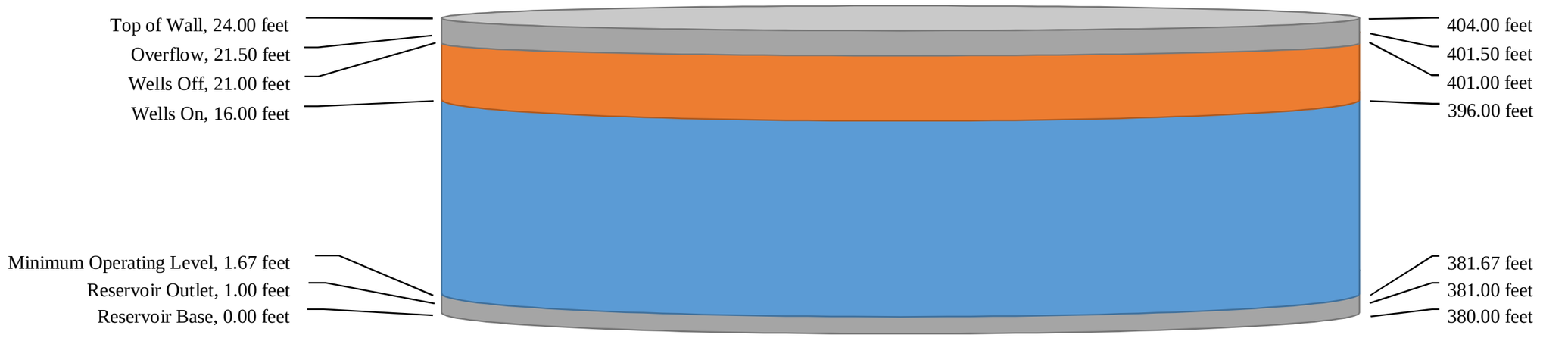
$V_{ES} = (Q_{PH} - Q_S)$ x 150 minutes

But in no case shall be less than zero, where:

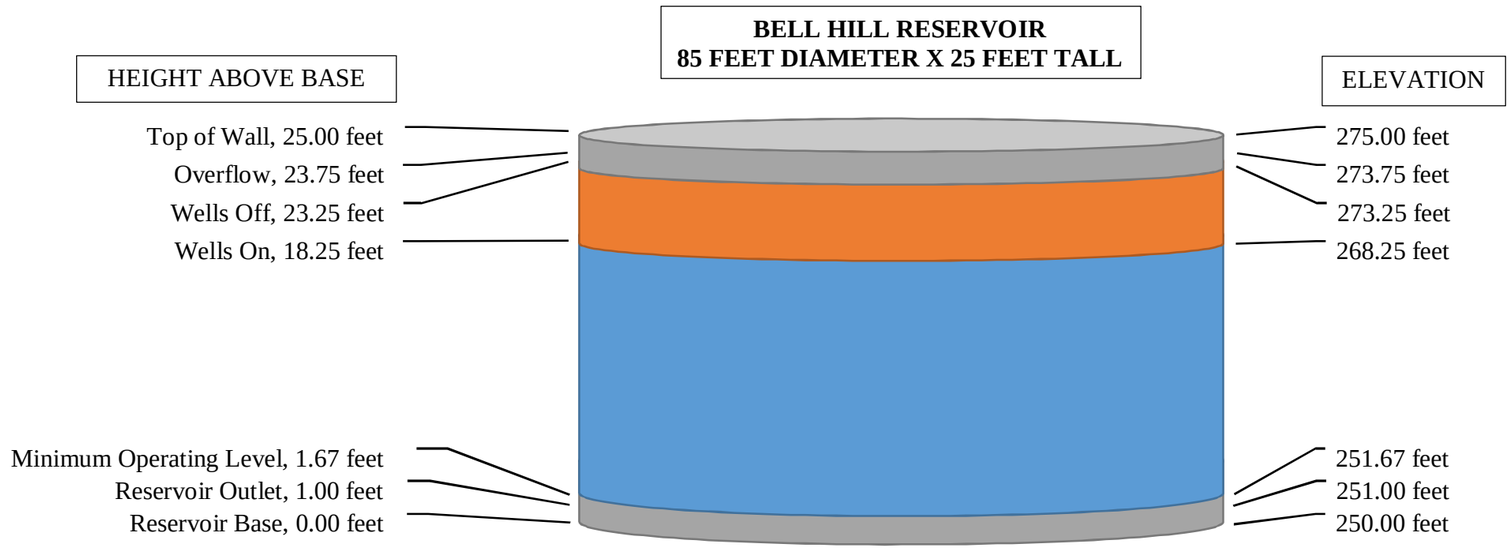
V_{ES} = Equalizing storage component, gallons
Q_{PH} = Peak hourly demand, gpm
Q_S = Total source of supply capacity, excluding emergency sources, gpm

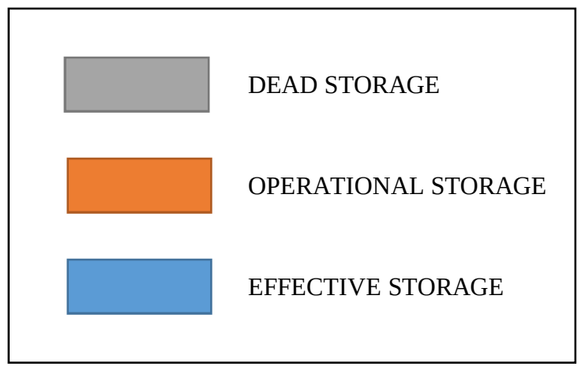
Projected peak hour demands are as shown by year in Table 2-16, and total source capacity is shown in Table 1-5.

HOFFMAN HILL RESERVOIR
160 FEET DIAMETER X 24 FEET TALL



BELL HILL RESERVOIR
85 FEET DIAMETER X 25 FEET TALL





CITY OF DUPONT
WATER SYSTEM PLAN
FIGURE 3-1
RESERVOIR EFFECTIVE STORAGE CAPACITY

Gray & Osborne, Inc.
CONSULTING ENGINEERS

Standby Storage

Standby storage is provided in order to meet demands in the event of a system failure such as a power outage, an interruption of supply, or break in a major transmission line. The amount of emergency storage should be based on the reliability of supply and pumping equipment, standby power sources, and the anticipated length of time the system could be out of service. The DOH Water System Design Manual recommends that standby storage be calculated using the following equations:

$SB_{TMS} = (2 \text{ days})(ADD)(N) - t_m(Q_S - Q_L)$

OR

$SB_{TMS} = 200 \times N$

Whichever is greater

Where

SB_{TMS}	=	Standby storage component for a multiple source system, gallons
ADD	=	Average day demand for the system, gpd/ERU
N	=	Number of ERUs
Q_S	=	Sum of all installed and continuously available sources of supply, except emergency sources, gpm
Q_L	=	Largest capacity source available to the system, gpm
T	=	Time that remaining sources are pumped on the day when the largest source is not available, minutes

Average day demand per ERU is shown in Table 2-11 and projected number of ERUs is shown in Table 2-15. Source capacities are shown in Table 1-5. Projected standby storage is based on a maximum of 18 hour per day pumping.

Fire Suppression Storage

Fire suppression storage is provided to ensure that the volume of water required for fighting fires is available when necessary. Fire suppression storage also reduces the impact of firefighting on distribution system water pressure. The amount of water required for firefighting purposes is specified in terms of rate of flow in gallons per minute (gpm) and an associated duration. Fire flows must be provided at a residual water system pressure of at least 20 pounds per square inch (psi). See discussion above; Fire Flow Standards, with regard to City of DuPont developer standards.

Fire suppression storage is calculated using the following equation:

$FSS = (FF)(t_m)$

Where

FSS = Required fire suppression storage component, gallons
FF = Required fire flow rate, as specified by fire protection authority, gpm
t_m = Duration of FF rate, as specified by fire protection authority, minutes

As shown in Table 3-2, the maximum fire flow standard is the Industrial standard of 4,000 gpm sustainable for 4 hours (240 minutes). This calculates to 960,000 gallons.

Total Storage Requirements

The various storage components as described in the preceding sections are calculated and added together in Table 3-16. The table shows that the existing effective storage, as calculated in Table 3-15, is adequate to meet the storage needs of the City through 2029, but is deficient by 588,000 gallons by 2038. However, as discussed in the text following Table 3-15, the total effective storage can be easily increased by adjusting the well on levels. At a combined 192,853 gallons per foot of water in the Bell Hill and Hoffman Hill Reservoirs, **if the operating intervals in both reservoirs were decreased to 1.9 feet, an additional 598,000 gallons of effective storage would be created, and there would be a surplus of 10,000 gallons**. As previously noted, the 5 foot operating interval is in use at this time is to minimize water stagnation in the reservoirs, but is easily adjustable by the operator by simply adjusting the well-on set points. As system demand increases and additional storage is needed, water stagnation also become less of an issue, and the well-on set points can be adjusted to meet the storage requirements.

It should be noted that the standby storage values always calculate to be 200 gallons times the total projected ERUs. This is because even with one source out of service the remaining sources can meet two days of average day demand in 18 hours of pumping, and therefore the minimum standard of 200 gallons per ERU determines the standby storage requirement.

TABLE 3-16

Storage Capacity Analysis

Year	Equalizing Storage, MG (1)	Standby Storage, MG (2)	Fire Storage, MG (3)	Total Storage, MG (4)	Existing Effective Storage, MG (5)	Storage Surplus/ (Deficit), MG (6)
2018	0.000	1.294	0.960	2.254	2.860	0.606
2019	0.000	1.352	0.960	2.312	2.860	0.548
2020	0.000	1.371	0.960	2.331	2.860	0.529
2021	0.000	1.390	0.960	2.350	2.860	0.510
2022	0.000	1.409	0.960	2.369	2.860	0.491
2023	0.000	1.428	0.960	2.388	2.860	0.472
2024	0.000	1.448	0.960	2.408	2.860	0.452
2025	0.000	1.467	0.960	2.427	2.860	0.433
2026	0.020	1.528	0.960	2.508	2.860	0.352
2027	0.051	1.590	0.960	2.601	2.860	0.259
2028	0.082	1.651	0.960	2.693	2.860	0.167
2029	0.113	1.713	0.960	2.786	2.860	0.074
2030	0.144	1.775	0.960	2.879	2.860	(0.019)
2031	0.175	1.836	0.960	2.971	2.860	(0.111)
2032	0.206	1.898	0.960	3.064	2.860	(0.204)
2033	0.237	1.960	0.960	3.157	2.860	(0.297)
2034	0.268	2.021	0.960	3.249	2.860	(0.389)
2035	0.299	2.083	0.960	3.342	2.860	(0.482)
2036	0.311	2.107	0.960	3.378	2.860	(0.518)
2037	0.323	2.131	0.960	3.414	2.860	(0.554)
2038	0.334	2.154	0.960	3.448	2.860	(0.588)

(1) Equalizing storage is calculated based on the DOH Water System Design Manual formula discussed above using the PHD value from Table 2-11, the projected number of ERUs from Table 2-15, and the source capacities shown in Table 1-5.

(2) Standby storage is calculated based on the DOH Water System Design Manual formula discussed above using the ADD value from Table 2-11, and the projected number of ERUs from Table 2-15, and the source capacities shown in Table 1-5.

(3) Fire flow of 0.96 MG is based on the Industrial Minimum Fire Flow of 4,000 gpm for a duration of 4 hours.

(4) Total Storage is the sum of Equalizing, Standby, and Fire Storage.

(5) Existing Effective Storage is from Table 3-15.

(6) Storage Surplus/(Deficit) is the difference between Existing Effective Storage and Total Storage. Note that storage deficit after 2029 can be eliminated by adjusting well-on set points, thereby reducing operational storage and increasing the effective storage.

TREATMENT ANALYSIS

The City of DuPont provides chlorine disinfection through the addition of sodium hypochlorite to its water system. The City's election to chlorinate its well sources is not

currently a Department of Health requirement but the City does so to significantly reduce the potential for contamination.

Bell Hill Water Treatment

Originally, two wells were constructed on the Bell Hill water facility site. They were developed in vertically separated aquifers so there was no interference when they ran simultaneously. The water quality from Well 1 is excellent, with no primary or secondary contaminants or organics detected beyond allowable limits. The water quality of Bell Hill Well 2 is good except for high iron and manganese. Table 3-3 shows Iron levels of 0.24 and 0.33 mg/L, and Manganese levels of 0.24 and 0.26 mg/L versus the secondary MCL levels of 0.3 and 0.05 mg/L, respectively. Iron and Manganese are secondary contaminants, meaning they are associated with potential aesthetic problems, including staining of laundry and fixtures, rather than potential health hazards. The City's method of controlling the iron and manganese for this well is through blending with the low manganese water from Bell Hill Wells 1 and 3. This has been accomplished by City operators by varying the length of pumping cycles. All three of these wells discharge directly to the Bell Hill Reservoir, which provides the opportunity for these waters to mix before being pumped into the distribution system.

The residual chlorine concentration target is 0.4 to 0.5 mg/L. This is maintained by injecting 12 percent sodium hypochlorite solution into the discharge of the wells at Bell Hill prior to entry into the Bell Hill Reservoir. No chlorine contact time is required because the Bell Hill wells are considered protected groundwater supplies.

The City is planning to replace the 12 percent sodium hypochlorite feed system at Bell Hill with an on-site chlorine generation system in the near future. The City installed on-site chlorine generation at Hoffman Hill wells in 2011 and is pleased with the system, so would like to duplicate that system at the Bell Hill wells. Doing so will eliminate handling of the hazardous 12 percent chlorine solution and is anticipated to reduce corrosion due to chlorine vapors in the rooms where the chlorine is stored.

Hoffman Hill Chlorination

On-site generation of sodium hypochlorite is used at both Hoffman Hill well locations. Sodium hypochlorite is generated at a concentration of approximately 0.8 percent and injected into the water main prior to entry to the Hoffman Hill Reservoir. Water quality is excellent, with no primary or secondary contaminants or organics detected beyond allowable limits. No chlorine contact time is required because the Hoffman Hill wells are considered protected groundwater supplies.

BOOSTER STATIONS ANALYSIS

The City of DuPont operates two booster pump stations; the Bell Hill Booster Pump Station is categorized as an open system and Hoffman Hill Booster Pump Station is

categorized as a closed system. An open system booster pump station transfers water to a higher pressure zone governed by an atmospheric storage tank. A closed booster pump station is one which transfers water to a higher pressure zone closed to the atmosphere.

Bell Hill Booster Station

To provide for satisfactory operation and meet the requirements of WAC 246-290-230, an open zone booster pump station, in addition to any and all other sources that may be pumping into that open zone, must be able to meet the maximum day demand (MDD) for the zone. At a minimum, the design is expected to ensure that MDD can be met with all sources in service, and that average day demand (ADD) can be met with the largest source out of service. For open systems, any needed peak hour demand or fire-flow capability can be met from gravity storage.

The Bell Hill Booster Pump Station directly serves the 400-foot pressure zone, and indirectly serves the 530-foot pressure zone through the Hoffman Hill Booster Pump Station, which pumps out of the 400-foot pressure zone. The combination of these two pressure zones comprise the entire City of DuPont water system. Hoffman Hill Wells 1 and 2 also pump directly into the 400-foot pressure zone. Therefore, the combination of all sources pumping into the 400-foot pressure zone, including the Bell Hill Booster Pump station and Hoffman Hill Wells 1 and 2, must be capable of meeting maximum day demand for the entire water system.

Requirement 1: MDD with all pumps operating

- From Table 1-9, the total capacity of the Bell Hill Booster Pump Station with all pumps operating is 5,400 gpm. From Table 1-5 the combined capacity of the Hoffman Hill Wells is 2,200 gpm. Therefore, the combined capacity of all sources feeding the 400-foot pressure zone is 7,600 gpm. From Table 2-16, the 20-year projected maximum day system demand is 5.919 MGD. To meet 5.919 MGD in 18 hours of source production requires a minimum source capacity of 5,481 gpm. Therefore, the existing booster pump system, together with the capacity of the Hoffman Hill wells, can meet the MDD for the system it is serving. In addition, with the largest pump out of service, the Bell Hill Booster Pump Station, in tandem with the Hoffman Hill Wells, have a combined capacity of 6,250 gpm, which can still meet MDD in less than 18 hours of pumping.

Requirement 2: ADD with the largest capacity pump off line

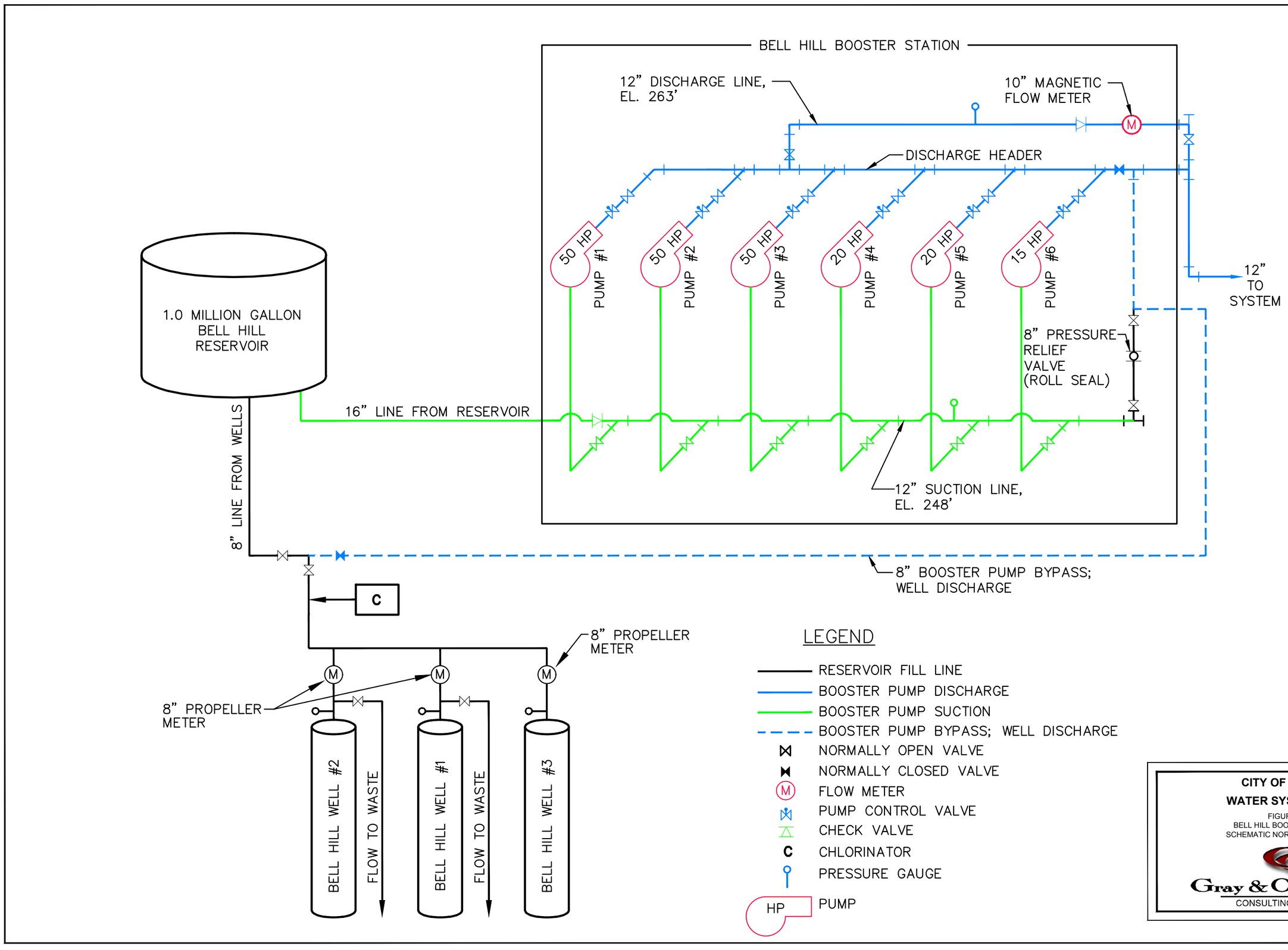
- From 2-16, the 20-year projected average day system demand is 2.192 MGD. To meet 2.192 MGD in 18 hours of pumping requires a combined source capacity of 2,030 gpm. From Table 1-9, the capacity of the station with the largest pump off line is 4,050 gpm. This installed

capacity exceeds the 2,030 gpm required to meet the projected buildout average day demand in 18 hours per day of pumping. Even with two of the largest sources out of service, the remaining Bell Hill Booster Pump Station capacity of 2,700 gpm can still meet ADD in less than 18 hours of pumping. Also, with the Bell Hill Booster pump station completely out of service, the 2,200 gpm combined capacity of the Hoffman Hill wells can meet ADD in less than 18 hours of pumping.

Control of the Bell Hill Booster Pump Station is maintained via a Supervisory Control and Data Acquisition (SCADA) system, which consists of a "headquarters" unit with a PC for graphical interface and a Programmable Logic Controller (PLC), all located at the Bell Hill wells, reservoir and booster pump station complex. This headquarters unit links and coordinates all the facilities. Each remote PLC has the capability of operating its facility independently from the headquarters unit. The unit has an auto dialer that is the only external notification of a system problem. When a remote facility has a problem, headquarters is down, or there is an extended power outage (2 minutes or more), the auto dialer calls a series of phone numbers until acknowledged. Headquarters is accessible off site via "PC Anywhere." There is a dedicated laptop that is carried by the staff person who is "on call" as well as several other PCs in the City. This unit has a wide variety of motioning and control functions that provides supervisory control of the entire water system. At the Bell Hill location there is generator back up for the headquarters unit and an additional uninterruptible power supply for the graphical interface to bridge the time until the generator is up to speed.

In the event of a failure of the headquarters unit, local control of the pump station by the PLC is initiated. With the headquarters unit in control of operation, Pump 6 runs continuously in order to maintain system pressure. An 8-inch bypass pressure relief valve regulates system pressure. As flow demand increases (300 gpm and higher), the headquarters unit selects among eight possible combinations (levels) of pumps. The level of pumping selected by the unit is based upon the most efficient combination of flow for the demand requirement at any given time. The PLC at Bell Hill has override capabilities via hand/off/auto (HOA) switches; this has a simple display to show current conditions and current alarms. This unit once programmed is capable to operate in local, pressure mode independently from headquarters.

During normal operation, the Bell Hill wells pump directly to the Bell Hill Reservoir. The booster pumps draw from the reservoir and discharge directly into the distribution system. An emergency bypass main enables well water to flow directly into the distribution system in the event of a pump station failure. A schematic of the Bell Hill Booster Pump Station is shown in Figure 3-2.



CITY OF DuPONT

WATER SYSTEM PLAN

FIGURE 3-2
BELL HILL BOOSTER STATION
SCHEMATIC NORMAL OPERATION

Gray & Osborne, Inc.
CONSULTING ENGINEERS

The following after hours SCADA emergencies will trigger an autodial callout:

- Hi/Low Pressure
- Hi/Low Reservoir Elevation
- Intrusion
- Fire
- Telemetry Failure
- High Pump On

Hoffman Hill Booster Station

The Hoffman Hill Booster Pump Station is a skid mounted modular unit installed inside a building structure. In total, four variable speed pumps are incorporated into the station. Two of these pumps provide for peak day demands and are each capable of delivering a capacity of 600 gpm each at 150 feet of TDH. The other two variable speed pumps provide fire flow and are capable of delivering a capacity of 500 gpm each at 150 feet of TDH, for a total pump station capacity of 2,200 gpm. With one of the largest pumps out of service the remaining three pumps are can produce up to 1,600 gpm.

In a closed system booster pump station, the entire flow and pressure required by the service area is supplied by the pumps in the station. Regulations require that the system provide peak hour demand (PHD) at no less than 30 psi at all service connections throughout the distribution system [WAC 246-290-230(5)]. For purposes of reliability, it is recommended that this capability be provided when the largest capacity booster pump is out of service.

A closed system booster pump station must also be capable of meeting fire suppression requirements. The pumping system must be capable of supplying maximum day demand plus fire flow described in WAC 246-290-230(6) while maintaining a minimum of 20 psi at ground level at all points in the distribution system. If the public water system is located in an area governed by the Public Water System Coordination Act of 1977 (PWSCA), the fire flow must be met even when the largest capacity booster pump is out of service [WAC 246-293-660(1)].

Requirement 1: PHD with the largest capacity pump off line

- The 530-foot pressure zone serves 645 SFR connections, and also provides irrigation for some parks and open spaces. The irrigation of parks and open spaces, however, is controlled by irrigation timers to water only during off-peak hours, and therefore does not impact PHD flows. PHD for this zone, using the PHD formula in Table 2-11, is calculated to be 560 gpm. The capacity of the Hoffman Hill Booster Pump Station with the largest pump off line is 1,600 gpm. This pump capacity is well in excess of the minimum source capacity requirement for this zone.

Requirement 2: MDD while supplying fire flow with the largest capacity pump off line

- At 645 ERUs and an MDD of 621 gpd per ERU, the maximum day demand for the 530-foot pressure zone is estimated at 400,545 gpd, which is 371 gpm in 18 hours of pumping. The 530-foot pressure zone has only SFR connections, so the fire flow requirement for the 530-foot pressure zone is 1,000 gpm. Therefore, MDD plus fire flow is 1,371 gpm. The capacity of the Hoffman Hill Booster Pump Station with the largest pump off line is 1,600 gpm, which is well in excess of the minimum requirement.

Control of the Hoffman Hill Booster Station is also maintained via a SCADA system, linked to headquarters at the Bell Hill complex via a dedicated phone line. The upper pressure zone booster station unit has override capabilities via hand/off/auto (HOA) switches; this has a simple display to show current conditions and alarms, in addition to a chart recorder. The station is equipped with a standby generator to keep the system operational until power service is restored in the event normal power service is interrupted. Hoffman Hill Wells 1 and 2 pump to the Hoffman Hill Reservoir. Each of the Hoffman Hills wells is equipped with a standby generator. A schematic of the Hoffman Hill Booster Pump Station is shown in Figure 3-3.

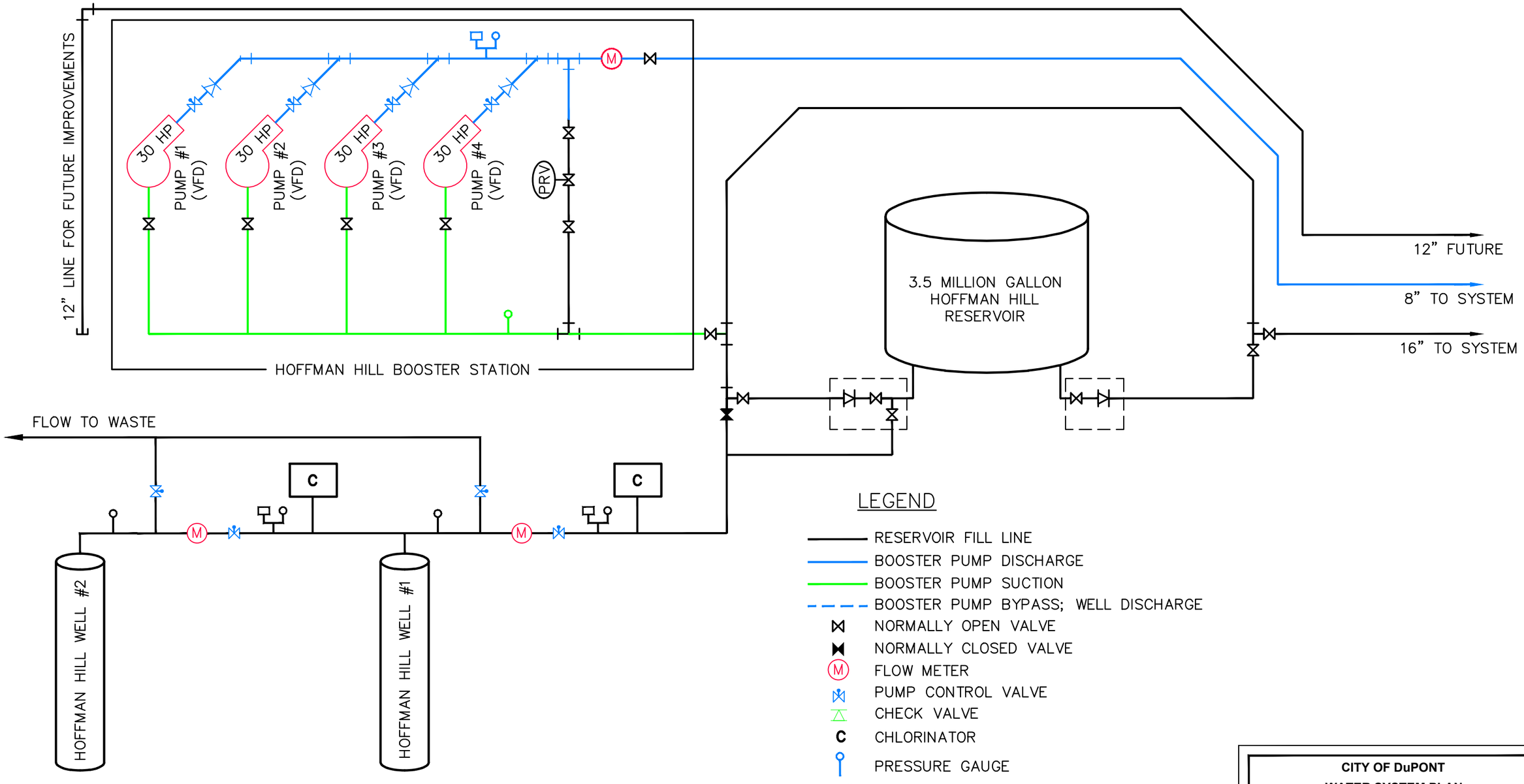
DISTRIBUTION SYSTEM

As shown in Figure 1-7, the City of DuPont water distribution system includes almost 49 miles of water mains. The Historic Village contained the oldest distribution system within the City until it was replaced by projects in 1999, 2016 and 2017. The former El Rancho Madrona Water System, constructed in the late 1960s and early 1970s is now connected with the DuPont Water System, and the original water distribution system was replaced in 2012. The existing water distribution system in the Northwest Landing portion of the City, was installed after 1992. Most of the distribution system is now ductile iron pipe installed after 1992.

HYDRAULIC MODELING

This section presents information on the computer hydraulic model of the City's water system and the results of hydraulic analyses conducted to evaluate the existing and future capabilities of the water system.

The operation of a municipal water system involves dynamic interactions between various water system components, including source, storage, pumping, transmission, and distribution system facilities. These interactions and their effect on the level of service provided to the City's customers are dependent on the distribution and magnitude of water demands within the system and the performance characteristics of the water system facilities. In addition, infrequent high water demand events, such as fire fighting and other emergencies, can significantly alter the normal flow patterns and pressures in the



CITY OF DuPONT

WATER SYSTEM PLAN

FIGURE 3-3
HOFFMAN HILL BOOSTER STATION
SCHEMATIC NORMAL OPERATION

Gray & Osborne, Inc.
CONSULTING ENGINEERS

municipal water system and its components. These factors must be considered in analyzing the ability of a water system to provide for future demands, while maintaining an adequate level of water service to customers.

The development of a computer hydraulic model, which can accurately and realistically simulate the response of a water system under a variety of conditions and scenarios, has become an increasingly important element in the planning, design, and analysis of municipal water systems. The Washington State Department of Health's WAC 246-290 requires hydraulic modeling as a component of water system comprehensive plans.

HYDRAULIC MODELING SOFTWARE

The City's water system has been analyzed using Innovyze's InfoWater hydraulic modeling software, which operates in an ESRI Geographic Information Systems (GIS) environment. The InfoWater model was created from an existing hydraulic model developed during the completion of the City's Water System Plan 2011 Update. The current model has been modified to include water system facilities added or modified since 2011. The model has been utilized to model developer projects to determine flow and pressure availability in the water system for various developer scenarios.

The InfoWater model is configured with a graphical user interface. Each water system element, including pipes, pumps, nodes, and reservoirs is assigned a unique graphical representation within the model. Each element is assigned a number of attributes specific to its function in the actual water system. Typical element attributes include spatial coordinates, elevation, water demand, pipe lengths and diameters, pump curves and control settings, and critical water levels for reservoirs. With attributes of each system element as the model input, the InfoWater software produces the model output in the form of flows and pressures throughout the simulated water system.

MODEL ASSUMPTIONS

Prior to the calibration of the hydraulic model, the basic layout of the water system is recreated within the model. The lengths, diameters, and connection points of system piping are assigned using an updated base map of the water system. The locations of normally closed valves, check valves, and pressure reducing valves (PRVs) are also found on water system base maps, while the critical elevations of the City's reservoirs are taken from the City's SCADA system settings and the system storage analysis. The assumptions regarding the modeling of the City's water sources and system demands are included in the following sections.

Source

The City's sources of supply include Bell Hill Wells 1, 2, and 3, and Hoffman Hill Wells 1 and 2.

Booster Stations

The City's Bell Hill and Hoffman Hill booster stations are included in the hydraulic model. Pump curves have been assigned to each pump based on data obtained from the City. Losses in suction and discharge piping are simulated using equivalent pipe lengths.

SYSTEM DEMANDS

A key element in the hydraulic modeling process is the distribution of demands throughout the water system. Total demand on the system is based on the existing and projected demands from Chapter 2.

Seven demand sets are used in the hydraulic analysis.

- Based on information provided by the City, the estimated demand at the time of hydrant testing was 650 gpm. These demands were used for the calibration of the model.

- 2018 Peak Hour Demands: These demands were used to verify the system is able to currently meet the DOH standards to supply domestic water at a minimum system wide pressure of 30 psi.

- 2018 Maximum Day Demands: These demands were used to evaluate the system's ability to currently meet the maximum day demands plus required fire flows at DOH's requirement of 20 psi.

- 2028 Peak Hour Demands: These demands were used to verify the system is able to meet the DOH standards to supply domestic water at a minimum system wide pressure of 30 psi within the 10-year planning period.

- 2028 Maximum Day Demands: These demands were used to evaluate the system's ability to meet the maximum day demands plus required fire flows at DOH's requirement of 20 psi within the 10-year planning period.

- 2038 Peak Hour Demands: These demands were used to verify the system is able to meet the DOH standards to supply domestic water at a minimum system wide pressure of 30 psi within the 20-year planning period.

- 2038 Maximum Day Demands: These demands were used to evaluate the system's ability to meet the maximum day demands plus required fire flows at DOH's requirement of 20 psi within the 20-year planning period.

MODEL CALIBRATION

The calibration of a hydraulic model provides a measure of assurance that the model is an accurate and realistic representation of the actual system. For the City's model, field measurements from May 31, 2018 are used for the calibration process.

Fire Hydrant Tests

The InfoWater hydraulic model of the City's water system was calibrated using data obtained from fire hydrant tests at various locations throughout the water system. Ten fire hydrant tests were conducted with the assistance of City personnel on May 31, 2018. During these tests, static and residual pressures were recorded as hydrants were opened and flow was recorded. Field results were used to calibrate the hydraulic model through verification and adjustment of pipe type, sizes, roughness coefficients, and elevations.

The testing locations include multiple points throughout the distribution system. A description of each testing location is presented in Table 3-17.

TABLE 3-17

Hydrant Testing Locations

Test Number	Planning Area	Test Location
1	Civic Center	City Hall Parking Lot
2	Manchester Place	Along Manchester Place
3	Wharf Road	Along Wharf Road
4	Bell Hill	Along Nelson Street
5	Historic Village	Along Barksdale Avenue
6	Palisade Village	Across from Clocktower Park
7	Yehle Park Village	Along Marshall Circle
8	Fort Lake Business and Technology Park	Along Loop Road
9	Hoffman Hills	Along Ridgeview Drive near Chief Leschi Park
10	Hoffman Hills	Along Swan Loop

The system conditions at the time of each test were recorded. Reservoir water levels, well operation, booster station flow rates, and approximate system demand were all recorded during the testing time period, based on telemetry data. A summary of the system conditions during the hydrant testing is presented in Table 3-18. The system conditions at the time of testing were replicated in the hydraulic model during the calibration process.

TABLE 3-18

System Conditions during Hydrant Testing

Facility	Conditions During Testing
Bell Hill Reservoir	N/A (1)
Hoffman Hill Reservoir	Level at 20.1 feet
Bell Hill Well 1	Off
Bell Hill Well 2	Off
Bell Hill Well 3	Off
Hoffman Hill Well 1	Off
Hoffman Hill Well 2	Off
Bell Hill Booster Station	Off

(1) Since water is pumped from the Bell Hill Reservoir into the distribution system, water level in the reservoir is not applicable.

Calibration Procedures

Using the system conditions for each hydrant test, the hydraulic model was used to generate static pressure and residual pressure at the measured hydrant flow rate. The total system demand at the time of the hydrant tests was approximately 650 gpm. Model output was generated at points in the model equivalent to the locations of the hydrant tests.

Model output for static pressure was generated by running the model under a total system demand of 650 gpm. Model output for residual pressure was generated at each hydrant test location by placing an added demand equal to the measured hydrant flow rate and recording the resulting pressure.

Calibration Results

The friction factors for the pipes in the modeled system are adjusted throughout the calibration process until the model output best approximates the measured values. A Hazen-Williams C-factor of 130 is used throughout the system. This friction factors is a typical values for most pipe and is generally conservative. The friction factors for the pipe also compensates for system losses through valves and pipe fittings.

The values measured in the hydrant flow tests are compared to the model output values in Table 3-19.

TABLE 3-19

Calibration Results

Test No. (1)	Flow (gpm)	Static Pressure (psi)			Residual Pressure (psi)			ΔS – ΔR (2)
		Field	Model	Difference	Field	Model	Difference	
1	1,321	78	78	0	69	69	0	0
2	1,332	76	77	1	70	67	-3	4
3	1,373	81	82	1	74	73	-1	2
4	1,007	52	52	0	47	46	-1	1
5	1,198	65	65	0	58	55	-3	3
6	1,256	64	67	3	60	61	1	2
7	1,244	71	71	0	65	64	-1	1
8	1,342	75	74	-1	71	70	-1	0
9	1,453	95	92	-3	75	75	0	-3
10	1,353	68	70	2	64	64	0	2

(1) See Table 3-16 for a description of the testing locations.

(2) ΔS – ΔR is equal to the static pressure difference minus the residual pressure difference.

Calibration of the hydraulic model produced results that varied from 0 to 3 psi of actual field test data for static and residual pressure. Hydraulic models are required to be within 5 psi of measured pressure readings for long-range planning, according to the DOH Design Manual, Table 8-1.

MODEL CONDITIONS

Model input assumptions have significant impacts on peak hour and fire flow results. Table 3-20 shows the assumed reservoir levels under different scenarios, based on the Storage Capacity Analysis presented in Table 3-16. During peak hour scenarios, the reservoir levels have been lowered to reflect depletion of operational and equalizing storage. During fire flow scenarios, fire suppression storage has also been removed. Storage has been depleted from the Bell Hill and Hoffman Hill reservoirs in proportion to their relative surface areas (i.e. gallons per foot of water depth; see Table 3-15). The Bell Hill and Hoffman Hill booster stations were assumed to be operational (with the largest pump at each booster station out of service) during all scenarios. All sources were assumed to be off during all scenarios. For the Peak Hour Demand scenarios, variable speed pumping with downstream node pressure control has been simulated at the Hoffman Hill booster station; the pressure setpoint used was 65 psi.

TABLE 3-20

Model Conditions

Modeling Scenario	Hoffman Hill Reservoir Level (ft)	Bell Hill Reservoir Level (ft)
2018 Peak Hour Demand	18.00	18.25
2018 Fire Flows	13.02	13.27
2028 Peak Hour Demand	17.57	17.82
2028 Fire Flows	12.60	12.85
2038 Peak Hour Demand	16.27	16.52
2038 Fire Flows	11.29	11.54

SYSTEM ANALYSIS

Peak Hour Analysis

According to WAC 246-290, a water system must maintain a minimum pressure of 30 psi in the distribution system under peak hour demand conditions. Furthermore, the DOH Water System Design Manual (2009) recommends that pipeline velocities not exceed 8 fps under peak hour conditions. The City's existing distribution system was modeled under 2018, 2028 and 2038 peak hour demand conditions. Model output results are located in Appendix G. Table 3-21 summarizes the minimum system pressure and location for the peak hour demand analysis. Modeled pressures exceeded 30 psi at all service connections for all peak hour scenarios, and no pipes in the distribution system had water velocities exceeding 8 fps. No system deficiencies were identified.

TABLE 3-21

Summary of Peak Hour Demand Analysis Results

Scenario	Total System Demand (gpm)	Minimum System Pressure (psi)	Location of Minimum System Pressure	Deficiencies
2018 Peak Hour	4,447	38.84	El Rancho Madrona	None
2028 Peak Hour	5,645	38.17	El Rancho Madrona	None
2038 Peak Hour	7,329	36.30	Bell Hill	None

Available Fire Flow Analysis

The DOH Water System Design Manual (2009) states that a water system should be designed to provide adequate fire flow under maximum day demand conditions, while maintaining a minimum system pressure of 20 psi. Figure 3-4, located in the back sleeve of the Plan, illustrates the City's available fire flow under 2038 maximum day demand

conditions. The results of fire flow modeling for 2018, 2028 and 2038 maximum day demand are included in Appendix G. No system deficiencies were identified.

WATER SYSTEM CAPACITY

A number of different factors can limit the capacity of a water system to serve customers. Limiting factors include water rights, installed source capacity, treatment system capacity, and storage capacity. The following sections evaluate the capacity of the City of DuPont water system relative to the applicable limiting factors.

WATER RIGHTS CAPACITY

This section determines system capacity based on water rights limits as presented in Table 1-6 and demand factors listed in Table 2-11.

Instantaneous Water Right Capacity Limit

As shown in Tables 3-12, based on meeting 20-year projected maximum day demand in 18 hours of source production, the City has an instantaneous water right surplus of 64 gpm relative to all water rights, but a deficit of 226 gpm relative to currently active water rights. However, as discussed under the heading *Water Rights Analysis,* the limit of 18 hours per day of source production is an artificial limit, because the City's wells can pump up to 24 hours per day. The existing active instantaneous water rights can meet projected 20-year maximum day demand in 18 hours and 48 minutes.

The system capacity limit based on 24-hours per day of source production is calculated based on total instantaneous water rights in gallons per minute and maximum day demand in gallons per day per ERU. From Table 1-6, the City of DuPont has a total of 5,390 gpm of instantaneous water rights. The maximum time that a well can pump in a day is 24 hours, which is 1,440 minutes. From Tables 2-11 and 3-1 the maximum day demand is 605 gpd per ERU. Therefore, the instantaneous water rights limit can be calculated as follows:

$$\text{Instantaneous Water Rights Connections Limit} = \frac{5{,}390 \text{ gpm} \times 1{,}440 \text{ min/day}}{605 \text{ gpd per ERU}} = \mathbf{12{,}829 \text{ ERUs}}$$

Annual Water Right Capacity Limit

As shown in Table 3-13, the City of DuPont has adequate annual water rights to meet projected annual demands of the system. The capacity of the system based on annual water rights is calculated from annual water rights converted to gallons per year and average day demand in gallons per day per ERU. From Table 1-6, the City of DuPont has a total of 3,360 ac-ft/yr of annual water rights. From Tables 2-11 and 3-1 the Average Day Demand is 231 gpd per ERU. The limit on ERUs due to the annual water right can be calculated as follows:

$$\text{Annual Water Rights Connections Limit} = \frac{3{,}360 \text{ ac-ft/yr} \times 325{,}851 \text{ gal/ac-ft}}{365 \text{ days/year} \times 231 \text{ gpd per ERU}} = \mathbf{12{,}985 \text{ ERUs}}$$

SOURCE CAPACITY

The minimum required source design criteria for a water system is that total source capacity should be capable of meeting maximum day water demand in 1 day (24 hours) of water production. Table 3-14 compares existing source capacity with the source capacity that would be necessary to meet projected maximum day demand in 18 hours per day of source production, and shows that the existing installed source capacity is short 226 gpm from that goal. As stated under the heading, *Source Capacity Analysis* the existing source capacity can meet 20-year projected maximum day demand in 18 hours and 48 minutes. To determine the number of ERUs supportable by the existing source capacity, we take the total amount of water that can be produced in 24 hours of operation and divide that by the maximum day demand per ERU as follows:

$$\text{Source Production Capacity Connections Limit} = \frac{5{,}100 \text{ gpm} \times 1{,}440 \text{ min/day}}{605 \text{ gpd per ERU}} = \mathbf{12{,}139 \text{ ERUs}}$$

TREATMENT SYSTEM CAPACITY

While there is no treatment system that limits the capacity of any of the City's water sources, the City does limit the production from Bell Hill Well 2 to approximately 600 gpm so that water from Bell Hill Wells 1 and 3 will reliably dilute the iron and manganese in the water from Bell Hill Well 2 to below their respective MCLs. Therefore, there is an effective treatment capacity limit on Bell Hill Well 2 of 600 gpm. That limitation limits the total source production capacity to 4,700 gpm. With a treatment system capacity limit of 4,700 gpm, the treatment system capacity limit on ERUs is calculated as follows:

$$\text{Treatment Capacity Connections Limit} = \frac{4{,}700 \text{ gpm} \times 1{,}440 \text{ min/day}}{605 \text{ gpd per ERU}} = \mathbf{11{,}187 \text{ ERUs}}$$

STORAGE CAPACITY

Table 3-16 shows that the capacity of the existing storage system is projected to be adequate through the year 2029, but will have a storage deficit of 0.588 MG by the year 2038. It should be noted that the amount of storage a water system requires depends partially on the amount of source capacity that the system has. Therefore, if the system source capacity changes, then the amount of storage that the system requires may also change. To determine the number of ERUs that can be supported by the existing storage, a table similar to Table 3-16 is used. The number of ERUs is manipulated until the point is found where adding one more ERU to the calculation results in a storage deficit. Table 3-22 shows that the limit on ERUs based on existing storage capacity is 8,812 ERUs. This storage capacity limit is based on the current operations settings, including a 5-foot interval between pumps-off and pumps-on levels.

TABLE 3-22

Storage Capacity Limits with Current Control Level Settings

ERUs	Equalizing Storage, MG	Standby Storage, MG	Fire Storage, MG	Total Storage, MG	Existing Effective Storage, MG	Storage Surplus/ (Deficit), MG
8,812	0.1376	1.7624	0.9600	2.8600	2.8600	0.0000
8,813	0.1377	1.7626	0.9600	2.8603	2.8600	-0.0003

As discussed in the section on Total Storage Requirements preceding Table 3-16, total effective storage can be increased by raising the well pumps-on levels in the reservoirs. At a 1.9-foot operating interval in both reservoirs, the existing effective storage capacity is adequate for the projected 20-year storage needs. If the well pumps-on levels were to be raised to 22.25 feet above the reservoir base in the Bell Hill Reservoir and to 20.00 feet above the base in the Hoffman Hill Reservoir, reducing the operating interval between pumps-on and pumps-off in both reservoirs to just 1 foot, this would decrease the combined pump cycle volume of both reservoirs to 192,000 gallons, and would increase the combined effective volume of both reservoirs to 3.631 MG. 192,000 gallons would still be a sufficient operational volume for source pump cycling control, and with higher system demands water turnover in the reservoirs will be less of a concern. Table 3-23 shows that with an operating interval of one foot, which would create an effective storage capacity of 3.631 MG, the existing storage could support up to 11,378 ERUs.

TABLE 3-23

Storage Capacity Limits with One Foot Operating Interval

ERUs	Equalizing Storage, MG	Standby Storage, MG	Fire Storage, MG	Total Storage, MG	Existing Effective Storage, MG	Storage Surplus/ (Deficit), MG
11,378	0.3954	2.2756	0.9600	3.6310	3.6310	0.0000
11,379	0.3955	2.2758	0.9600	3.6313	3.6310	-0.0003

CAPACITY SUMMARY

Water System Capacity limits as presented above are summarized in Table 3-24. Storage capacity with current well control settings is the most limiting factor, followed by treatment capacity, then by source capacity, then be reservoir capacity with the operating intervals in both reservoirs reduced to one foot, then by instantaneous water rights, and finally by annual water rights.

It should also be noted that the treatment capacity limit is not a firm limit, because Bell Hill Well 2 can be pumped up to 1,000 gpm if needed. The result of doing so may be a short term exceedance of a secondary water quality standard, which would last only as long as the maximum day demand persists. Also, some of the water from Bell Hill Well 2 will blend in the Hoffman Hill Reservoir and in the distribution system with water from Hoffman Hill Wells 1 and 2, such that only portions of the distribution system would potentially be temporarily affected by the increased iron and manganese.

TABLE 3-24

Summary of Water System Capacity Limits

Limiting Factor	System Capacity Limit, ERUs	Additional Available ERUs
Storage Capacity with Current 5-Foot Operating Interval	8,812	2,640
Treatment Capacity	11,187	5,015
Storage Capacity with 1-Foot Operating Interval	11,378	5,206
Source Capacity	12,139	5,967
Instantaneous Water Rights	12,829	6,657
Annual Water Rights	12,985	6,813

SYSTEM DEFICIENCIES

This section reviews the foregoing analyses and summarizes any system deficiencies that have been identified.

WATER RIGHTS

It is pointed out under the heading *Water Rights Analysis* that the City should protect their existing, currently inactive rights for the El Rancho Madrona well and for the Historic Village wells by adding one or more of their existing active wells as points of withdrawal on those currently inactive rights. Also, in planning for buildout, the City of DuPont will pursue transferring existing water rights for Weyerhaeuser golf course wells to one or more active City wells, and will continue to pursue the new water right application G2-30221.

SOURCE CAPACITY

The existing source capacity can meet 20-year projected maximum day demands in 21 hours and 18 minutes. This is short of the recommendation of meeting maximum day demand in 18 hours of source production. The City should be planning to add source capacity within the next 10 to 12 years. The City is advised to watch the system demands and see if they increase as projected. It is possible that water use efficiency measures may keep water demand lower than projected. However, if additional source capacity should be needed, additional water rights will be needed also, as discussed in the previous section.

TREATMENT

No known treatment deficiencies exist with the present blending or the chlorination system at the Bell Hill wells, or with the chlorination system at Hoffman Hills. The City would, however, like to replace the 12 percent bulk sodium hypochlorite feed system at Bell Hill with a new on-site chlorine generation system similar to the one installed at Hoffman Hill.

Currently the City meets the iron and manganese standards by blending water from Bell Hill Well 2 with water from Bell Hill Wells 1 and 3, and this is not currently a problem for the City. However, in the event that the City should need additional source capacity in the future, or if the capacity of one of the City's wells should decline, the City may want to consider in the future to install a treatment system for Bell Hill Well 2 to remove iron and manganese so that more water from Bell Hill Well 2 can be utilized without exceeding the iron or manganese standards in the water distribution system.

STORAGE

No known storage deficiencies exist within the City based on the storage analysis presented in this chapter and summarized in Table 3-16. However, Hoffman Hill Reservoir is in need of recoating both inside and outside, and should be evaluated against current seismic design standards to see if any modifications may be warranted to meet current seismic code.

BOOSTER STATIONS

No deficiencies have been identified with the booster pump stations.

DISTRIBUTION SYSTEM

No deficiencies have been identified with the water distribution system.

RECOMMENDED IMPROVEMENTS

- Add one or more existing water sources as additional points of withdrawal on water rights G2-00800S (636, Historic Village Well 1), G2-00799S (635, Historic Village Well 2) and G2-20970C (El Rancho Madrona Well),

- Continue pursuing transfer of existing water rights for Weyerhaeuser golf course wells to one or more active City wells and the new water right G2-30221.

- Replace existing bulk 12 percent sodium hypochlorite feed system at the Bell Hill Wells with an on-site chlorine generation system.

- Plan for a possible iron and manganese treatment system at Bell Hill Well 2 for the twenty year planning horizon.

- Recoat Hoffman Hill Reservoir inside and outside.

- Evaluate Hoffman Hill Reservoir relative to current seismic codes.

CHAPTER 4

WATER USE EFFICIENCY PROGRAM

OBJECTIVE

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

WATER USE EFFICIENCY PLANNING REQUIREMENTS

In 1989, the Washington Legislature passed the Water Use Efficiency Act (43.20.230 RCW), which directed DOH to develop procedures and guidelines relating to water use efficiency. In response to this mandate, Ecology, the Washington Water Utilities Council, and DOH jointly published a document titled *Conservation Planning Requirements* (1994). In 2003, the Municipal Water Supply – Efficiency Requirements Act (Municipal Water Law) was passed by the Washington State legislature. This legislation amended RCW 90.03 to require additional conservation measures. The Municipal Water Law applies to all Municipal Water Suppliers, which is defined as all Group A community Water systems. Among other things, the Municipal Water law directed DOH to develop the Water Use Efficiency Rule (WUE Rule), which was adopted January 22, 2007. The WUE Rule has since been incorporated into the drinking water regulations. WAC 246-290 Part 8, sections 800 – 840, includes much of the WUE Rule. Parts of the WUE rule are also included in WAC 246-290 Part 2, Planning and Engineering Documents.

In addition, DOH has developed a WUE Rule guidance document titled "Water Use Efficiency Guidebook" (WUE Guidebook) originally dated July 2007 (DOH Publication #331-375). The WUE guidebook has since been revised twice. The third and latest edition as of this writing was revised January 2017. The WUE Guidebook supersedes and replaces the 1994 Conservation Planning Requirements. Therefore, the WUE Rule and the WUE Guidebook now provide all the currently effective water use efficiency planning requirements.

WATER USE EFFICIENCY RULE

The WUE Rule consists of a series of amendments to existing sections and addition of new sections to WAC 246-290, the Group A Public Water System Regulations, and sets additional requirements for public water purveyors. The WUE Rule is comprised of four sections:

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

The WUE Guidebook is intended to provide guidance and clarification on the requirements of the WUE Rule, and not to establish any additional requirements. The requirements of the WUE Rule are discussed in the following sections.

PLANNING REQUIREMENTS

The Planning Requirements of the WUE Rule include the following:

- Estimation of the amount of water saved through implementation of the system's WUE program over the past 6 years.
- Description of the water system's WUE Goals.
- Select WUE Measures.
- For each WUE Measure selected, either:
  - Include a plan to implement the measure, or
  - Evaluate selected WUE Measures to show that they are not cost effective.

These WUE Rule planning requirements are addressed in the following sections:

ESTIMATION OF WATER SAVED

The amount of water saved is estimated by comparing how much water was predicted to be required in the previous water system plan to the amount of water that was actually used. Table 4-1 show the predicted annual demand for the years 2012 through 2017 from Table 2-14 of the 2011 Water System Plan, and the actual annual demand for the years 2012 through 2017 based on metered water production records from Table 2-4 if this Water System Plan. Annual savings range from 87 MG in 2017 to 147 MG in 2014, with a total 6-year savings of 686 MG.

TABLE 4-1

Estimation of Water Saved

Year	Predicted, MG	Actual, MG	Savings, MG
2012	501	410	91
2013	526	392	134
2014	552	405	147
2015	577	459	118
2016	590	480	110
2017	603	516	87
Totals	**3,349**	**2,663**	**686**

WATER USE EFFICIENCY GOALS

Previous Goals

The WUE Rule's effective date was January 22, 2007. For municipal water systems with 1,000 or more connections, the requirement to set your own WUE goals was July 1, 2009. The WUE Rule further requires that WUE Goals must "be set in a public forum that provides opportunity for consumers and the public to participate and comment on the water use efficiency goals." On August 16, 2011, the City of DuPont adopted by the following WUE goals:

- Maintain the City's distribution system leakage (DSL) below 10 percent over the next 6 years.

- Reduce per residential ERU consumption by 1 percent per year over the 6-year planning period.

As shown in Table 2-8, the City has been successful in maintaining DSL below 10 percent, but as shown in Table 2-8 the water use per ERU has not reduced by 1 percent per year. The 2011 Water System Plan used an average day demand of 223 gpd per ERU based on 2009 residential water use and connections data. In 2011 the average day water use had declined to 210 gpd per ERU. However, this usage rate subsequently rose to 233 gpd per ERU by 2016 then declined to 227 gpd per ERU in 2017, with an average from 2011 through 2017 of 222 gpd per ERU. For purposes of this water system plan the ERU value is 230 gpd per ERU, based on the average residential water use of 2016 and 2017.

New Goals

In consideration of the trend toward increasing demand per ERU, the City's goal for the coming 10-year planning period is as follows:

- Maintain the City's distribution system leakage (DSL) below 10 percent over the next 10 years.

- Maintain average consumption per residential ERU at no more than 230 gpd per ERU over the coming 10-year planning period.

As the water system continues to grow, it is anticipated that water use efficiency will continue to improve. This improvement is anticipated due to plans to:

- Requirements for low water use fixtures in new construction
- Improvements in water system control
- Improvements in water accounting
- Further measures to promote conservation
- Water rates that encourage conservation

WATER USE EFFICIENCY MEASURES

The WUE Rule requires that water systems with between 2,500 and 9,999 service connections must implement or evaluate a minimum of six WUE Measures. The WUE Guidebook further states that WUE Measures that are required in other portions of the WUE Rule cannot be counted as measures to be selected under this requirement. Measures required in other portions of the WUE Rule include the following:

- Installation of source and service meters if meters are not already present;

- Regular calibration of meters;

- Development and implementation of a water loss control program if distribution system leakage exceeds 10 percent; and

- Education of consumers about water use efficiency practices once per year.

Measures that the WUE Guidebook suggests can count toward satisfying the required number of WUE Measures include the following:

- Implementation of a conservation rate structure.

- Implementation of a water reclamation program.

- Customer assistance in repair of leaks in customer service lines and in homes.

- Additional consumer education, such as student education and consumer education at fairs.

- Bills showing water consumption history.

Implementation of measures by customer class count as separate measures for each customer class for which they are implemented.

WATER USE EFFICIENCY MEASURES SELECTED BY DUPONT

For the coming 10 year planning period the City of DuPont intends to continue the WUE measures that were adopted in the 2011 Water System Plan, which are as follows:

Customer Assistance in Repair of Leaks

- Leak detection and repair program assistance to residents between the meter and the residence for the Residential (single-family and multi-family) customer class.

- Leak detection and repair program assistance to businesses between the meter and the business for the Commercial customer class.

- Leak detection and repair program assistance to businesses between the meter and the business for the Industrial customer class.

- Leak detection and repair program assistance to customers between the meter and the irrigation device for the Irrigation customer class.

Education of Consumers

The education of consumers about water use efficiency practices. This has either taken place or can take place through the following measures instituted by the City of DuPont:

- School outreach.

- Displays at City of DuPont sponsored events and fairs.

- Targeted marketing to both businesses and residential users.

- Customer leak detection education.

Implementation of a Water Savings Program

Implement a program that provides tools to our customers that will save water. This has either taken place or can take place through the following measures instituted by the City of DuPont:

- Toilet retrofits in the older neighborhoods of Historic Village and El Rancho Madrona.
- Rebate program for more water efficient appliances.
- Showerhead and faucet replacement.

The City of DuPont is currently implementing at least six WUE measures.

IMPLEMENT OR EVALUATE WATER USE EFFICIENCY MEASURES

The City of DuPont is currently implementing more than six WUE Measures, which meets the minimum requirement. Since the minimum number of WUE Measures is being implemented, no evaluation of the cost effectiveness of conservation measures is required.

METERING REQUIREMENTS

The WUE Rule requires all sources and customer service connections be metered by January 22, 2017. The City of DuPont currently meters all sources, and all customers, and implements a water meter replacement program to assure meter accuracy. Therefore, no further action is required to comply with this requirement.

DISTRIBUTION SYSTEM LEAKAGE STANDARD

The WUE Rule set a leakage standard of 10 percent or less of finished water production. Distribution system leakage is defined as the sum of all water metered into the distribution system over a 3-year time period, less the sum of all metered water uses, and known or credibly estimated unmetered uses, out of the distribution system over the same time period. Known or credibly estimated unmetered uses include uses such as construction, firefighting, and water main flushing.

Based on Table 2-8, the 3-year running annual average Distribution System Leakage (DSL) for the City of DuPont ranged from 9.06 percent for 2012 through 2014 to 7.17 percent for 2014 through 2016. The most recent 3 year average is 7.44 percent for 2015 through 2017, and the 7 year average from 2011 through 2017 is 8.24 percent. These leakage rates are less than the 10-percent standard threshold and demonstrate that

the City is in compliance with the ten percent maximum DSL leakage standard of the WUE Rule.

GOAL SETTING AND PERFORMANCE REPORTING

Pursuant to the WUE Rule, the City of DuPont must set WUE Goals and report progress annually. The City's WUE Goals have been addressed in preceding sections of this chapter. The annual report must include the following:

- Total source production
- Distribution system leakage in percentage and volume
- Goal description, schedule, and progress toward meeting goals

GOAL SETTING

The WUE Rule requires that WUE Goals must include a measurable outcome, address water supply or demand characteristics, and include an implementation schedule. The goal setting process must be held through a public forum and be re-evaluated every 6 years or during the water system plan update process. The first WUE Goals were required to be set by July 1, 2009 for municipal water suppliers with 1,000 or more service connections.

Annual WUE performance reports must be available to the public and submitted to customers and DOH. The first annual reports were due July 1, 2008, for municipal water suppliers with 1,000 or more service connections, and annually by July 1 each year thereafter.

WATER USE DATA REPORTING

The WUE Rule requires annual reporting of water use data. The first annual reports were due July 1, 2008, for municipal water suppliers with 1,000 or more service connections, and annually by July 1 each year thereafter. The most recent Annual Performance Report was submitted to DOH in May of 2018. Table 4-1 summarizes the water use data collection requirements.

TABLE 4-2

Summary of Water Use Data Collection

Data Type	Unit of Measure	Collection Frequency	Comments
Water Production	Gallons	Monthly	Total by month and by year.
Interties	Gallons	N/A	Water transferred through interties (DuPont is intertied with Joint Base Lewis-McChord but has never been utilized).
Water Sold	Gallons	Billing Period	Total sold by customer class for each billing period.
Estimated Unmetered Water Use	Gallons	Billing Period	Estimate and record unmetered water uses for each billing period.
Estimated Identified and Corrected Water System Leaks	Gallons	Billing Period	When leaks are discovered and repaired, the leakage rate and duration are estimated and the resultant leakage volume for the billing period is estimated and recorded.
Accounted-for Water	Gallons	Billing Period	The sum of Water Sold, Estimated Unmetered Water Use, and Estimated Identified and Corrected Water System Leaks.
Distribution System Leakage	Gallons	Billing Period	The difference between monthly Water Production and monthly Accounted-for Water.
Percent Distribution System Leakage	Percent	Billing Period	Distribution System Leakage divided by Water Production times 100 percent. Calculate for each billing period, for each year and for a 3-year running average. If 3-year running average exceeds 10 percent, further actions are required to reduce distribution system leakage.

WATER USE EFFICIENCY PROGRAM DEVELOPMENT AND LEVEL OF IMPLEMENTATION

The following sections describe the City of DuPont's WUE Goals, a description of the WUE Measures, and the resulting water use projections.

REGIONAL CONSERVATION PROGRAMS

The effects of a customer conservation program extend beyond the water service area. For example, Seattle Public Utilities heavily promoted water conservation to its

customers in 2001 and communities throughout Puget Sound experienced a decrease in consumption. As the WUE Rule takes effect, neighboring water systems will likely increase their conservation efforts, thus increasing awareness of the need to conserve.

TARGET WATER SAVINGS PROJECTIONS

Target Water Savings is a comparison of projected water use with and without the water use efficiency measures. If we assume that implementation of the WUE measures will result in meeting the WUE goals, then we can compare what projected water demand might be if the goals are met to what they might be if the goals were not met. In this case, the goals are to maintain the DSL rate below ten percent and maintain the ADD value at 231 gpd per ERU. That is what is projected in Table 2-16. Therefore, to project the savings we need to project what the water system demand might be if the WUE Goals were not met.

From Table 2-8 it can be seen that the DSL rate increased from 8.64 percent in 2011 to 9.23 percent in 2017. That increase is an average annual rate of 1.12 percent per year. From Table 2-9 it can be seen that the average day residential water use increased from 210 gpd per connection in 2011 to 227 gpd per connection in 2018. That increase is an average annual rate of 1.33 percent per year. Therefore, it can be extrapolated that if WUE measures were not in place, DSL might continue to increase at a rate of 1.12 percent per year and the average day demand might continue to increase at a rate of 1.33 percent per year.

Table 4-3 shows the projected water system demands if DSL and ADD were to increase as they did between 2011 and 2018 compared to the projected water demands of Table 2-16.

TABLE 4-3

Projected Savings with WUE Measures

Year	Projected Non-DSL ERUs (1)	Projected DSL ERUs Without WUE Measures (2)	ADD Without WUE Measures, gpd (3)	Annual Water Production without WUE Measures, MG (4)	Annual Water Production with WUE Measures, MG (5)	Annual Savings, MG (6)
2018	5,871	597	231	545	545	0
2019	6,134	605	234	576	570	6
2020	6,222	613	237	591	580	12
2021	6,309	621	240	607	586	21
2022	6,395	629	244	626	594	31

TABLE 4-3 – (continued)

Projected Savings with WUE Measures

Year	Projected Non-DSL ERUs (1)	Projected DSL ERUs Without WUE Measures (2)	ADD Without WUE Measures, gpd (3)	Annual Water Production without WUE Measures, MG (4)	Annual Water Production with WUE Measures, MG (5)	Annual Savings, MG (6)
2023	6,482	638	247	642	602	40
2024	6,570	646	250	658	612	47
2025	6,657	655	253	675	618	57
2026	6,936	664	257	713	644	69
2027	7,215	672	260	748	670	78
2028	7,495	681	264	788	698	90
2029	7,776	690	267	825	722	103
2030	8,056	700	271	866	748	118
2031	8,334	709	274	904	774	130
2032	8,615	718	278	947	802	145
2033	8,895	728	282	990	826	164
2034	9,174	738	285	1,031	852	179
2035	9,455	747	289	1,076	878	198
2036	9,561	757	293	1,103	891	213
2037	9,669	767	297	1,131	898	233
2038	9,776	778	301	1,160	908	251
Total 20-Year Savings						**2,183**

(1) Projected Non-DSL ERUs are Total ERUs minus DSL ERUs from Table 2-15.

(2) Projected DSL ERUs Without WUE Measures are DSL ERUs from Tables 2-10 and 2-15 increased annually by 1.12 percent to reflect the average rate of increase in Annual Percent DSL between 2011 and 2017 as shown in Table 2-8, rounded to the nearest whole number.

(3) ADD Without WUE Measures is the ADD from Tables 2-9 and 2-11 increased annually at a rate of 1.33 percent to reflect the increase in Average Day Residential Water Use per Connection between 2011 and 2017 as shown in Table 2-9, rounded to the nearest whole number.

(4) Annual Water Production without WUE Measures is the sum of Projected Non-DSL ERUs and Projected DSL ERUs Without WUE Measures times ADD Without WUE Measures, times 365 days per year, and divided by one million gallons per MG.

(5) Annual Water Production with WUE Measures is Annual Demand from Table 2-16.

(6) Annual Savings is Annual Water Production without WUE Measures minus Annual Water Production with WUE Measures.

Table 4-3 shows that by maintaining the ERU value at 231 gpd and maintaining DSL at 9.23 percent, rather than allowing them to increase as they did between 2011 and 2017 as shown in Tables 2-8 and 2-9, annual savings of up to 257 MG can be realized, and the cumulative savings over 20 years can be 2,317 MG, of 2.317 billion gallons.

SOURCE OF SUPPLY ANALYSIS

OPTIMIZING USE OF CURRENT SUPPLIES

The City of DuPont has increased the efficiency of its water system in the past 7 years by finding and repairing water system leaks, by requiring compliance with state planning requirements for efficient fixtures for all new construction, by promoting water conservation amongst their customers, and by improved water accounting. The City plans to continue these efforts to further optimize current water supply. The City may be able to delay the expenses of additional source capacity, additional treatment capacity, additional storage capacity, and additional booster pump capacity by continued implementation of water conservation measures.

ENHANCED CONSERVATION MEASURES

As technology for water leak detection and repair advances, and as more water efficient building fixtures and appliances become the standard, water conservation will be further enhanced by implementation of standard building codes and replacement of aging fixtures and appliances with newer, more water efficient units.

WATER RIGHT CHANGES

Based on Table 3-12, the City of DuPont's instantaneous water rights of 5,100 gpm for their active sources fall short by 47 gpm from meeting projected maximum day demand in 2038 within 18 hours of source production. This shortfall may be alleviated by adding existing active sources as additional points of withdrawal for some of the water rights for currently inactive sources. However, it should be noted that maintaining demand per ERU and maintaining DSL at or below the averages determined in Chapter 2 of this water system plan may be critical to having adequate water rights to meet buildout water system demands.

ARTIFICIAL RECHARGE

At this time there are no plans for any kind of artificial recharge of the aquifers in the City of DuPont area. The City does not operate its sewer system. Waste water is handled by Pierce County and pumped to the Chambers Creek Wastewater Treatment Facility (WWTF) for processing and disposal, which is currently released into Puget Sound.

WATER RECLAMATION

The WUE Rule requires that water utilities with more than 1,000 service connections include an evaluation of water reclamation and reuse opportunities in their water system plans. Since the City of DuPont does not operate a WWTF, water reclamation is not an option for to the City unless Pierce County decides it wants to become involved in water

reclamation. Currently, there is not enough demand for reclaimed water to justify the cost associated with upgrading Pierce County's current WWTF or the installation of the approximate 12 miles of 'purple pipe' required to distribute reclaimed water back to the City of DuPont. The City does rely on a significant amount of water for irrigation purposes. In the future, there may be commercial or industrial applications that could also utilize reclaimed water if it were to become available.

Reclaimed water could possibly come from two sources, the Chambers Creek Wastewater Treatment Facility and/or the Tatsolo Point Wastewater Treatment Facility. The state-of-the-art Chambers Creek Facility operated by Pierce County provides sewer service to the City of DuPont and is located approximately 12 miles north of the City along Puget Sound. Presently, the costs associated with the installation of a reclaimed water pipeline (i.e., purple pipe) to reuse reclaimed water in the City of DuPont would be cost prohibitive. However, as water sources become more difficult to acquire and higher in demand, this may become a viable option in the future. The Joint Base Lewis-McChord (JBLM) Tatsolo Point Facility, located approximately 1 mile north of the DuPont city limits is much closer to the City; however, significant upgrades to the facility would be required to meet the Class A reuse requirements. In the future, the Joint Base Lewis-McChord (JBLM) Tatsolo Point Facility is planning to implement a complete reuse program.

The City of DuPont recently participated in the review, development, and update of the Pierce County Unified Sewer Plan. The Plan noted the high cost to provide reclaimed water from the Chambers Creek Wastewater Treatment Facility to the City makes the project prohibitive.

Mr. Gus Lim, P.E., Public Works Director for the City of DuPont, currently serves on the Basin Review Committee for Pierce County, representing small utilities and jurisdictions with populations less than 10,000. This partnership allows the City to remain informed of new developments within the county regarding reclaimed water.

WATER SUPPLY CHARACTERISTICS

The WUE Guidebook indicates that a WUE Program should include a description of the water system source characteristics. The source characteristics for the DuPont water system are thoroughly described in Chapters 1 and 3, and in related Appendices of this Plan.

CHAPTER 5

WELLHEAD PROTECTION PROGRAM

BACKGROUND

Water from underground aquifers, commonly referred to as groundwater, is the primary source of drinking water for an estimated 65 percent of Washington state residents. DuPont obtains all of its drinking water from groundwater sources. The water sources for the DuPont water system are two aquifers located beneath the City and extending under Joint Base Lewis-McChord military reservation, into unincorporated Pierce County and beyond.

Groundwater supplies can be susceptible to contamination from surface sources such as underground storage tanks, pesticides, accidental spills and nitrates from septic tanks. To protect groundwater supplies, the Environmental Protection Agency (EPA) and the Department of Health (DOH) now require public water utilities to develop a wellhead protection program as a component of their water system comprehensive plans. The purpose of a wellhead protection program is to provide local utilities with a program for preventing groundwater contamination. A successful wellhead protection program consists of a number of components that must be developed before the plan can be fully implemented. The major components of the plan are described below and form the basis of the chapter that follows:

- A **Delineated Wellhead Protection Area** (WHPA) based on all reasonably available hydrogeologic information, including an assessment of susceptibility to contamination.

- An **Inventory** of all known and identifiable potential contamination sources within each wellhead protection area.

- A **Spill Response Plan** for each wellhead protection area containing documentation for coordination with local first responders (police, fire, HAZMAT team, etc.).

- **Contingency Plans** for providing alternate sources of drinking water in the event of contamination.

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

SUPPORTING DOCUMENTS

Several hydrogeologic studies have been performed in the DuPont area. A summary and brief discussion of the more pertinent documents referenced in this plan are listed below:

- **Ground-Water Occurrence and Stratigraphy of Unconsolidated Deposits, Central Pierce County Washington, U.S. Geological Survey, (1968)**

  A comprehensive groundwater survey of the hydrogeology of central Pierce County. The study developed the hydrogeologic framework, upon which much of the subsequent hydrogeologic work in Pierce County was based.

- **Clovers/Chambers Creek Geohydrogologic Study, Brown and Caldwell, (1985)**

  The report provided the technical basis for decisions by state and local entities regarding water management and land use planning. A comprehensive assessment of the hydrogeology within the Clovers/Chambers Creek Area including the South Tacoma Wellfield was completed. The Clovers/Chambers Creek study area extends southeast from Puget Sound to Joint Base Lewis-McChord (formerly known as Fort Lewis) between American Lake and Sequalitchew Lake.

- **Fort Lewis Wellhead Protection Program, AGI Technologies, (1996)**

  In this report, the wellhead protection areas for groundwater sources on the Joint Base Lewis-McChord (formerly known as Fort Lewis) were developed with the use of an analytical model.

- **Hydrogeologic Report, Bell Hill No. 1, Hart Crowser, (1988)**

  This report discussed the results of a pumping test performed on Well 1 and made recommendations regarding pumping rates. A well log and pumping draw down data were included in its Appendix.

- **Hydrogeologic Report, Bell Hill No. 2, Hart Crowser, (1990)**

  Similar to the Bell Hill 1 report, this report discussed the results of a pumping test and presented backup data in its Appendix.

- **Hydrogeologic Report, Bell Hill No. 3, Hart Crowser, (1998)**

  Similar to the Bell Hill 1 report, this report discussed the results of a pumping test and presented backup data in its Appendix.

- **Hydrogeologic Report, Hoffman Hill Well No. 1, Hart Crowser, (1998)**

  Similar to the Bell Hill well reports this report discussed the results of a pumping test and presented backup data in its Appendix. In addition, the report completed an evaluation of the potential for saltwater intrusion.

- **Hydrogeologic Report, Hoffman Hill Well No. 2, Aspect Consulting, (2003)**

  Similar to the Bell Hill well reports this report discussed the results of a pumping test and presented backup data in its Appendix. In addition, the report completed an evaluation of the potential for saltwater intrusion.

- **Technical Memorandum City of DuPont, Water Supply Wells - Bell Hill Well No. 1 and 2 Additional Analysis in Support of the Water Rights Permit, Hart Crowser, (1991)**

  The technical memorandum includes the results of analytical modeling performed for both City of DuPont Bell Hill wells. Although the results show zones of contribution for the wells, the travel times necessary to delineate wellhead protection areas were not developed.

AQUIFER SUSCEPTIBILITY

Completion of a susceptibility assessment is an important initial step in selecting appropriate delineation methods to define wellhead protection area boundaries. Completion of the susceptibility assessment and submittal to the Department of Health allows for a susceptibility ranking. If wells receive a low susceptibility ranking, as the City of DuPont wells did, then DOH applies certain waivers and reductions in source water monitoring. The susceptibility assessment surveys completed for the DuPont wells utilized the calculated fixed radius method for the protection area delineations. Groundwater flow directions were not accounted for in the assessments performed.

The susceptibility rating is dependent upon factors such as well construction, geologic location, and distances to known or suspected contaminant sources. Drinking water wells vary in their susceptibility to contaminants discharged at the surface. Wells with poor construction or improper surface seals have an increased susceptibility to contaminants. In addition, wells located in unconfined aquifers typically have a higher degree of susceptibility than deep wells in confined aquifers. The supply aquifers for Bell Hill

Wells 1, 2, and 3 are all confined. Depths to the top of the aquifers are 230 and 450 feet, respectively. A low susceptibility rating was received for Wells 1, 2, and 3 from the Department of Health as shown in the Water Quality Monitoring Report for the Year 2018 in Appendix F.

The supply aquifer for the Hoffman Hill Wells 1 and 2 are completed in the Salmon Springs Aquifer. The assessment rated the Well 1 as having a low susceptibility rating due to the confining layers. Hoffman Hill Well 2 has not been rated; however, it is in the same general vicinity as the other well and accesses the same aquifer. Therefore, it is assumed the susceptibility is also low.

The El Rancho Madrona well received a moderate susceptibility rating from the Department of Health. The use of this well has been discontinued since the El Rancho Madrona water system was connected to the City of DuPont water system, and the El Rancho Madrona Well has been decommissioned.

WELLHEAD PROTECTION AREA DELINEATION

The following sections detail the purpose, methods, and results of the wellhead protection area delineations.

PURPOSE

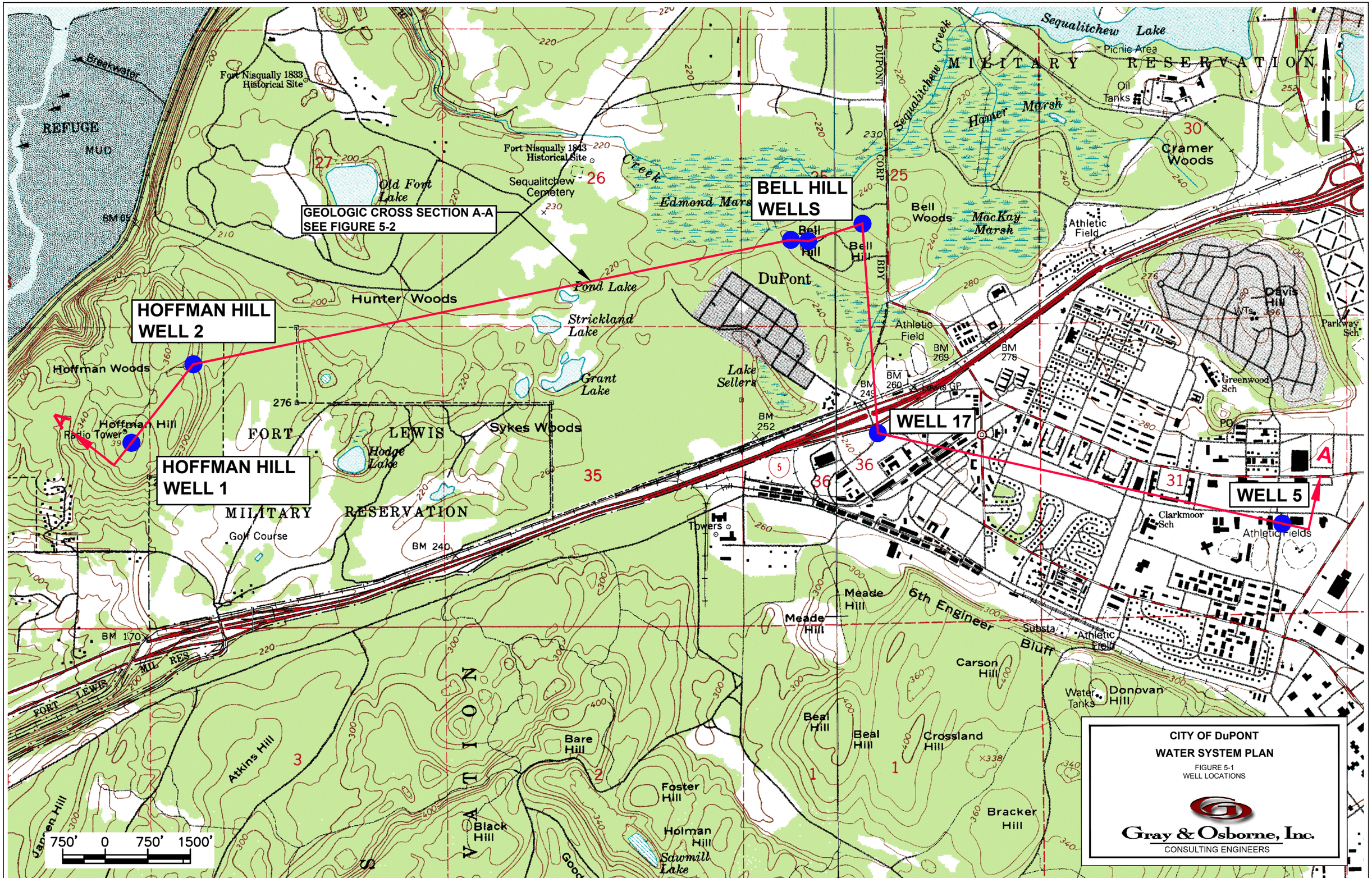
The purpose of delineation is to estimate areas capable of contributing contaminants to a pumping well. These areas are referred to as zones of contribution and provide a basis for focusing a community's groundwater protection efforts. The following sections describe the local hydrogeology, common methods used to delineate zones of contribution, the specific methods used for the City of DuPont's delineation, and the resulting zones of contribution.

LOCAL HYDROGEOLOGY

Figure 5-1 presents the location of the hydrogeologic cross-section shown in Figure 5-2, of the underlying water bearing formations associated with the DuPont Bell Hill wells. In the DuPont area, the uppermost aquifer is unconfined and comprised mostly of Steilacoom gravels. This aquifer was formed from outwash sands and gravels as the Vashon ice sheet melted and receded to the north. In the vicinity of DuPont where these strata are saturated, the water table elevation is approximately 200 feet above sea level.

Underlying the Steilacoom gravels is Vashon Lodgement till. This unit is composed of a mixture of sands, silts, clays, and cobbles. Generally, this unit acts as an aquitard and restricts the downward migration of groundwater.

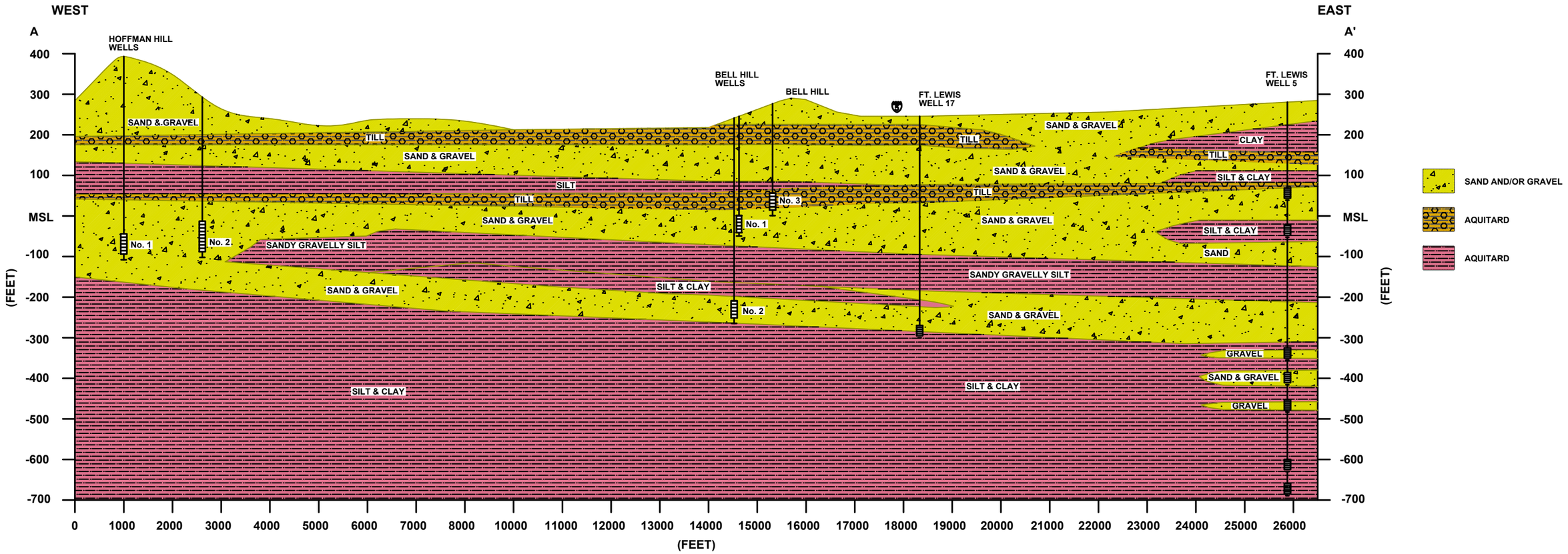
Underlying the Vashon till is the Advanced Outwash of the Vashon glaciation and the Pre-Vashon sediments. These units are comprised of fine to medium sands and are



CITY OF DuPONT
WATER SYSTEM PLAN

FIGURE 5-1
WELL LOCATIONS

Gray & Osborne, Inc.
CONSULTING ENGINEERS



*HYDROGEOLOGIC CROSS SECTION BETWEEN BELL HILL WELL No. 2 AND HOFFMAN HILL WELL No. 2 IS INFERRED.
*SEE FIGURE 5-1 FOR LOCATION OF GEOLOGIC CROSS SECTION A-A

CITY OF DuPONT
WATER SYSTEM PLAN
FIGURE 5-2
SCHEMATIC HYDROGEOLOGIC CROSS SECTION

Gray & Osborne, Inc.
CONSULTING ENGINEERS

SOURCES: FT. LEWIS WELLHEAD PROTECTION PROGRAM, AGI, 1996;
HYDROGEOLOGIC REPORT BELL HILL WELL No. 1, CITY OF DUPONT, HART CROWSER, 1988;
HYDROGEOLOGIC REPORT BELL HILL WELL No. 2, CITY OF DUPONT, HART CROWSER, 1990;
HOFFMAN HILL WELL No. 1 DRILLING LOGS;
HOFFMAN HILL WELL No. 2 PROJECT REPORT, CITY OF DUPONT, GRAY & OSBORNE, 2008.

typically about 90 feet thick (depth of 70 to 160 feet) near DuPont. The Kitsap formation, formed during a non-glacial period, underlies the Pre-Vashon sediments. The unit is observed in the boring logs for Bell Hill Wells 1 and 2 as a gray-to-green silt and silt bound gravels.

In the vicinity of the Bell Hill wells, at a depth of approximately 220 feet (30 ft. below MSL) the Kitsap formation ends and the gravels of the Salmon Springs aquifer are observed. The productive portion of the Salmon Springs aquifer is gravels extending to a depth of approximately 300 feet (50 ft. below MSL). At the Hoffman Hills wells the Salmon Springs formation extends from a depth of approximately 415 feet (30 feet below MSL) to a depth of 495 feet (110 ft. below MSL). The upper productive portion of the Salmon Springs formation appears to be largely coarse grained material. The lower 60 feet of the Salmon Springs aquifer is composed of interbedded silts, sands, and gravels. Since the City wells are not screened in this portion of the aquifer, and since the hydrogeologic characteristics are significantly different from the upper portion of the aquifer it is not included the hydrogeologic analysis. Bell Hill Wells 1 and 3 and Hoffman Hill Wells 1 and 2 are screened in the Salmon Springs aquifer. Noble (1990) has renamed this unit the Fleet Creek aquifer based upon soil dating performed since Walters and Kimmel (1968). AGI (1996) in the *Fort Lewis Wellhead Protection Program* refers to this unit as the Sea Level Aquifer.

Below the Salmon Springs aquifer are older fine grained deposits. The bottom 60 feet of the Salmon Springs aquifer is a transitional zone to the fine grained deposits below. These fine grained deposits extend from a depth of approximately 360 feet to 445 feet. This zone is formed of generally gray to brown silts. AGI (1996) correlates a fine grained unit, at a similar depth under Joint Base Lewis-McChord, to the Puyallup Formation and Stuck Drift.

From a depth of approximately 445 to 510 feet, sandy gravel is apparent in the Bell Hill well logs. Bell Hill Well 2 is completed in this unit. Both wells terminate in the silt underlying this coarse grained unit. Hart Crowser has called this deep aquifer undifferentiated outwash. They have correlated the lower coarse grained portion to the Lakewood Glacial Aquifer after Noble (1990). The DuPont wellhead vicinity is shown on Figure 5-1, which also details the location of a hydrogeologic cross-section. The hydrogeologic stratigraphy is summarized in Table 5-1.

TABLE 5-1

Hydrogeology Summary

Aquifer	Approximate Depth Below Surface (Feet)	Approximate Elevation (MSL)	Source of Recharge	Aquifer Type	Soil Description	Source Well	Well Production Capacity
Vashon Recessional	0 to 20	+255 to +235	Direct infiltration of precipitation	Unconfined	Gravely Silt		
Vashon Lodgement Till	20 to 70	+235 to +185	N/A	Aquitard	Sand and Gravel with cobbles		
Vashon Advance Outwash and Pre-Vashon Sediments	70 to 160	+185 to +95	Leakage from Vashon Recess. through "window" in till	Confined and Unconfined	Gravely Sand		
Kitsap Formation	160 to 220	+95 to +35	N/A	Aquitard	Green Silt and Silt bound Gravel		
Salmon Springs - Fleet Creek	Bell Hill 220 to 300 Hoffman Hill 415 to 495	+30 to -50 -30 to –110	Leakage from Vashon Recess. through "window" in till	Confined	Sandy Gravel gravely Sand with silt	Bell Hill Wells1, 3 and Hoffman Hill 1 and 2	Bell Hill Wells 900 and 1,000 gpm Hoffman Hill Wells 1,100 gpm each
Puyallup Formation?	360 to 445	-105 to –190	N/A	Aquitard	Sandy Silt		
Older Undifferentiated - Lakewood Glacial	445 to 510	-190 to -255	Upland areas to east	Confined	Sandy Gravel	Bell Hill Well 2	1,000

RECHARGE AND DISCHARGE ZONES

Recharge for the Salmon Springs aquifer largely comes from a "window" in the Vashon till to the east and leakage through the overlying formations. AGI (1996) identified this "window" as being underneath the logistic center area at Joint Base Lewis-McChord but also indicated that the "window" may extend as far southwest as Gray Field. This recharge area is up-gradient and outside of the 10-year zone of contribution. Groundwater flows west northwest in the vicinity of the Bell Hill wells in this aquifer and discharges into Puget Sound. For the Hoffman Hill wells, we have also assumed a northwesterly flow direction directly to Puget Sound. A lack of well data in the area of DuPont precludes determining the exact groundwater flow direction in the vicinity of the DuPont wells. The assumed flow direction is west northwest directly into Puget Sound based on Hart-Crowser (1991).

The source of recharge for the Older Undifferentiated Outwash is uncertain. Probable sources include the upland areas to the east and leakage downward from the overlying aquifers. Discharge is assumed to be west northwest directly into Puget Sound.

GROUNDWATER MODELING

A groundwater model simplifies the characteristics of an aquifer in order to provide mathematical estimates of actual conditions. As the groundwater model is increasingly simplified the model becomes easier to use, but the results become less accurate. The most commonly accepted groundwater models for delineating a WHPA (zone of contribution) are the Fixed Radius, Analytical, and Numeric models, the simplest being the Fixed Radius method.

The simplest groundwater model is based on the Calculated Fixed Radius method. In the Calculated Fixed Radius method, the delineations are concentric areas around each well calculated based on pumping data and known or assumed aquifer characteristics.

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

A Numeric model requires significantly more data than other methods. In Numeric modeling, a grid is superimposed over the study area. Each square in the grid, called a cell, is characterized by physical parameters that are estimated from data collected from a variety of sources. The sources may include well logs, geologic and hydrogeologic maps, geophysical data, groundwater elevation data, stream flow discharge, and meteorological data. The parameters used to define the hydrogeological characteristics of each cell in the study area include identification of the vertical relationship of each aquifer and confining layer, the transmissivity of each aquifer, the thickness of the fine grained materials that separate the aquifers, the annual recharge, the connection between surface

water and groundwater, the relationship between the model area and the surrounding areas (boundary conditions), and lastly, the location and pumping rate of wells. The Numeric method can generate more accurate results than the Fixed Radius or Analytical methods. However, Numeric models are relatively costly to develop. Consequently, Numeric models are more commonly used by large utilities, with complex aquifers that have the resources to collect the extensive model input data required.

The distances and directions that the groundwater travels while moving toward a well in a designated time period delineates the wellhead protection zone. For the purposes of wellhead protection, the distance water will travel in 1, 5, and 10 years before reaching the well are used. These are the travel times or zones of contribution whose delineation is required by regulation (WAC 246-290).

The travel times in this report do not take into account either the amount of time needed for a particle of water to reach the groundwater system or the effects that the subsurface environment may have on the contaminant. The time for a fluid particle to reach an aquifer system from the ground surface may be on the order of a few days to several years, depending upon the depth to groundwater, the amount of rainfall, and the geologic regime. Once in the groundwater system, the movement of contaminants will generally be retarded relative to groundwater flow. The amount of retardation depends upon factors such as the type of contaminant and the organic content of the aquifer.

MODELING RESULTS

The Department of Health, recommends that analytical modeling be performed when the hydrogeologic setting is strongly non-circular. The hydrogeologic setting in the vicinity of DuPont creates a strongly non-circular wellhead protection zone for the City's wells. The water surface in both of these aquifers is assumed to slope towards Puget Sound at approximately 0.006 ft/ft, creating strongly non-circular wellhead protection areas. Thus, the wellhead protection areas were developed through the use of the analytical groundwater computer model TWODAN (Fitts, 1995). Based upon Hart Crowser (1988, 1990, 1998a, 1998b), a modeling study performed on Bell Hill Wells 1 and 2 (Hart Crowser (1991), the Clovers/Chambers Creek Geohydrologic study (Brown and Caldwell, 1985), and the Fort Lewis Wellhead Program (AGI, 1996), several assumptions and simplifications were made to the modeled groundwater flow regime for each aquifer in order to delineate the WHPA as shown in Table 5-2.

TABLE 5-2

Groundwater Modeling Assumptions

Parameter	Bell Hill Wells 1 and 3	Bell Hill 2	Hoffman Hill Wells 1 and 2
Groundwater Flow direction	NW to Puget Sound	NW to Puget Sound	NW to Puget Sound
Hydraulic Gradient	0.005	0.005	0.005
Hydraulic Conductivity (ft/day)	200	55	150
Aquifer thickness (feet)	80	60	83
Transmissivity (ft^2/day)	16,000	3,340	11,000
Flow Regime	Isotropic, Homogeneous	Isotropic, Homogeneous	Isotropic, Homogeneous
Pumping Rate	750 gpm	750 gpm	1,100 gpm

Once the aquifer characteristics are assumed, the zones of contribution around each well can be estimated. The wellhead delineation zones resulting from the modeling effort indicate elliptic contribution areas, reflecting the hydraulic gradient towards Puget Sound, as indicated in Figure 5-3. The WHPA for Bell Hill Well 2 is wider (NE-SW) than that for Bell Hill Wells 1 and 3. Bell Hill Wells 1 and 3 have a longer WHPA in the southeast direction. The difference in the two WHPAs is created by the difference in hydraulic conductivity. The aquifer is assumed to discharge directly to Puget Sound, thus the two zones are oriented in the same direction. The WHPAs of all three wells overlap each other, thus they are shown as one combined zone. The 1-year, 5-year and 10-year zones shown on Figure 5-3 reflect those for Bell Hill Wells 1 and 3. Bell Hill Well 2 is screened in a deeper aquifer than Bell Hill Wells 1 and 3, and this extra depth should provide additional protection from contamination.

The WHPA for the Hoffman Hill wells is shown on Figure 5-4. Similarly to the Bell Hill wells the WHPAs for the Hoffman Hill wells overlap. Therefore, for simplicity, the combined WHPAs are shown as one.

The boundaries for wellhead protection areas may be jurisdictional or administrative; however, each area is defined through groundwater modeling by estimating the flow system that contributes to the well. The terms wellhead protection area and zone of contribution are often used interchangeably. However, time intervals are generally assigned to zones of contribution to estimate the time of travel to reach the well. Zone 1 represents the 1-year time of travel; Zones 2 and 3 represent the 5- and 10-year times of travel, respectively. The most intensive management efforts should initially be focused within Zone 1, followed by Zones 2 and 3 as indicated in Table 5-3.

TABLE 5-3

Wellhead Protection Zones of Contribution for the City of DuPont

Time of Travel	Zone of Contribution - Max. Distance Bell Hill Wells 1 and 3	Zone of Contribution - Max. Distance Bell Hill Well 2	Zone of Contribution - Max. Distance Hoffman Hill Wells 1 and 2
1 year	2,500 feet	1,500 feet	1,800 feet
5 years	8,000 feet	3,500 feet	5,500 feet
10 years	14,500 feet	6,500 feet	10,000 feet

INVENTORY OF POTENTIAL CONTAMINANT SOURCES

An essential element of wellhead protection is an inventory of all potential sources of groundwater contamination in and around the delineated wellhead protection areas. The purpose of the inventory is to identify past, present, and proposed activities that may pose a threat to the well, spring, or surrounding area. Partial inventories may have already been conducted for other purposes, such as those discussed at the beginning of this chapter. For the inventory to be effective; a full accounting of all known and potential sources of contamination within the zones must be conducted and the information accurately mapped.

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

POTENTIAL CONTAMINANT SOURCES

Within a wellhead protection zone, there are many diverse activities that may contaminate an aquifer thereby jeopardizing the water supply. It is important that these activities are properly inventoried and, if necessary, regulated to prevent degradation of the groundwater supply. Relevant activities include land use and zoning practices, landfills, commercial and industrial operations, underground storage tanks, septic tanks, dry wells and catch basins, as well as known sites of contamination. A discussion of these practices, their potential effects on groundwater, and the regulatory requirements that may apply are included in the following sections.

Landfills

A landfill is a disposal facility, in which solid waste is permanently placed, and is not a land treatment facility. Minimum functional standards for solid waste hauling are regulated by the Washington State Department of Ecology under WAC 173-304. These

BELL HILL WELLS

1 YEAR

5 YEAR

10 YEAR

12

13

14

15

16

DUPONT

FORT LEWIS MILITARY RESERVATION

Adams Woods

Hunter Woods

Sykes Woods

Kennedy Woods

Anderson Woods

Larson Hill

Cramer Woods

Bell Woods

Miller Hill

Clayton Hill

GRAY ARMY AIR FIELD

Barlow Island

Sears Lake

AMERICAN LAKE

Segualitchew Lake

Picnic Area

Campground

Old Fort Lake

Lake Sellers

Hodge Lake

Simpson Lake

Wright Marsh

MacKay Marsh

Hunter Marsh

Sawmill Lake

Stellacoom - DuPont Rd

DuPont Ave.

Heaston St.

McNeil St.

Meade Hill

Carson Hill

Crossland Hill

Donovan Hill

Bracker Hill

Foster Hill

Holman Hill

Black Hill

Bare Hill

Beal Hill

Atkins Hill

Travis Hill

Benn Hill

Aldred Hill

Hard Hill

Jorden Hill

Kemp Hill

Harold Hill

Fort Nisqually 1833 Historical Site

Fort Nisqually 1843 Historical Site

Athletic Field

Athletic Fields

Oil Tanks

Water Tanks

Water Tank

Water Tanks

Control Tower

Oil Tank

Hospital

Heliport

Evergreen Sch

Parkway Sch

Greenwood Sch

Clarkmoor Sch

Hillside Sch

Lookout Tower

Lookout Towers

Firing Range

Towers

Golf Course

6th Engineer Blvd

Goodman

Shannon

Noble

BM 240

BM 252

BM 269

BM 278

BM 292

Grave Pt.

Substa.

Ranges

LEVEE

Murray

MADIGAN AR MEDICAL CEN

CAMP MURRAY NATIONAL GUARD

LEGEND:

- WATER WELL
- WELLHEAD PROTECTION AREA BOUNDARY
- DUPONT CITY LIMITS

XX Existing or Potential Contamination Site. See Table 5-5 for descriptions of sites.

500 0 1000 2000 4000 Feet

SCALE: 1" = 2000'

CITY OF DuPONT

WATER SYSTEM PLAN
FIGURE 5-3
COMBINED WELL HEAD PROTECTION AREAS
BELL HILL WELLS

Gray & Osborne, Inc.
CONSULTING ENGINEERS

HOFFMAN HILL WELL 2

HOFFMAN HILL WELL 1

BELL HILL WELLS

1 YEAR

5 YEAR

10 YEAR

1

2

3

LEGEND:

- WATER WELL
- WELLHEAD PROTECTION AREA BOUNDARY
- DUPONT CITY LIMITS

xx Existing or Potential Contamination Site. See Table 5-5 for descriptions of sites.

500 0 1000 2000 4000 Feet

SCALE: 1" = 2000'

CITY OF DuPONT

WATER SYSTEM PLAN
FIGURE 5-4
COMBINED WELL HEAD PROTECTION AREAS
HOFFMAN HILL WELLS

Gray & Osborne, Inc.
CONSULTING ENGINEERS

regulations set siting and closure criteria, performance standards, and operating requirements for landfills. The regulations are highly restrictive in that a proposed landfill site must meet a series of "fatal flaw" tests. A wellhead protection area would qualify as a fatal flaw, thereby prohibiting the construction of a new landfill.

Past landfill practices were not so restrictive, however. Abandoned and improperly maintained landfills and dump sites are often a major source of groundwater contamination. Leachate from landfills poses a threat to groundwater quality should it migrate to the water table. The Department of Ecology is responsible for mitigating dump site cleanup when potentially hazardous leachates are present.

Joint Base Lewis-McChord Landfills 4 and 5 are both located to the north of the DuPont Bell Hill wells, outside of the WHPA and as such should not pose a threat to the City of DuPont Wells.

Commercial and Industrial Activity

Areas of commercial and industrial land use are located within most wellhead protection boundaries. Businesses that may contribute contaminants to the groundwater include dry cleaners, gas stations and other businesses with fuel storage tanks, auto repair shops, metal plating facilities, asphalt and concrete facilities, and machine shops. Wastes generated at these businesses include substances such as petroleum products, solvents, surfactants, heavy metals, and other organic materials. These wastes can potentially enter the groundwater system through inadequate disposal practices or accidental spills. Table 5-4 presents typical commercial and industrial activities and the potentially hazardous chemicals that may be associated with them.

The siting and operation of facilities that treat, store, or dispose of hazardous waste are subject to the requirements of the Resource Conservation and Recovery Act (RCRA), Subtitle C. In Washington State, the Department of Ecology regulates facilities that generate more than 220 pounds of hazardous waste per month under WAC 173-303, Dangerous Waste Regulations. The regulations are significant in that they establish a number of requirements for these facilities including surveillance and monitoring, record keeping, performance and design criteria, and siting and closure procedures. Ecology divides the facilities into three levels of hazardous waste accumulation: Level 1 facilities generate 2,200 pounds of waste per month or more; Level 2 facilities generate between 220 and 2,200 pounds per month; and level 3 facilities generate less than 220 pounds. Level 3 generators are exempt from the regulations. All Level 1 and 2 facilities must initially file a report of their activities with Ecology and update those activities annually. From these reports an identifier code is established for each facility. This code is required by a transporter to deliver or accept shipments. A summary of those activities is published annually by Ecology, thereby allowing water purveyors the opportunity to determine the types of activities present within their WHPA.

No Level 1 or Level 2 generators have been identified within the 10-year zone of contribution to the Bell Hill or Hoffman Hill wells.

TABLE 5-4

Contaminants Associated with Commercial and Industrial Activities

Commercial/Industrial Activity	Potential Contaminants
Automobile/Truck Service	waste oils, solvents, acids, paints, soaps
Boat Yard/Marinas	detergents, gasoline, diesel fuels, batteries, oil, seepage from boat waste disposal areas, wood preservative and treatment chemicals, paints, waxes, varnishes, automotive wastes
Dry Cleaners	solvents (perchloroethylene, petroleum solvents, Freon) spotting chemicals, (trichloroethane, methylchloroform, ammonia, peroxides, hydrochloric acid, rust removers, amyl acetate)
Cemeteries	fertilizers, pesticides
Country Clubs/Golf Courses	fertilizers, herbicides, pesticides, swimming pool chemicals, automotive wastes
Electric/Electronic Equipment Manufacturers	nitric, hydrochloric and sulfuric acid, heavy metal sludges, ammonium persulfate, cutting oil and degreasing solvent, corrosive soldering flux, waste plating solution, cyanide, methylene chloride, perchloroethylene, trichloroethane, acetone methanol
Furniture/Wood Manufacturing	paints, solvents, degreasing and solvent recovery sludge
Metal Plating Shops	sodium and hydrogen cyanide, metallic salts, alkaline solutions, acids, solvents, heavy metal contaminated wastewater/sludge
Lawns and Gardens	fertilizers, herbicides, pesticides
Printers, Publishers	solvents, inks, dyes, oils, miscellaneous organics, photographic chemicals
Sand and Gravel Mining	diesel fuel, motor oil, hydraulic fluids
Scrap, Salvage and Junkyards	used oil, gasoline, antifreeze, PCB contaminated oils, lead acid batteries

Underground Storage Tanks

Underground storage tanks (USTs) and leaking underground storage tanks (LUSTs) are a major threat to groundwater quality. Petroleum products, which may contain impurities that are mobile in the groundwater system, are the most commonly stored substances in USTs. The EPA has estimated that 35 percent of all USTs could be leaking. The most

common causes of leaks are structural failure, corrosion, improper fittings, and improper installation. Ecology regulates underground storage tanks in Washington State under WAC 173-360. The regulations require that owners and operators of underground storage tanks comply with the following sections of the regulations:

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

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

As of July 1, 1991, owners and operators of all existing nonexempt underground tanks must have a permit from Ecology. A valid permit is a requirement for delivery of regulated substances. The permit must be updated annually. As a condition of the permit, the owner must have completed the following requirements:

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

- Installation of leak detection devices.

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

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

Installation and replacement of underground storage tanks must meet the specifications and performance and design standards identified in the WAC. Ecology follows the federal UST guidelines, which at this time do not require double wall vessels.

Underground storage tank inspections are performed by Ecology primarily through the information developed in the permitting process. Although routine annual inspections are not performed, Ecology inspectors do prioritize sites considered potentially hazardous. Technical assistance visits are also conducted at the request of the owner/operator. This provides another avenue in which Ecology can monitor the status of USTs.

Ecology maintains a file on all permitted USTs in Washington State, as required by RCRA, Subtitle 1. The file provides the site name and address, tank identification number, date of installation, size, tank status, and the substance stored at the site.

Many underground tanks were identified in Joint Base Lewis-McChord within the 10-year Zone of Contribution. Most of these tanks are used for No. 2 heating fuel. The number of tanks identified by Zone, are shown on Table 5-5.

Septic Systems

Pierce County is responsible for regulating and permitting residential and small commercial on-site sewage disposal systems within the county, excluding federal facilities. Contaminants associated with septic tank effluent include pathogenic organisms, toxic substances, and nitrogen compounds. Ammonia and nitrate nitrogen are highly soluble in water.

Pierce County will not allow septic systems for proposed residences if they are within 300 feet of a sanitary sewer. Old septic systems may remain in use as long as they are not in a utility local improvement district (ULID) and are not failing. Septic system elimination incentives may provide assistance to residences currently using septic systems who wish to connect to an available sanitary sewer. Sanitary sewer service is available for future development in DuPont, and Joint Base Lewis-McChord is fully sewered.

Drywells, Catch Basins, and Improperly Sealed or Secured Wells

Stormwater serves as a source of groundwater recharge, but it can also be a source of groundwater contamination. Runoff from streets, parking lots and other impervious surfaces can contain heavy metals, hydrocarbons, petroleum products, pesticides, and animal wastes. Dry wells may be used for stormwater, septic waste, or other wastewater disposal at commercial, industrial, and multi-family residential sites. Dry wells and catch basins may be located along major transportation corridors. Contaminants generated along transportation routes, such as Interstate 5 and railroad corridors, include petroleum products, lead, hazardous chemicals and other emission products. Dry wells and catch basins are potential sites of contamination because their intended use often discharges contaminants directly into the groundwater.

Approximately three dozen catch basins have been located on the Joint Base Lewis-McChord base map within the 10-year Zone of Contribution. Some of these catch basins may not be connected to a storm drainage discharge line and are essentially dry wells. In addition to the catch basins on Joint Base Lewis-McChord, there are approximately ten catch basins located along the Interstate-5 right-of-way. These appear to be unconnected to a central storm drainage system. Eight of the I-5 catch basins are within the 5-year Zone of Contribution, while the remaining two are in the 10-year zone.

Accidental Spills

Accidental spills or releases of contaminants can potentially impact groundwater supplies. Potential sources of spills and leaks include underground storage tanks, accidents and poor disposal practices. Interstate 5 and the Burlington Northern Railroad tracks, both of which pass through the City of DuPont's 5- and 10-year WHPA, are potential sources of hazardous materials. The Washington State Patrol (WSP) is the first responder for hazardous material spills on Interstate 5. WSP then notifies the Department of Ecology, who in turn authorizes an independent contractor to clean up the spill. Burlington Northern is the first responder to spills within their right-of-way. Their current spill response program is discussed later in this chapter.

The Joint Base Lewis-McChord Fire Department is the first responder to all spills of hazardous material within their jurisdiction. Upon arrival at the spill site they will call in the appropriate teams to assist in or assume command of the cleanup. They will assist the City of DuPont upon request with any spills within the City's jurisdiction.

Stormwater

Stormwater can contain many chemicals that are derived from road runoff. These include: heavy metals such as lead and zinc, oils and grease, pathogens and nutrients. Typically, the concerns regarding storm water are related to the impacts on surface water. However, groundwater can also be adversely impacted by stormwater.

Joint Base Lewis-McChord has a Stormwater Pollution Prevention Plan (Gray & Osborne, 1994) and a Spill Prevention, Control and Countermeasure Plan (Coe-Truman Technologies, 1991). These plans set forth a list of Best Management Practices (BMPs) to minimize the spill of contaminants and the response to be undertaken in the event of a spill. A stormwater modeling study of the Joint Base Lewis-McChord system was completed by Gray & Osborne, 1996. This report estimated transit time of water in the storm drainage system from various inlets to the outlet for each major sub-basin. These estimates allow the various response teams at Joint Base Lewis-McChord to refine the necessary response times should a spill occur.

Confirmed and Suspected Contamination Sites

Under the Model Toxics Control Act Cleanup, WAC 173-340, The Department of Ecology is responsible for ensuring all hazardous waste sites are properly remediated. This includes confirmed and suspected sites of contamination as well as Leaking Underground Storage Tanks (LUSTs). A separate inventory for each, which includes the status of cleanup efforts, is maintained by Ecology. Ecology conducts an initial site investigation within 90 days of learning of a potentially contaminated site. If this investigation shows that remediation action is required, the site will appear on the Confirmed and Suspected Contaminated Sites Report. The sites are also given a Washington Ranking Mode BIN number between 1 and 5. A ranking of 1 indicates the

greatest assessed risk to human health and the environment. The contaminant type and the affected media, such as groundwater, are also noted. Once the remedial action has been completed, Ecology's Toxics Cleanup Program determines if the site can be removed from the list.

There are two confirmed and suspected sites located outside and north of the wellhead protection areas, Joint Base Lewis-McChord Landfills No. 4 and No. 5. Landfill No. 4 has received a ranking of three with both soil and groundwater being impacted. Landfill No. 5 has received a ranking of five with groundwater being the impacted media.

In addition to the two landfills, the Logistics Center on Joint Base Lewis-McChord is on the U.S. EPA National Priorities List. Trichloroethylene has been found in both the Steilacoom Gravel aquifer and the Salmon Springs aquifer, about 2.5 miles north of the DuPont 10-year WHPA. Work is currently underway to stabilize movement of the groundwater contaminant plume in the Steilacoom Gravel aquifer. The direction of groundwater movement in the Steilacoom Gravel in the area is to the northwest and to the west in the Salmon Springs aquifer (AGI, 1996). These flow directions do not intersect the WHPA for the City of DuPont Bell Hill wells.

INVENTORY DATA SOURCES

The inventory of potential contaminant sources was compiled using various data sources. AutoCAD maps from the Joint Base Lewis-McChord and the City of DuPont were used to locate the sewer lines and storm drain lines. Agencies such as Ecology and EPA maintain contaminant databases that list businesses that handle and store potential contaminants. In addition to the documents discussed previously, the following databases were used to create the inventory for the City of DuPont's WHPA:

- **"What's In My Neighborhood" Interactive Web Site, (June 2018)**

  https://fortress.wa.gov/ecy/neighborhood/. This Ecology web site allows access to contamination cleanup activities by map location. Reports of the status of cleanup activities are available from this site.

- **"Facility/Site" Interactive Web Site, (June 2018)**

  https://fortress.wa.gov/ecy/facilitysite/MapData/MapSearch.aspx. This Ecology web site allows access to information on facilities and sites of environmental interest to Ecology including: State Cleanup sites, Federal Superfund sites, Hazardous Waste Generators, Solid Waste Facilities, Underground Storage Tanks, Dairies, and Enforcement. These facilities are summarized in the inventories and located on the maps.

- **"Source Water Assessment Program" Interactive Web Site, (June, 2018)**

  https://fortress.wa.gov/doh/eh/maps/SWAP/index.html. This DOH web site shows public water supply sources, wellhead protection areas, water system service areas, and regulated hazardous materials sites, with links to the "Facility /Site" interactive web site.

- **Title III Facilities**

  Title III facilities are identified as those that generate, treat, store, or dispose of hazardous materials in sufficient quantity to pose a threat to the community. There are several different types of Title III facilities depending upon the amount of and the nature of the material handled. All of these companies must report to the County on an annual basis. This reporting was a result of the 1986 Superfund Amendments and Reauthorization Act. Title III was subsequently renamed to the Emergency Planning and Community Right to Know Act (EPCRA).

- **Septic Systems**

  Pierce County issues permits for all septic systems within the county, except those on federal facilities. The county has very little involvement with septic systems in the DuPont area due to the presence of sanitary sewers and Joint Base Lewis-McChord.

- **Landfills**

  The landfill coverage used in this Plan was developed from base maps of the Joint Base Lewis-McChord area.

- **Zoning and Land Use**

  Electronic files containing zoning designations were obtained from the City of DuPont.

- **Base Map File and City Sewer and Stormwater Information**

  The City of DuPont and Joint Base Lewis-McChord maintain AutoCAD file base maps with sewer and stormwater overlays for their systems.

Table 5-5 summarizes the potential known sources of contamination found within the 1-, 5-, and 10-year zones of contribution on Washington State Department of Ecology web sites. Copies of site summary sheets available from the Ecology web sites are included in Appendix H. Additionally, field surveys revealed that road construction has occurred

within the 1-year zone in preparation for future development. The 5-year zone is largely undeveloped woodland. In the southeast portion, the Historical Museum and the Joint Base Lewis-McChord Public Works Department posed no obvious threat to groundwater contamination. Within the 10-year travel zone, locked storage buildings were observed. In addition to these buildings, army vehicles are parked west of the storage area, west of North Division Street and North of Crary Avenue. Vehicle maintenance occurs in the area west of North Division Street and South of Crary Avenue. These operations may pose a threat to groundwater if contaminants are spilled or leaked into the ground.

TABLE 5-5

Potential Contaminant Sources within the Wellhead Protection Area

Site No. (1)	Zone of Contribution	Site Description
1	Hoffman Hill Wells, 5-year	Interstate 5
2	Hoffman Hill Wells, 5-year	BNSF Railroad
3	Hoffman Hill Wells, 5-year	Amtrak Derailment, suspected groundwater contamination with benzene, non-halogenated solvents, other non-halogenated organics, and diesel. Status is "Awaiting Cleanup."
4	Bell Hill Wells, 5-year	Interstate 5
5	Bell Hill Wells, 5-year	BNSF Railroad
6	Bell Hill Wells, 5-year	DuPont Grocery, Ecology Site No. 17157522, underground storage tanks containing gasoline and diesel.
7	Bell Hill Wells, 5- and 10-year	Several buildings on JBLM with heating oil tanks.
8	Bell Hill Wells, 5-year	Stormwater catch basins along I-5 discharging to dry wells.
9	Bell Hill Wells, 5-year	Fort Lewis Bldg. 2055, Ecology Site No. 14614, confirmed soil contamination with petroleum (other) above cleanup limit. Status is "Awaiting Cleanup."
10	Bell Hill Wells, 5-year	US ARMY HQ I Corps & Fort Lewis, Ecology Site No. 25778176, Hazardous Waste Generator, Treatment and Storage Facility.
11	Bell Hill Wells, 5-year	JBLM Rainier Lodge, Ecology Site No. 6157, storm water infiltration facility.
12	Bell Hill Wells, 10-year	Abdul Azim Khan Site, Ecology Site No. 97898582, Hazardous Waste Management Facility.

TABLE 5-5 – (continued)

Potential Contaminant Sources within the Wellhead Protection Area

Site No. (1)	Zone of Contribution	Site Description
13	Bell Hill Wells, 10-year	Fort Lewis Log Center, Ecology Site No. 227, confirmed groundwater contamination with halogenated organics above cleanup limit. Status is "Cleanup Complete, Ongoing Monitoring."
14	Bell Hill Wells, Approx. 900 feet north of 10-year	JBLM Bldg. 6031, Ecology Site No. 19765, groundwater contaminated with gasoline. Status is "Site Cleanup Started."
15	Bell Hill Wells, Approx. 600 feet east of 10-year	FY12 RSU & Faith Avenue Improvements, Ecology Site No, 70491, stormwater infiltration facility.
16	Bell Hill Wells, Approx. 2,000 feet east of 10-year	Fort Lewis Bldg. 3292, Ecology Site No. 24078, confirmed soil contamination with petroleum hydrocarbons. Status is "Awaiting Cleanup."

(1) See Figures 5-3, 5-4 and 5-5 for locations of sites in Table 5-5.

WELLHEAD INVENTORY

Development of Wellhead Protection Area Maps

The wellhead protection area map was developed as a tool for managing the zones of contribution of the City's wells as shown in Figure 5-5. The map can be distributed to the local first responders and businesses to increase public awareness of the location of the boundaries of the wellhead protection area and the significance of potential contaminant sources located in the area. The map shows the boundaries of the delineated zones of contribution, the locations of the potential contaminant sources, and the current land use.

The wellhead protection area map was updated from the map contained in the 2011 Water System Plan, which was created with the assistance of the Joint Base Lewis-McChord Department of Public Works. Updates are based on information available on the Washington State Department of Ecology and Washington State Department of Health web sites.

SPILL RESPONSE

Spill response planning is an important aspect of both an emergency management plan and a wellhead protection program. The release of hazardous materials in a wellhead protection area can create problems other than the initial contamination of soil and surface water. When the release occurs in either the 1-, 5-, or 10-year zones of travel,

there is the possibility that the spill will eventually contaminate aquifers that supply the City's drinking water. Planning for spill response should reflect the needs and concerns of the community while maintaining the quality of the groundwater. Gaining community support in the preparation of a spill response program is important. Coordination of federal, state, and more importantly, local emergency response organizations is required as well.

Specific response procedures for wellhead protection areas must be determined prior to the occurrence of a contamination incident. The information obtained as a result of the susceptibility assessment and the wellhead protection area inventory can be used to determine what types of spill response measures are necessary for the protection of drinking water sources. In order to be accepted by local emergency responders, spill response procedures for wellhead protection areas should be realistic and easily implemented.

The following are examples of simple measures that can be taken during a spill/incident response to reduce the likelihood of groundwater contamination in a wellhead protection area.

- In wellhead protection areas, attempt to contain hazardous liquid spills by using absorbents to reduce infiltration into the ground.

- Do not allow spills to be routed into drywells for cleanup.

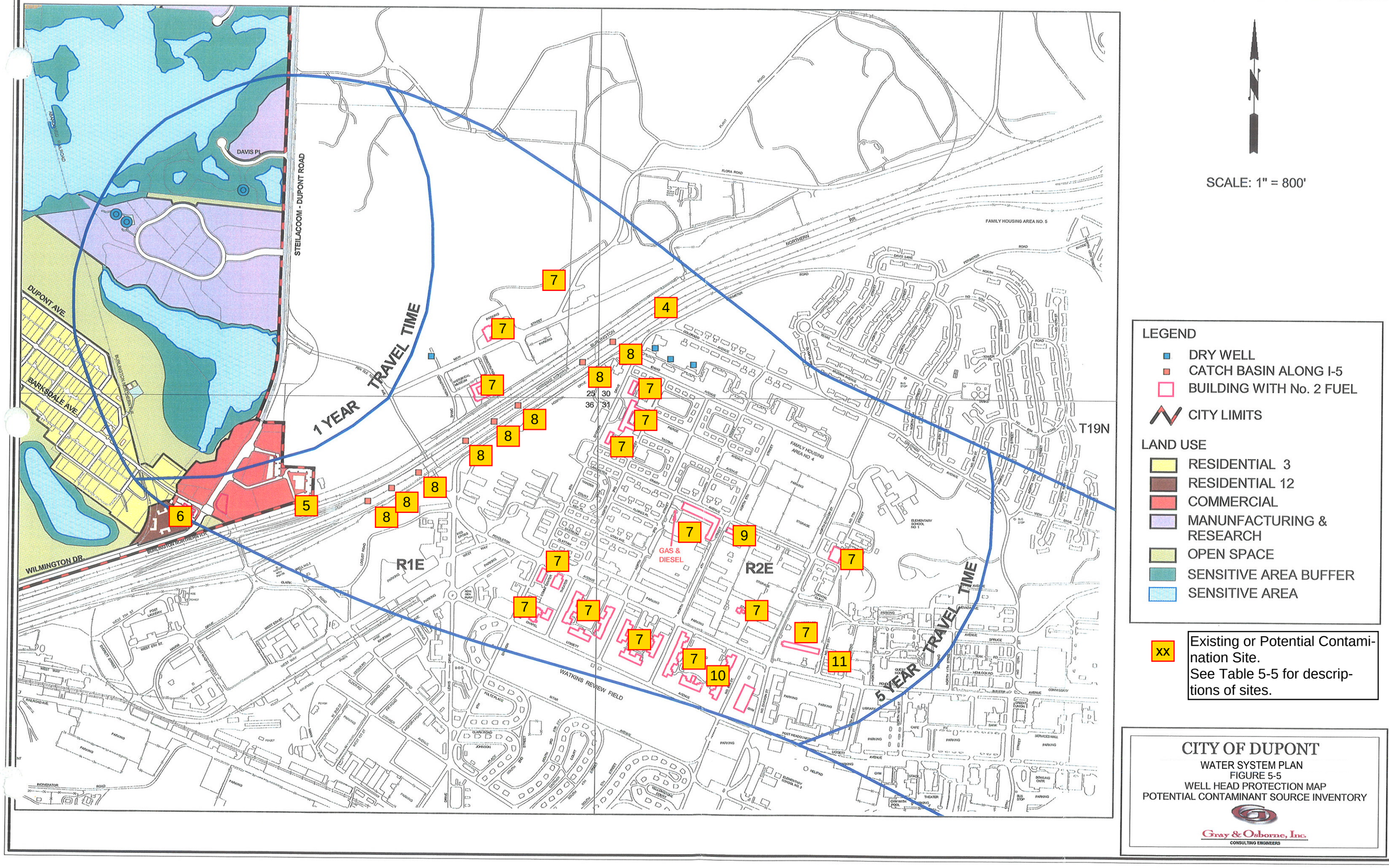
In order for spill response procedures to be effectively executed, coordination, cooperation, and communication among the responding agencies, organizations, and individuals is imperative. There are many spill response organizations at the local, state, and federal levels. Depending on the magnitude and type of the release, any of the following organizations may be involved in a spill response for a wellhead protection area in Washington State.

- **Environmental Protection Agency (EPA)**

  The EPA is primarily responsible for all land spills including spills that occur on inland U.S. waters not under the jurisdiction of the United States Coast Guard.

- **Joint Base Lewis-McChord Fire Department**

  The Joint Base Lewis-McChord Fire Department is the first responder to any spills or releases of hazardous materials into the environment in the military reservation. Upon arrival at the scene, they will conduct an appropriate survey of the situation and call for assistance from the necessary teams.



SCALE: 1" = 800'

LEGEND

- DRY WELL
- CATCH BASIN ALONG I-5
- BUILDING WITH No. 2 FUEL
- CITY LIMITS

LAND USE

- RESIDENTIAL 3
- RESIDENTIAL 12
- COMMERCIAL
- MANUNFACTURING & RESEARCH
- OPEN SPACE
- SENSITIVE AREA BUFFER
- SENSITIVE AREA

xx — Existing or Potential Contamination Site. See Table 5-5 for descriptions of sites.

CITY OF DUPONT

WATER SYSTEM PLAN
FIGURE 5-5
WELL HEAD PROTECTION MAP
POTENTIAL CONTAMINANT SOURCE INVENTORY

Gray & Osborne, Inc.
CONSULTING ENGINEERS

- **Joint Base Lewis-McChord Hazardous Materials Team**

  The Joint Base Lewis-McChord HAZMAT Team is available on an as needed basis but must be activated by the Joint Base Lewis-McChord Fire Department. They can provide assistance both at Joint Base Lewis-McChord and offsite as necessary.

- **Department of Ecology (Ecology)**

  Ecology's Spill Response Team is responsible for determining the source and cause of the release and the responsible party. If the responsible party is unknown, Ecology will investigate to determine who is responsible and ensure that containment, clean up, and disposal proceedings begin. Additionally, Ecology is the first responder to accidental spills of hazardous materials on roadways. They have a 24-hour on call HAZMAT team should a spill occur.

- **Department of Health (DOH)**

  The DOH is developing a set of standard operating procedures that first responders can use in wellhead protection areas, critical aquifer recharge areas, and other sensitive groundwater areas. These standards were developed in conjunction with organizations such as Ecology's Spill Operations Section and the Association of Fire Chiefs. DOH also provides assistance through laboratory support and services, if necessary, to the cleanup effort.

- **Washington State Department of Transportation (WSDOT)**

  WSDOT can provide spill response assistance through traffic control, equipment, and personnel for non-hazardous cleanup activities on state and interstate highways.

- **Pierce County**

  The Pierce County Department of Emergency Management has developed a comprehensive spill response plan. This plan specifies who is in charge of spill response and the responsibilities of each state and local governmental agency that might be notified in the event of a spill.

- **City of DuPont**

  The City of DuPont Fire Department is the first responder to local spills or releases of hazardous materials. In addition, the DuPont Fire Department

can call for assistance from surrounding Fire Departments, such as Joint Base Lewis-McChord, to assist to spill control, management, and cleanup.

- **Burlington Northern Spill Response Team**

  Coordination with this team is an important part of the spill response effort. Burlington Northern has a 24-hour on call HAZMAT team available to mitigate accidental releases within their right-of-ways.

- **Washington State Patrol**

  The Washington State Patrol is the "Incident Command Agency" for all spills on Interstate highways.

There are many spill response plans in existence in Washington State. These plans address specific geographical areas such as wellhead protection areas and types of materials such as oil discharges. Organizations involved in the storage and transport of hazardous substances have also been required to develop spill response plans. In addition, cleanup contractors are on call 24 hours a day to respond to spills. These plans are designed to be consistent and compatible with each other to ensure that response efforts are carried out effectively. Examples of the types of federal and state plans are listed below:

- **Oil and Hazardous Substance Pollution Contingency Plan for Federal Region Ten**

  This plan divides responsibilities among federal, state, and local governments; provides procedures for establishing local contingency plans; and provides procedures for response actions in accordance with the Clean Water Act and the Comprehensive Environmental Response, Compensation, and Liability Act.

- **Washington Statewide Master Oil and Hazardous Substance Spill Contingency Plan**

  This plan provides a means for coordinating statewide response to spills by Ecology and other state agencies.

- **Wellhead Protection Program Guidance Document-Spill/Incident Response Planning**

  As stated previously, the public water system is required to coordinate with local emergency responders, Ecology's Spill Operations Section, the local health department, and any local emergency planning committee.

These and other similar documents were used for guidance in preparing a local spill response program for the City of DuPont.

SPILL RESPONSE PROGRAM

The City of DuPont has adopted the Pierce County spill response program. The Pierce County Plan outlines the general off-site emergency procedures as required by EPCRA, and is included in the Appendix H. Spills that occur within the property boundaries of a facility are handled according to that facility's plans.

Generally, under the County's plan the Fire Dispatch Centers provide a single point of contact for spills. When a call is received regarding a spill a Hazardous Materials Incident Notification worksheet, "Pink Sheet" is filled out based upon data gathered from the field. The appropriate agencies and Hazardous Materials teams are notified based upon the data gathered for this worksheet. After being notified of a hazardous material incident Dispatch Centers are responsible for making the following notifications:

- The fire district in which the incident occurred,
- Appropriate local law enforcement,
- Pierce County Fire Prevention Bureau,
- Tacoma-Pierce County Health Department,
- Pierce County Department of Emergency Management and,
- The State Division of Emergency Management Duty Officer.

If the spill were to occur on Interstate 5, a similar response program would be followed as outlined in the Pierce County program. However, the Washington State Patrol is the "Incident Command Agency" for all spills on Interstate highways.

It is important that the City also be notified of any spills that occur within the WHPA. To facilitate notification, the City will provide copies of the WHPA map to Pierce County, Joint Base Lewis-McChord, and Ecology. Accompanying each map should be a letter requesting that the agency in question notify the City in the event of a hazardous materials spill.

CONTINGENCY PLANNING

Contingency planning is an important component of a wellhead protection program; however, planning alone cannot account for unanticipated incidents. A worst case scenario would be a contamination event that would render the Bell Hill or Hoffman Hill wells unusable. Should this happen, the City would be forced to activate the intertie with Joint Base Lewis-McChord, develop an alternate source of supply, or provide a treatment process capable of removing the contaminant from the Bell Hill or Hoffman Hill sources.

In the interim, the existing intertie with Joint Base Lewis-McChord could supply the City with up to 800 gpm on a continuous basis. Since future peak day demand requirement will greatly exceed 800 gpm, severe water use restrictions would be required to ensure an adequate domestic supply to City customers. If a long-term loss of Bell Hill or Hoffman Hill sources were to occur, the City could potentially negotiate with Joint Base Lewis-McChord for additional capacity.

SUMMARY AND RECOMMENDATIONS

In accordance with the requirements of the Washington State Department of Health, a wellhead protection program has been prepared for the City of DuPont's Bell Hill Wells 1, 2, and 3, and Hoffman Hill Wells. 1 and 2. An EPA analytical hydrogeological model was used to establish the 1-, 5-, and 10-year zones of contribution, more commonly referred to as a Wellhead Protection Area (WHPA). An inventory of potential contamination sources of contamination within the WHPA was developed through research of available records and a visual survey of the area. A map identifying the locations of the potential sources of contamination, overlaid with the WHPA was constructed.

1. The 5- and 10-year time of travel zone encompasses about 2,400 feet of Burlington Northern railroad tracks, Interstate 5, and a portion of the Joint Base Lewis-McChord Military Reservation. As indicated previously, a hazardous materials spill by either a truck or train could pose a threat to the water quality in the Bell Hill wells. Accidental spills are not the only potential source of contamination. Activities at Joint Base Lewis-McChord that may use hazardous materials could adversely affect the City's water quality if improperly handled or disposed of. Burlington Northern Railroad, Pierce County, Joint Base Lewis-McChord, and Ecology have been provided a copy of the WHPA map, with instructions to notify the City in the event of a spill within a zone of contribution. Copies of the notification letters are included in Appendix H.

CHAPTER 6

OPERATION AND MAINTENANCE PROGRAM

WATER SYSTEM MANAGEMENT AND PERSONNEL

Waterworks Operator Certification, specified in WAC 246-292, requires all Group A water systems in Washington State to retain in their employ individuals who are certified, by examinations, as competent in water supply operation and/or management. The Washington State Department of Health (DOH) determines the required level and number of certified positions based on the population and complexity of the water system. Minimum education and experience requirements for the various certification levels are detailed in the Water Works Operators Certification Regulations, published by the DOH.

A Water Distribution Manager 2 (WDM2) is the minimum level of operator certification required for the City of DuPont. The City must employ at least one water system operator with a WDM2 or higher certification in responsible charge of the water system. The City complies with WAC 246-292 by employing the personnel listed in Table 6-1 below:

TABLE 6-1

City of DuPont Water System Operators

Operator Name	Operator Number	Certification Levels
Mr. Scott Hein	007319	Water Distribution Manager 2 Cross-Connection Control Specialist Commercial Driver's License Class A with Tank Endorsement
Mr. Fred Foreman	002854	Water Distribution Manager 2 Cross-Connection Control Specialist Backflow Assembly Tester Cert #B5778 Commercial Driver's License Class B
Mr. Larry Clark	009784	Water Distribution Manager 2 Cross-Connection Control Specialist Water Treatment Operator In Training Backflow Assembly Tester Cert #B5920 Commercial Driver's License Class B
Mr. Justin Moore	013493	Water Distribution Manager 2 Cross-Connection Control Specialist Commercial Driver's License Class A

TABLE 6-1 – (continued)

City of DuPont Water System Operators

Operator Name	Operator Number	Certification Levels
Mr. Paul Jacoby	010262	Water Distribution Manager 2 Cross-Connection Control Specialist Water Treatment Operator In Training Commercial Driver's License Class A with Tank Endorsement
Mr. Scott Newton	012381	Water Distribution Manager 1 Cross-Connection Control Specialist Backflow Assembly Tester Cert #B5871 Commercial Driver's License Class B with Bus Endorsement
Mr. Jesse Davis	013373	Water Distribution Manager 1 Cross-Connection Control Specialist Commercial Driver's License Class A Right of Way/Laws & Safety Spray License
Mr. Andre Ward	013963	Water Distribution Specialist Commercial Driver's License Class A
Mr. Branden Clark	014136	Water Distribution Manager 1 Cross-Connection Control Specialist Commercial Driver's License Class B

PROFESSIONAL GROWTH REQUIREMENTS

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

https://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/RegulationandCompliance/WaterworksOperatorCertification

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

- Confined space
- Trenching and shoring
- Traffic Flagging
- Asbestos cement pipe safety
- Cross-Connection Control

The City of DuPont's certified operators all complete CEUs on a regular basis. All certified operators have received training in the areas listed above.

SYSTEM OPERATION AND CONTROL

MAJOR SYSTEM COMPONENTS

The City of DuPont's municipal water system serves the City water service area via five wells, a 1.0 million gallon (MG) concrete reservoir, a 3.5 MG steel reservoir, and two booster pump stations located at Bell Hill and Hoffman Hill. Technical schematics for the two booster pump stations are provided in Figures 3-1 and 3-2. A description of the normal operation of each facility is given in the following sections.

Control System

The water system components are controlled by a central PC based SCADA control system with a graphical user interface, coupled with local PLCs. The SCADA system collects system data and sets operational parameters for the local PLCs. The SCADA computer can be accessed and controlled remotely via www.logmein.com by senior operations staff via tablet and smartphone applications. The individual PLCs are set to continue on their most recent operational parameters from the SCADA computer, in the event that the SCADA computer should fail.

Bell Hill Reservoir and Booster Station

The City has copies of a detailed operations manual developed for the Bell Hill Booster Station. The manual provides descriptive instruction of how the facility is to be operated.

Under normal operating conditions, the water level in the Hoffman Hill Reservoir will "float" on the distribution system. As the Hoffman Hill Reservoir level drops, the Hoffman Hill Wells and the booster pumps at Bell Hill will turn on. In order to maintain at least a minimal turnover in the Bell Hill Reservoir, the smallest booster pump at Bell Hill will be the first to turn on, followed by a Hoffman Hill well, and then the remaining five Bell Hill booster pumps. When pressure drop as seen at Bell Hill PS below 45 psi for 30 seconds all pumps switch to *pressure mode* to maintain the pressure at Bell Hill at 50 psi. The SCADA has an alternator feature with both Hoffman Hill wells that allows them to alternate between each other as lead or lag, also allowing the Bell Hill booster station to be the lead or lag depending on set point settings. During peak season, the smallest pump generally cannot meet minimum demand and usually runs 24 hours per

day, 7 days per week, providing approximately 300 gpm continuously. When the combination of active Bell Hill Booster Pumps and Hoffman Hill Wells fill the Hoffman Hill Reservoir, the active Hoffman Hill Wells and Bell Hill Booster Pumps turn off.

In 2017 the control panel and pump controllers at the Bell Hill Booster Pump Station were replaced. Booster pumps 4, 5, and 6 were put on Variable Frequency Drive (VFD) motor controllers, and booster pumps 1, 2, and 3 were put on solid state "Soft" starters. This has resulted in more steady pressure and smoother operation of the Bell Hill Booster Pump Station. Pumps 4, 5, and 6 now vary their speed to maintain a constant output pressure. Pumps 1, 2 and 3 turn on sequentially and run at constant speed when demand outstrips the capacities of pumps 4, 5, and 6 to maintain system pressure.

The SCADA system telemetry is controlled by a headquarters unit, which includes a 2-way switch that allows booster pump control to be toggled between pressure at Bell Hill and reservoir level at Hoffman Hill. The headquarters unit is physically located at the Bell Hill complex along with the Bell Hill PLC. In the event of a failure of the headquarters unit, local control of the pump station by the PLC is initiated. When communication is lost between the headquarters PLC and the RTUs, those RTUs will run on the last set points. Hoffman Hill Wells 1 and 2 will keep the Hoffman Hill Reservoir full and the Hoffman Hill Pump Station will continue to maintain the pressure set point. With the headquarters unit in control of operation, the PLC selects among eight possible combinations of pumps. The level of pumping selected by the headquarters unit is based upon the most efficient combination of flow for the demand requirement at any given time.

During normal operation, Bell Hill Wells 1, 2, and 3 pump directly to the 1.0 MG reservoir. The booster pumps draw from the reservoir and discharge directly into the distribution system. In the event that the reservoir or booster station is offline, the wells can pump directly into the distribution system by manually opening and closing valves and manually running the wells.

Most of the station's operating parameters (i.e., pumps on, flow rate, pressure reservoir elevation, etc.) are monitored and recorded at the headquarters unit. In the event of an-after-hours emergency, the SCADA will autodial through a series of phone numbers until an operator is contacted. Emergencies which will trigger an-after-hours callout include:

- High/Low Pressure
- High/Low Reservoir Level
- Intrusion
- Fire
- Telemetry Failure
- Hoffman Hill chlorine generation failure

Generally the alarm system has been successful in notifying operations staff of system problems such that they can be corrected before customers are affected. A loss of signal

from the headquarters unit will initiate local control. With local control, the pumps are called on sequentially (Pumps 1 through 6) in direct response to decreasing pressures in the distribution system.

During a power failure at the Bell Hill facilities, Bell Hill Wells 1 and 2 will provide the only source of water for the Bell Hill reservoir, since they can be powered by a backup generator located at the Bell Hill site. A power outage has limited effect on headquarters PLC communication with the remote sites because the City relies on Century link for communication, and they have 24 to 48 hours of life during a power outage. When communication is lost with Hoffman Hill Reservoir, City operations staff are alerted, and pressure as seen at Bell Hill will be maintained at 50 psi, or as set by the operator. As during normal operation, Bell Hill Well 1 will be called by the water level in the Bell Hill Reservoir. Table 6-2 summarizes the Bell Hill Booster Pump Station.

TABLE 6-2

Bell Hill Booster Pumps

Installation	Pump Model	Pump Configuration	Rated Capacity	Meter
Booster Pumps 1-3	Byron Jackson Type 12 GH vertical turbine pump w/US motor	2 stage 50 hp	1,350 gpm each	10" Sparling Series FM655 magnetic flow meter (Tigermag) w/transmitter
Booster Pumps 4 and 5	Byron Jackson Type 10 GH vertical turbine pump w/US motor	3 stage 20 hp	500 gpm each	
Booster Pump 6	Byron Jackson Type 8 GH vertical turbine pump w/US motor	4 stage 15 hp	350 gpm	

Hoffman Hill

Control of the Hoffman Hill reservoir and booster pump station is also maintained via the SCADA system located at the Bell Hill complex and a PLC at the booster station. The monitoring points for the booster station are integrated with the City of DuPont water telemetry system. In the event normal power service is interrupted, the Hoffman Hill pump station is equipped with a standby generator to keep the system operational until power service is restored. The generator at Hoffman Hill reservoir only supplies power to the Booster Station. Hoffman Hill Well 1 has a transfer switch that could be connected to a portable generator, but does not have a plug receptacle, so a portable generator would need to be hard wired into the transfer switch to provide backup power at Hoffman Hill Well 1. A generator plug receptacle would make it much simpler to connect a portable generator to Hoffman Hill Well 1 when needed. Installation of such a receptacle has been included in the Capital Improvement Program discussed in Chapter 8.

The Hoffman Hill Booster Pump Station is a skid mounted modular unit installed inside a building structure. In total, four pumps controlled by VFD controllers are incorporated into the station. The pump station originally had two 25 hp Peerless Model C825A pumps capable of 425 gpm each, and two 30 hp Peerless C830 pumps, capable 500 gpm each, at 150 feet TDH. In 2016 the two 25 hp pumps were replaced with two 30 hp Paco Model LC30707-7 capable of up to 600 gpm at 150 feet TDH. The two newer of these pumps, capable of delivering a combined capacity of up to 1,200 gpm at 150 feet of TDH, provide for peak day demands. The other two pumps provide fire flow and are capable of delivering a capacity of 500 gpm each at 150 feet of TDH. With one of the largest pumps out of service (600 gpm), the remaining three pumps are sized to provide peak day demand plus fire flow for the 530-foot pressure zone. A capacity analysis is provided in Chapter 3. Table 6-3 summarizes the Hoffman Hill Booster Pump Station.

TABLE 6-3

Hoffman Hill Booster Pumps

Installation	Pump Model	Pump Configuration	Rated Capacity	Meter
Booster Pumps 1 and 2	Paco Model LC30707-7	30 hp	600 gpm	6-Inch Siemens Mag 5100 Magnetic Flow Meter w/transmitter
Booster Pumps 3 and 4	Peerless Model C830A	30 hp	500 gpm	

SOURCE OF SUPPLY

Bell Hill Wells

Bell Hill has three wells (Bell Hill Wells 1, 2, and 3). As stated in Chapter three, Well 2 has a concentration of manganese above the MCL. For this reason the recommended method of controlling the manganese is through dilution (or blending) with the low manganese water from Wells 1 and 3. This is accomplished by varying output of Well 2 and the length of pumping cycles. The third well, Well 3 was drilled to maximize the water right while meeting the necessity of blending. Although not a DOH requirement, water from the Bell Hill wells is chlorinated. A residual chlorine concentration target is 0.4 to 0.5 mg/L is maintained by injecting 12 percent sodium hypochlorite into the discharge of the wells at Bell Hill prior to entry into the Bell Hill Reservoir. The City is currently considering replacing the chlorination system at Bell Hill with an on-site chlorine generation system.

During normal operation, the water level in the Bell Hill Reservoir controls the operation of the Bell Hill wells. Wells 1 and 3 are used preferentially over Well 2 due to the high iron and manganese concentrations in Well 2. Well 2 is called last so that low manganese water from Wells 1 and 3 is available to provide maximum dilution of the higher manganese water from Well 2. When Well 2 is utilized, the flow is restricted so

that the total iron and manganese concentrations are less than the secondary MCLs when mixed with Wells 1 and 3. Table 6-4 describes the configuration of the pumps and capacities of the Bell Hill Wells.

Bell Hill Well 1 was rehabilitated in 2017 by Charon Drilling of Graham, Washington, including brushing the casing and surging the screen. A video inspection by Robinson Noble, Inc. following the rehabilitation verified that the casing and screen are in good condition. A pump test by Charon Drilling and Robinson Noble, Inc. sustained 1,000 gpm for 24 hours with 29.68 feet of drawdown. Prior to rehabilitation, Bell Hill Well 1 was losing capacity and producing an average of approximately 850 gpm with 32.6 feet of drawdown. After rehabilitation of Bell Hill Well 1, a new high efficiency FlowServe pump with a 100-hp Tesla motor was installed in the well.

TABLE 6-4

Bell Hill Well Pump Description

Installation	Pump Model	Pump Configuration	Rated Capacity	Meter
Bell Hill Well 1	Byron Jackson/Hydro-Flow submersible pump w/Tesla motor	5 stage 100 hp	1,000 gpm (1)	8-Inch Sparling Series 100 propeller meter w/FT 193 transmitter
Bell Hill Well 2	Byron Jackson Type MQ submersible pump w/Type H motor	7 stage 150 hp	1,000 gpm (2)	8-Inch Sparling Series 100 propeller meter w/FT 193 transmitter
Bell Hill Well 3	Byron Jackson Type MQ submersible pump w/Type H motor	7 stage 150 hp	1,000 gpm	8-Inch Sparling Series 100 propeller meter w/FT 193 transmitter

(1) The pump in Bell Hill Well 1 is capable of up to 1,000 gpm, but is throttled to 900 gpm based on the water rights limit.

(2) The pump in Bell Hill Well 2 is capable of up to 1,000 gpm, but is throttled to control the levels of manganese in the blended water from Bell Hills Wells 1, 2, and 3.

Hoffman Hill Wells

Hoffman Hill includes two wells associated with Hoffman Hill Reservoir. As with the Bell Hill wells, the Hoffman Hill wells are chlorinated. On-site generation of sodium hypochlorite is used at this location. Sodium hypochlorite is generated at a concentration of approximately 0.8 percent (8,000 ppm) and injected into the water main prior to entry to the Hoffman Hill Reservoir and the water distribution system.

The operating strategy for the City of DuPont is to maximize the use of the Hoffman Hill Well(s). This is done for three primary reasons: (1) The vertical turbine pump at

Hoffman Hill is more easily maintained than the submersible well pumps utilized at Bell Hill; (2) The Hoffman Hill Reservoir does not require booster pumps to reach most of the intended distribution system; (3) The Hoffman Hill system is less complex (fewer parts to maintain) than the Bell Hill system. Table 6-5 describes the configuration of the pumps and capacities of the Hoffman Hill Wells.

TABLE 6-5

Hoffman Hill Well Pump Description

Installation	Pump Model	Pump Configuration	Rated Capacity	Meter
Hoffman Hill Well 1	Byron Jackson Type MQ Line Shaft Drive	6 stage 200 hp	1,100 gpm	8-Inch Sparling Series 100 propeller meter w/FT 193 transmitter
Hoffman Hill Well 2	Byron Jackson Type MQ Line Shaft Drive	7 stage 200 hp	1,100 gpm	8-Inch Sparling Series 100 propeller meter w/FT 193 transmitter

PREVENTIVE MAINTENANCE PROGRAM

The most cost-effective method for maintaining a water system is to provide a planned preventive maintenance (PM) program. A planned PM program can provide the optimum level of maintenance activities for the least total maintenance cost. The routine maintenance procedures for each system component follow. Example maintenance reporting and monitoring forms are included in Appendix I.

RESERVOIRS

Improperly maintained reservoirs can cause contamination in public water systems. This can be a result of contaminants entering the reservoir through cracks or openings at the vent, overflow or drain screens. Deteriorating hatch covers and vandalism can also compromise reservoir water quality. Poorly designed and maintained reservoirs can hamper the emergency operation of a water system. If reservoir drains are not functioning properly, it may be impossible to purge a contaminant from the system. Written documentation of reservoir maintenance are completed with each inspection and repair, and a copy of the report retained on file.

Periodic Maintenance

The Bell Hill Reservoir was put into service in 1991 and the Hoffman Hill Reservoir in 1999. Both reservoirs were inspected and cleaned in 2009 and in 2015.

It is important that each reservoir is cleaned and inspected for leaks approximately once every 5 years. This involves taking one of the reservoirs out of service and draining it completely, or using a SCUBA diver to inspect the reservoir. Inspect the condition of the interior and exterior paint (in case of a steel reservoir). Observe the extent and depth of any pitting in the reservoir surface. Check the floor and footings for any leaks or cracks. Check the roof of the reservoir for rust and cracking.

Periodic maintenance of the reservoirs includes the following. Vent screens and the integrity of the access hatch and other openings into the reservoir are inspected quarterly. Any opening that may allow the entry of insects or small animals will either be sealed or screened accordingly.

Cleaning and Disinfection

The exterior of the reservoirs will be pressure washed every 5 years to remove the buildup of moss and algae. The interior walls and bottoms of the reservoirs will be cleaned prior to disinfection to remove all dirt and loose material. These interior surfaces should be cleaned by thorough sweeping or scrubbing. The floor and lower walls of the reservoirs may be suitably cleaned from a jet of water from a hose nozzle. Care should be taken to remove any scaffolding, planks, tools, rags or other materials not a part of the structure.

The reservoirs can be adequately disinfected by the direct application of a strong chlorine solution to the inner surfaces of the structure. A 200 ppm available chlorine solution is prepared by dissolving one ounce of HTH (65 percent calcium hypochlorite) to 24 gallons of water, or by diluting one gallon of household bleach in 260 gallons of water. The HTH powder should be made into a paste and then added to the water. This solution can be applied with suitable brushes or spray equipment. The solution should thoroughly coat all exposed surfaces, including the inlet/outlet piping and drain piping, such that the piping should have available chlorine of not less than 10 ppm when filled with water.

The disinfected surface should remain in contact with the strong chlorine solution for at least 30 minutes, after which potable water may be admitted. The inlet/outlet and drain piping should be purged of the 10 ppm chlorinated water, and the reservoir filled to overflow level.

After the disinfection procedure is completed, and before the reservoir is placed in service, water from the full reservoir shall be sampled and tested for coliform organisms. Subject to satisfactory bacteriological testing, the remaining water may be delivered to the distribution system.

Internal Coatings

The internal coating of the welded steel Hoffman Hill Reservoir will have a checkup every 5 to 10 years. The recommended procedure is a photo video inspection of the interior walls. Recoating of the exterior will be considered every 10 to 15 years. Also, this inspection will note the condition of anchor bolts, access ladder, balcony, hatches, riser pipes, safety railings and any other appurtenances.

DISTRIBUTION SYSTEM

Distribution System Valve Maintenance

Good preventative maintenance dictates that all valves be exercised regularly. The City of DuPont currently exercises valves in the system as time permits. The DOH recommends that valves be exercised on a regular (annual or semi-annual) basis to keep them in good working condition and to extend their service life. Records should be kept of valve maintenance. On average, it is estimated that a two man crew can exercise about 30 valves daily. A three man crew can repair or replace about 1.5 valves per day, depending on size and location. For planning purposes, approximately 5 percent of all valves scheduled for testing should be assumed to be in need of repair or replacement. A sample valve maintenance form is included in Appendix I. Valves that do not close tightly should be removed, repaired or replaced. An important aspect of distribution system valve maintenance and record keeping is to ensure distribution valves are completely open. A partially closed valve can seriously reduce peak day operation and fire flow supply.

Hydrant Maintenance

Fire hydrants in the system are flushed periodically. The extent of flushing is usually determined by customer complaints of "dirty water" and after any construction in the immediate area of the hydrant. Hydrants should be inspected regularly and repaired if necessary. On average, a two man crew can flow test and check about eight hydrants daily. It is important to maintain good records of hydrant maintenance. A sample hydrant maintenance form is included in Appendix I. The following recommended procedure for testing fire hydrants has been adapted from the American Water Works Association (AWWA), 1989:

<u>Maintenance Procedure</u>

- Check appearance of hydrants for visible damage or leaks. Check for residue stains on the hydrant.
- Remove an outlet-nozzle cap and sound for leakage.
- Check for presence of water or ice in the hydrant body with a plumb bob.
- Replace the outlet-nozzle cap. Open the hydrant a few turns and allow air to vent. Tighten the cap.

- Open the hydrant fully.
- Check for leakage at flanges and around outlet nozzles, packing, and seals.
- Partially close the hydrant so the drains open and water flows through under pressure for about 10 seconds, flushing the drain outlets.
- Close the hydrant completely.
- Remove an outlet-nozzle cap and attach a fire hose or some other deflector
- Open the hydrant and flush.
- Close the hydrant and check operation of the drain valve.
- Check the main valve for leakage.
- Remove all outlet-nozzle caps, clean and lubricate the threads.
- Check chains and cables for free action.
- Replace caps and tighten.
- Check lubrication of operating nut threads.
- Locate and exercise auxiliary valve. Leave open.

Water Main Flushing

The entire water system should be systematically flushed over an approximate 2-year period. This may be accomplished by using uni-directional flushing procedures to flush approximately four percent of the total system, or about 10,700 lineal feet, each month with scouring velocities.

Flushing Procedures

Before initiating a comprehensive flushing program, staff reviews distribution maps and plans each month's flushing. The following procedures are adapted from guidance provided by the AWWA, 1986:

- Determine the initial clean source of flushing water, sections of mains to be flushed at a given time, the valves to be used in each case, and the order in which the sections will be flushed. Start at or near one of the interties and work outward so as not to disturb sediments in unflushed portions of the system. If possible, schedule work so that each zone can be completed by the end of the day or so that a natural stopping point is reached. If this is not done, fire protection may be severely restricted. Ensure that all flushing water used comes from areas previously cleaned or from mains large enough to resist sediments being stirred up by the flow. Keep the length of main being flushed as short as possible, especially on small pipe. This will minimize pressure losses in the system and the length of time each customer may be delivered dirty water.

- Assure that an adequate amount of flushing water at sufficiently high pressure is available and that it can be disposed of safely. Use a rate of flow required to produce a velocity of 2.5 fps in pipes as follows:

Pipe Diameter, inches	2	3	4	6	8	10	12
Flow Rate for 2.5 fps, gpm	25	56	98	221	392	612	882

- Do not flush a large main supplied by a single smaller main; the volume available is usually inadequate for flushing. Hydrant pressure or pitot gauges are useful in determining flushing rates.

- Prior to flushing, notify the following parties:

  a. Fire department and water utility billing office.

  b. Other utilities, such as gas, electric, and telephone companies, who may have underground facilities in the area.

  c. Those customers who may be inconvenienced by reduced pressure or dirty water, including:

     - Food service establishments.
     - Hospitals, nursing homes, and other health facilities.
     - Customers with special medical needs, such as home dialysis

- Isolate the section to be flushed from the system. Close valves slowly to prevent water hammer.

- Open the fire hydrant or blowoff valve slowly until the desired flow rate is obtained. When flushing from a dry-barrel fire hydrant, use the gate valve upstream of the hydrant for throttling purposes. Alternatively, a 2-1/2- inch gate valve can be installed on the fire hydrant outlet port to control the flow rate. Open the hydrant valve fully to prevent water from escaping into the ground through the fire hydrant barrel drain.

- Direct flushing water away from traffic, pedestrians, and private land. Ensure that flushing water drains to an appropriate storm sewer or watercourse without causing excessive flooding of streets, underground utility vaults, or private property; the utility may be held responsible for any accidents or damage related to the released water.

- Prevent heavily contaminated water from discharging to sensitive natural watercourses. Check with Pierce County Utilities for conditions of disposal to the sanitary sewer. If sewer disposal is unavailable, flushing into a tanker truck may be necessary.

- If water contains chlorine, dechlorinate waters discharging to sensitive natural streams per DOE standards. Following are the steps of dechlorination:

  a. Estimate the rate of flushing. This may be estimated from previous hydrant flow tests or flushing data. If no data is available, open flushing valve just long enough to take a pitot gauge measurement. Calculate the flushing rate using a formula from the AWWA guidance manual.

  b. Determine the chlorine residual in the main using a suitable field test kit.

  c. Prepare a dechlorinating agent solution to be pumped into the flushing discharge using a positive displacement chemical feed pump.

  d. Simultaneously flush main and pump dechlorinating agent into the discharge.

The City has dechlorinating equipment that can dechlorinate the City's potable water at a rate of up to 800 gpm.

- Check system pressure at a nearby hose bib. If pressure is less than 20 psi, throttle the flow through the hydrant. When possible, check system pressures in higher or remote areas of the pressure zone to ensure that pressures do not drop below 20 psi. This may necessitate a two-man crew with radios. It has been the City operations staff's experience that they are able to maintain 40 psi throughout the system during line flushing operations at the recommended flow rates.

- Record the date, time, location, pressure zone, size and length of main; and estimate the flushing flow rate and velocity, and time required to clear. Take samples noting the water's odor, color, turbidity, and the presence of any visible objects or organisms.

- When the flushing water is clear, close the hydrant or blowoff valves slowly.

- Keep records of which valves are opened and closed. If, at the end of a day's work, valves normally open are left closed, alert the fire department.

- Proceed to the next section to be flushed and repeat these procedures.

Dead-End Waterlines

Dead-end waterlines are susceptible to water quality problems and should be flushed regularly to remove stagnant water and debris which may have been deposited. The City has a minimal number of dead-end mains in the system due to development policies that encourage developers to loop water mains when possible. Two dead-end lines currently have metered automatic flush stations. The operations crew flushes the remaining dead end lines on an as-needed basis.

BOOSTER PUMP STATIONS

The City's booster pump stations were constructed in years 1991 (Bell Hill) and 2003 (Hoffman Hill). The City has copies of detailed operation and maintenance manuals for both booster pump stations. Routine maintenance includes keeping records of water meter totalizer, run time meter, and flow rate readings for each pump and pump output pressure to assure they are working properly, and keeping the facilities clean. A copy of the weekly and monthly maintenance checklist forms used by the operators to document the completion of tasks is included in Appendix I.

WELLS

Routine maintenance for the wells includes keeping records of water meter totalizer and flow rate readings for each well, discharge pressures, periodic sounding of the static and pumping water levels in each well, and keeping the facilities clean. Water quality samples must be taken at each well as required by the Washington State Department of Health. Summaries of the total annual production of each well should be maintained. Records should be maintained of the original well construction, any modifications to the well construction, all equipment installed in each well and all service performed on the equipment.

TREATMENT

Routine maintenance for the treatment systems discussed above include record keeping of all chemical feed mix preparation, chemical feed usage, chlorine feed rate, chemical dosage, chlorine generator performance, chlorine residual following treatment, and any changes made.

METERS

Accurate water metering is an essential financial and conservation oriented component of water system infrastructure. A substantial amount of revenue may be lost through inaccurate metering of residential, commercial, and industrial accounts. Without accurate master or source meter readings, the water utility cannot determine lost and unaccounted for water volumes.

Non-Residential and Commercial Meters

Non-residential water meters serve high water use customers including apartment complexes, hotels, schools, and commercial and industrial facilities. Typically, meters 2 inches and larger serve this class of customer. The revenue generated by the non-residential and commercial customer is generally quite significant. For this reason, nonresidential revenue meters require strict routine maintenance and calibration to avoid lost water revenue. AWWA recommends that utilities test meters 2 to 4 inches on a 1- to 3-year basis, and meters 6 inches and larger on a 2- to 5-year basis.

The City provides service to a number of high use commercial and industrial services. The City's goal is to calibrate and provide maintenance as necessary for all meters 2 inches and larger on a biannual basis. It is estimated that a two man crew, on average, can test and conduct maintenance on approximately four meters per day. All 3-inch and larger meters were tested in 2016.

Residential Meters

Residential services are also an important source of revenue for a water utility. AWWA recommends the replacement of residential meters on a 10-year basis. For the purposes of this report, meters 1.5 inches and smaller are considered residential. A suggested schedule for replacement or repair of residential meters is 10 percent annually. From Table 2-2, there are were total of 2,877 1.5-inch or smaller services in 2017. Ten percent is 288 services per year, which is 24 water services replaced per month, which averages a little over one meter per working day.

INVENTORY OF MATERIALS

The City maintains an inventory of parts and supplies including the appurtenances needed to make emergency repairs. At a minimum the materials on hand and included in the inventory include the materials necessary to repair leaks for every size and type of pipe in the system. Spare valves in sizes 16 inch and smaller are included in this inventory.

The City has sufficient supplies to repair pipes in the system from sizes ranging from 2 inches to 16 inches. The City also has a limited supply of spare valves in the larger sizes. Service line and meter connection repair parts are stocked. 24-hour numbers for local suppliers are available for immediate repair needs.

RECOMMENDED SCHEDULE

Table 6-6 is a listing and schedule of normal maintenance and operations activities. The frequency listed is a minimum and the actual frequency is adjusted as necessary to meet system requirements.

TABLE 6-6

Preventive Maintenance Schedule

Frequency	Maintenance Task
Daily	Monitor distribution system and note any suspected leaks
Daily	Inspect wells and record meter readings
Daily	Inspect booster stations and record meter reading
Daily	Log Hoffman Hill on-site chlorine generator performance, dosage rate and changes made
Daily	Log Bell Hill 12 percent chlorine feed system performance, dosage rate and changes made
Monthly	Collect routine coliform samples
Bi-Monthly	Inspect/repair/replace service meters as requested
Bi-Monthly	Cross connection control program tasks
Quarterly	Inspect storage reservoirs
As Needed	Flush dead-end lines
As Needed	Inspect/repair hydrants
As Needed	Exercise/repair valves
As Needed	Uni-directional flushing of all mains
As Needed	Calibrate master meters
Every 5 to 10 Years	Drain and clean reservoirs

The recommended maintenance program described here is based on recommendations of the AWWA, the Washington State Department of Health, and Gray and Osborne's experience with water utilities.

EMERGENCY RESPONSE PROGRAM

Water utilities have the responsibility to provide an adequate quantity and quality of water in a reliable manner at all times. To do this, utilities must reduce or eliminate the effects of natural disasters, accidents, and intentional acts. Most utilities routinely deal with small scale emergency situations. Large scale emergency situations occur far less frequently, but may manifest themselves in the same way as the routine emergencies. If a utility is well prepared to handle routine emergencies, they will also be better prepared to handle more disastrous ones.

Although it is not possible to anticipate all potential disasters affecting the City's water system, formulating procedures to manage and remedy several common emergencies is appropriate.

WATER SYSTEM PERSONNEL EMERGENCY CALL-UP LIST

Table 6-7 is an emergency phone list for the City of DuPont. A copy of this list should be kept updated and visible at City Hall, the Maintenance Shop, and the Fire and Police Departments.

TABLE 6-7

Emergency Phone List

Agency/Group	Contact	Phone Number (1)
Fire/Police	--	911
Public Works Supervisor	Scott Hein	(253) 377-4626 (C)
Senior Operator	Fred Foreman	(253) 377-4971 (C)
Operator	Brandon Clark	(253) 259-0742 (C)
Operator	Larry Clark	(253) 377-4970 (C)
Operator	Justin Moore Paul Jacoby	(253) 377-4978 (C)
Public Works Department		(253) 964-8121
24 Hour Emergency Line (message)		(253) 964-8121
On-Call Phone		(253) 377-5060
DuPont 20500P auto dialer		(253) 964-1798
DuPont SCADA computer (modem-in)		(253) 964-2855
Pipe/Fitting Suppliers	US Filter	(800) 552-7394
Pipe/Fitting Suppliers	H.D. Fowler	(800) 927-5699
Fuel for backup power generators	Puget Sound Petroleum	(253) 539-5959
Joint Base Lewis-McCord: Emergency Intertie Operation		
Washington State Department of Health	NW Regional Office	(253) 395-6750
Washington State Department of Health – Office of Drinking Water	Emergency Hotline Number	(877) 481-4901
Washington Department of Ecology	Emergency Spill Response	(360) 407-6300
State Wide One-Call	Utility Locates	(800) 424-5555/811
Gray & Osborne, Inc.	Seattle Number Olympia Number	(206) 284-0860 (360) 292-7481

(1) (C)=Cellular

PUBLIC NOTIFICATION

If the drinking water supply becomes contaminated, many people can become seriously ill or die. In the event that public notification is required during an emergency, the City maintains a list of both television and radio resources that can be provided with news releases regarding the situation.

State and federal laws require water systems to notify their customers any time a problem with drinking water poses a health risk. Notifying customers (as soon as possible) when their water may not be safe to drink, gives them time to protect themselves and their families. Public notification is mandated by WAC 246-290-71001 in accordance with 40 CFR 141.201 through 208 when the system violates a National Primary Drinking Water Regulation. Public notification timing and distribution requirements depend on the level of threat associated with the violation or event. The following Tiers outline the level of health concern and the notification requirements:

- Tier 1: Acute health concerns require notification within 24 hours.
- Tier 2: Chronic health concerns require notification within 30 days.
- Tier 3: Reporting and monitoring violations require notification within 365 days.

WAC 246-290-Part 7, Subpart A includes the following notification sections: Public notice content, Public notification distribution, Public notification mandatory language, Special public notification requirements, Consumer information, and Public notification special provisions. The City must send a copy of all public notifications and the appropriate Public Notice Certification to the Office of Drinking Water.

Appendix K includes the Suggested Boil Water Notice public notification.

EMERGENCY RESPONSE PROCEDURES

The City provides guidelines for the general assessment of an emergency situation. The first order of business is to assess whether or not an Emergency Operations Center (EOC) should be established. An EOC is probably not necessary under the following conditions:

- A single event has occurred
- A small number of similar events have occurred
- The event has already peaked or ended

Establishing an EOC should be considered under the following conditions:

- Multiple events have occurred
- Several system outages
- Severity or length of event is increasing
- Communications are down or failing
- Event is regional

VULNERABILITY ASSESSMENT

The effect of potential hazards on each major water system component, and on water quality and quantity must be assessed. The purpose in preparing such an assessment is to establish the strengths and weaknesses of each system component. Based upon the assessment of vulnerability, the utility can establish performance goals and acceptable levels of service for the system, given various disaster scenarios.

Following is a discussion of eight potential hazards that could affect the water system components of the City of DuPont water system.

Bacteriological Presence Detection Procedure

Notification procedures for notifying system customers, the local health department, and DOH of water quality emergencies are an important component of an emergency response program. Many public water systems will occasionally detect positive coliform samples, mainly as a result of minor contamination in distribution mains or sample taps, or improper bacteriological sampling procedures. However, under the Revised Total Coliform Rule (RTCR) the persistent detection of coliforms in the water supply will trigger a Level 1 Assessment to determine and eliminate the source of the coliform bacteria, and repeated detection of E. coli bacteria requires issuing a public boil water notice to ensure the health and safety of the water customers. Emergencies such as floods, earthquakes, and other disasters can affect water quality as a result of damage to water system facilities, thereby warranting a boil water order in advance of supply. A suggested boil water notification is included in Appendix K. WAC 246-290-320 requires water utilities to follow specific procedures in the event E. coli bacteria are detected in the water system. The most up-to-date procedures are outlined on the DOH website at https://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/Contaminants/Coliform#WhatColi.

VOC/SOC and Inorganic Chemical/Physical Characteristics Detection Procedures

The procedures to comply with DOH requirements in the event of a volatile organic chemical, synthetic organic chemical or inorganic chemical contamination are no longer posted on the DOH website. If any VOC or SOC is detected in the City's source water the City is advised to contact Mr. Steve Hulsman of the Washington State Department of Health Northwest Drinking Water Office at (253) 395-6777 to discuss appropriate follow-up actions.

Power Failure

Various types of weather have disrupted power in the past, such as wind, lightning, freezing rain, and snowstorms and will likely occur in the future. The City of DuPont has emergency generators at many of their facilities in case of power failure. Also, backup emergency generators are available in the Olympia and Tacoma areas and could be utilized if necessary. No specific arrangements exist for securing an emergency generator although generators may be requested through the Pierce County Department of Emergency Management. Pierce County Emergency Management personnel could arrange for emergency generators from Joint Base Lewis-McChord. The Bell Hill emergency backup generator needs to be refueled at least every 24 hours when running. The City has a verbal agreement with Puget Sound Petroleum [(253) 539-5959] that they will come out after hours. If needed to keep generators fueled. To date, the longest outage was 36 hours.

Severe Earthquake

A severe earthquake could cause damage to the distribution system and water system facilities. In addition, communication and transportation systems may be interrupted.

System Component	Action
Distribution System: Distribution and transmission mains may be broken	Check water system thoroughly for unexplained drops in pressure or reduction in flow rate Isolate broken sections and repair
Reservoirs: Reservoirs may be leaking or structurally damaged	Check reservoirs for structural damage and drain if in danger of bursting Check reservoirs for cracks and leaks, and seal or drain as required

Severe Snowstorm

Heavy snowfall may impede motor vehicle traffic and City personnel may not be able to reach a problem area. Severe snowstorms will require the City's personnel to clear driveways to the well sites, booster stations, and reservoirs but should not otherwise affect the operation of the water system.

System Component	Action
Distribution System: Transportation to monitor system and make repairs will be limited	Plow streets if necessary and if equipment is available Have chains and other snow gear ready for maintenance equipment and vehicles Valve locations should be kept current and made available for maintenance personnel
Booster Stations and Reservoirs: No immediate effect. Snow may prevent access.	Plow streets if necessary and if equipment is available Have chains and other snow gear ready for maintenance equipment and vehicles

Fire

An extensive fire may result in low distribution system pressures and drawing down of the City's reservoirs.

System Component	Action
Transmission and Distribution System: Low pressure may result in the extremities of the distribution system depending on the extent of the fire demand. Potential for backflow events is increased.	Generally no action necessary. If fire is extreme, eliminating other water uses may be appropriate. After fire event take distribution coliform samples to assure contamination has not occurred due to backflows.
Booster Stations: Additional pumps will be called on.	Check to make sure booster pumps are operating.
Reservoirs: Drawdown will occur with increased demand.	Monitor reservoir levels.

High Water and Flooding

Heavy snowmelt and/or rains cause the water level to rise and reach a flood level. High water and flooding should not affect the water system as all facilities are above the floodplain level except for portions of the distribution system. High water or flooding may occur in wetland areas affecting access to the distribution and facility components. Natural wetlands act to reduce flooding.

System Component	Action
Distribution System	Check routine coliform levels throughout distribution system Check water mains which cross flooded wetlands/streams
Booster Stations and Reservoirs: No effect. Reservoirs are above flood level	No action is necessary

Contamination of Water Supply

Contamination of a water supply may result from main breaks or pollution from an isolated source. Continuous chlorination and an adequate detention time are the best protection should a bacteriological contamination occur. A chemical spill within a Wellhead Protection Area, should one occur, presents a less likely but much more serious problem. The best available method of protecting the water supply is through education of the property owners and by limiting access to the greatest extent possible. The City should discuss these potential problems with the owners of property within the Wellhead Protection Area and secure their cooperation on restricting access. Wellhead Protection Area boundaries could be posted with signs, which identify it as a public water supply source.

Distribution System Contamination
• Close valves if possible to isolate source
• Repair and or remove source of pollution
• Flush previously contaminated section and test until free of contamination prior to resumption of use
Reservoir Contamination
• Resample to confirm contamination
• Check distribution system for presence of contamination
• Isolate reservoir from system
• Inspect vent screens, hatches, and piping to identify source of contamination
• If reservoir water is contaminated and therefore considered unsuitable for consumption, drain and clean reservoir.
• Consider disinfecting reservoir if bacteriological standards are exceeded. Follow AWWA Standards.

If it is determined that a water quality problem may exist because of an intentional act, water samples must be taken as soon as possible. The initial sample may indicate the contamination agent and the extent of a possible problem. If the contamination problem is shown to be system related, the results of the water samples will be a major aid in tracking the source of the contamination. Under an emergency recovery operation, water quality decisions will depend on the nature of the problems encountered.

If from the first set of samples, the source of contamination cannot be determined, isolate segments of the system to eliminate loops and flush before taking a set of resamples. By flushing, the wide spread of contamination will be minimized, and the direction of the contamination source for sampling will be easier to determine. The second set of sample sites should reflect those areas that will aid in determining the direction of contamination. Any system-wide loss of pressure requires extensive flushing to clear any contaminants that may have infiltrated the water mains.

In the event that the City believes that a water quality problem exists or a test of a drinking water sample has failed and has been proven to test "positive contamination," the following guidelines should be followed:

1. Lab Sample – The initial sample shall be analyzed for potential contamination.

2. DOH Notification – As soon as possible following determination of contamination notify the Pierce County Department of Health and Washington State Department of Health that an initial water sample has shown a potential contamination.

3. Notify law enforcement: Pierce County Sheriff.

4. Flush the system in all areas of potential contamination.

5. Resample the area of the system that appears from the first samples to be the most likely source of contamination.

6. Continue flushing and re-sampling until samples show contamination has been cleared.

7. Follow public notification requirements as directed by DOH.

Additional details on response to a contamination event can be found in DOH publication 331-583, "Water Main Break Response Protocol for Chlorinated Water Systems."

WATER SHORTAGE RESPONSE PLAN

In 2004 the City of DuPont completed a Water System Emergency Response Plan (ERP) that included Sections that form the City of DuPont's Water Shortage Response Plan. There are three essential elements to a Water Shortage Response Plan: (1) Chain of Command; (2) Communication Procedures; (3) Alternative Water Sources.

CHAIN OF COMMAND

The City Administrator will consult with the Pierce County Department of Emergency Management (DEM) and the County will determine if an emergency occurring within City boundaries is of sufficient magnitude and scope to warrant the County's Emergency Operations Center (EOC) taking the lead. When an emergency is not sufficient in terms of its size or complexity to require the County EOC lead authority, the City will establish its EOC at the fire station and keep the County Department of Emergency Management (DEM) advised as needed as the incident progresses.

On scene management of emergencies is the responsibility of the Incident Commander. Normally, the Incident Commander is the senior person from the City's Fire Department. However, depending on the stage of the incident and the nature of the event, the senior person at the scene from another City Department can assume incident command until properly relieved by a more qualified official. In the case of a water shortage event, the City of DuPont has listed the roles and responsibilities of the following key personnel.

Mayor

The Mayor is the Chief Elected Official and, in coordination with the County DEM, has the responsibility for disaster declaration. The Mayor assigns responsibility for emergency management activities to the City Administrator.

City Administrator

The City Administrator has primary responsibility for emergency management operations and serves as the primary liaison with the Pierce County DEM while directing City activities for emergency planning and operations.

Public Works Director

The City water system is operated by the Public Works Department. In the event of an emergency sufficient to activate the EOC, the City's Public Works Director or designated representative will locate to the EOC. The Public Works EOC representative is responsible for coordination all public works functions with other members of the EOC Operations Group. The Public Works Director also serves as the Public Information Officer for all Public Works matters.

Senior Water System Operator

In the event of an emergency involving the water system, the Public Works Director or Senior Water System Operator will serve as the on-scene Incident Commander until properly relieved by an appropriate Police or Fire Department representative. The Senior Operator is responsible for all aspects of the water system during an emergency, including damage assessments, assessing customer impacts, coordinating with jurisdictional public health agencies and adjacent water utilities, keeping the public and media informed through the City's Public Information Officer, and working with the Public Works Director for design and construction services required for repair and recovery operations.

COMMUNICATION PROCEDURES

The water system personnel emergency call-up list is the cornerstone of an emergency response plan because it provides decision-making personnel with access to resources necessary to cope with the emergency.

Emergency Phone List

The Public Works Department maintains emergency phone number lists for use by City personnel. The first list includes Public Works employee's office, page and cell phone numbers. The second list includes the numbers for emergency services, generator rentals, adjacent utilities, fuel suppliers, parts supplies, safety equipment, pumper trucks, and contractors. The emergency phone numbers are updated frequently as phone numbers change. The emergency contacts and numbers show in Table 6-7 are a short list, current at the time of the writing of this plan, and may be helpful in the event of an emergency until a more complete and up to date list can be obtained from the Public Work Department.

Media Contact

In the event that public notification is required during a water system emergency, the City Administrator acts as the primary spokesperson for the City.

Regulatory Agency Contact

Liaison with the Washington State Department of Health (DOH) is normally the responsibility of the Public Works Supervisor.

ALTERNATIVE WATER SOURCES

Interties

The alternative water source for the City of DuPont is the Joint Base Lewis-McChord intertie discussed previously. The intertie is metered, and is capable of providing up to 1,000 gpm in an emergency situation. Activating the intertie requires opening two valves: One by the City of DuPont and one by JBLM. The intertie feeds from JBLM into the 400-foot pressure zone, controlled by the water level in the Hoffman Hill Reservoir. The hydraulic gradeline of the JBLM system at the intertie is slightly higher than the hydraulic gradeline of the 400-foot pressure zone. There are not any automatic controls at the JBLM intertie, so the water level in the Hoffman Hill Reservoir needs to be monitored when the intertie is open to assure that it does not overflow, and one of the intertie valves may be manually throttled or closed if the Hoffman Hill Reservoir is filled while the intertie is open.

Emergency Water Supplies

Under the County Emergency Management Plan (CEMP), citizens are urged to keep a 72-hour supply of food and water in the event of an emergency. The City will endeavor to supply potable water to support emergency operations within its capabilities.

Transport of Potable Water During Emergencies

If the City obtains potable water by transporting from another source, DOH has issued guidelines for water system utilities that deliver potable water to the public during emergencies. The current guide at the time of this writing is titled, "Truck Transportation Emergency water supply for public use." DOH Publication #331-063 Revised January 2017. This guidance is found at the following website and is summarized below:

https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-063.pdf

It should be noted that from time to time DOH reorganizes their web site. If the above web address does not work, search the DOH Drinking Water web site for publication #331-063.

General

- DOH recommends that someone with water treatment expertise be responsible for the operation and management of trucked potable water.
- The City should contact the regional office of the DOH Division of Drinking Water or the local health department to discuss current requirements and approve the proposed operation.

Truck Container

- The truck container must be contaminant-free and capable of being maintained so that water contamination is prevented.
- If a truck container has been previously used only for potable water and has been protected from possible contamination, it may be used without disinfection and testing for bacteria.
- Truck containers that cannot pass the initial testing criteria after disinfection (i.e., absence of coliforms) shall not be used.
- Trucks previously used for substances other than potable water will be evaluated on an individual basis. Consult with DOH before using trucks that may have previously carried toxic or other non-potable liquids.
- All truck containers must be filled or emptied through an air gap or approved double-check valve assembly, in accordance with WAC 246-290-490.

Initial Truck Disinfection

- The tank and all hoses, pumps, and other equipment used in handling water should be disinfected by filling with water containing at least 50 to 60 parts per million (ppm) of chlorine and then held in the tank for at least 24 hours.

- One gallon of liquid bleach is required in every 1,000 gallons of water to produce 50 to 60 ppm. Bleach should be 5.25 to 6 percent hypochlorite with no additives. Bleach should be added in proportion to the water as the tank is being filled, e.g., add approximately one-half gallon of bleach with each 500 gallons of water.

- The chlorine solution must be flushed from the tank after 24 hours.

- Once the tank is emptied, refill it with the water to be transported, and test for coliform bacteria. If coliforms are present, repeat the process. If the tank cannot be disinfected to eliminate coliforms, it must not be used.

- Water to be transported by tank trucks should contain a free chlorine residual of about 1 part per million (1 ppm or 1 mg/L) at the beginning of the haul.

Source of Water

- The source for emergency trucked water must come from an approved public water supply, unless otherwise approved by DOH.

- Every precaution should be taken to ensure that the water remains potable once it is collected and transported.

Receiving Tank

- The water system's receiving tanks must be inspected to assure that water quality issues will not occur during filling and later distribution to consumers.

- Receiving tanks must be cleaned and disinfected using the same procedures identified for the truck containers (see "Initial Truck Disinfection" guidelines).

- The receiving tanks must be kept secure and protected from contamination throughout the emergency response.

- The customer's receiving tank must be filled through an air gap or an approved double-check valve assembly in accordance with WAC 246-290-490.

Documentation and Record-Keeping

- The receiving water system is responsible for documenting and keeping proper records of the emergency trucked water operation.

- Records should be retained for at least 6 months for review upon request by health agencies, haulers, or the supplying water system.

CROSS-CONNECTION CONTROL PROGRAM

The City of DuPont City Council has passed two ordinances related to cross-connection control; Ordinance 394 on August 9, 1989 and Ordinance 488 on November 9, 1993. Ordinance 394 protects the water supply from contamination; prohibits cross-connections; requires backflow prevention devices; requires landowners or water users receiving its water supply from the City to conform with applicable regulations of the City; and adopts state standards for cross-connection control regulation. It also adopted DOH regulations regarding public water supplies, WAC 246-290-490, Cross-Connection Control and The Accepted Procedure and Practice in Cross-Connection Control Manual – Pacific Northwest Section – American Water Works Association, as they currently exist and as they may be amended in the future. Ordinance 488 regulates the use of water, provides for the sale of the same and provides penalties for violations. Section 7 of that ordinance prohibits cross-connections. Ordinance 394 and pertinent sections of Ordinance 488 are included as Appendix J.

The City's Cross-Connection Control Program establishes minimum standards for the City to protect the public potable water supply from possible contamination due to cross connections. The Program addresses authority, responsibility, requirements, administrative procedures, minimum requirements, record keeping, and standard forms and letters.

From Table 6-1 it can be seen that the City currently employs eight water system operators with Cross-Connection Control Specialist certifications. The City's lead Cross-Connection Control Specialist, Mr. Fred Foreman conducts plan reviews, surveys existing and new customers, and interacts with customers to educate and deal with compliance issues. In addition, the lead Cross-Connection Control Specialist is in charge of record management, investigation of backflow incidents, and backflow testing and repair.

CROSS-CONNECTION CONTROL

Water utility purveyors have the responsibility to protect customers from water contamination due to cross connections, as required by WAC 246-290-490. A cross connection is any physical arrangement where the potable water supply is connected, directly or indirectly, to any liquid, gas, or solid of unknown or unsafe quality that may contaminate the public water supply through backflow. The regulation also requires utilities to develop and implement a comprehensive program to control cross connections within the system. An acceptable cross connection control program addresses the following elements:

- Adoption of an appropriate ordinance, code or rule-of-service for the purveyor to establish the legal authority to implement the cross-connection control program.
- Written procedures for implementing the cross-connection control program.
- Identification of staff position responsible for the organization and implementation of the cross-connection control program.
- Establishment of the qualifications necessary for the personnel working in the cross-connection control program. Detailed procedures for conducting surveys of new and existing facilities to identify all existing and potential cross-connections that could result in contamination of the distribution system.
- Requirements that only approved backflow assemblies shall be installed at locations where cross-connection protection is required.
- A procedure or system requiring testing of all backflow prevention assemblies upon installation, annually, and when moved or repaired.
- An adequate record keeping system.
- Customer information and public education regarding the cross-connection control program.

CITY CROSS-CONNECTION CONTROL PROGRAM

The City of DuPont has established a Cross-Connection Control and Backflow Prevention Program, which is provided in Appendix J.

Priority Service List and Surveillance Program

There are three categories of business establishments that may pose a hazard to the water system. Category one services pose the highest degree of hazard, category two services are considered less hazardous than category one, and category three services are considered the least hazardous. Table 6-8 lists common facilities in each category.

TABLE 6-8

Commercial Hazard Categories

Category 1	Category 2	Category 3
Printers	Blood banks	Food processing facilities
Medical laboratories	Drug rehabilitation centers	Dairy establishments
Chemical companies	Nursing homes and hospitals	Beverage and candy manufacturers
Radiator shops	Photo labs	Massage and health spas
Battery, fertilizer, and paint manufacturers	Doctor, dentist, and veterinarians' offices	Motels and school with pool, spa, or sauna facilities
Pest control businesses	Commercial laundries	
Janitorial companies	Car washes	

New and Existing Cross-Connection Devices

New and existing cross connection devices are catalogued and checked initially by City staff. It is the responsibility of the customer to ensure proper testing of the devices on an annual basis thereafter. A condition for new services is an evaluation by the cross-connection control certified City staff to determine if a backflow device is needed.

Cross-Connection Control Program Record Keeping

A critical program element is the maintenance of accurate records in support of an aggressive cross-connection control program. The City has developed an electronic database for tracking each service with a cross connection device, called XC2. Annual testing results for the devices are recorded in the database. Appendix J includes a Backflow Prevention Program Activity Summary and Compliance Report developed by the City of DuPont for the 2017 reporting period.

Program Scheduling and Personnel Requirements

The City currently maintains a fully implemented cross-connection control program. Table 6-9 lists the required program items that the City oversees.

TABLE 6-9

Cross-Connection Control Program Implementation Schedule

Item	Proposed Date
City staff obtain cross-connection control training	Ongoing
City staff obtain cross-connection control certification	Ongoing
Adopt cross-connection control ordinance	Ongoing
Catalog existing cross-connection control devices	Ongoing
Identify locations of needed cross-connection control devices	Ongoing
Establish program for inspection and receipt of testing results	Ongoing

Cross-Connection Control Program Summary

The City's Cross-Connection Control Program is overseen by a DOH-certified Cross-Connection Control Specialist (CCS) employed by the City. As of the end of 2017, there were 3,151 connections to the City's water system. Of these connections, 1,229 had backflow prevention devices installed. Backflow prevention devices installed include Reduced Pressure Backflow Assemblies (RPBAs), Double Check Valve Assemblies (DCVAs), and Double Check Detector Assemblies (DCDAs). Installed backflow prevention devices are a mix of premises isolation preventers, which are typically installed at or near the location of the service connection to the main, and in-premises preventers, which are typically installed within the customer premises.

As required by WAC 246-290-490, backflow prevention devices are tested on an annual basis by a DOH-certified Backflow Assembly Tester (BAT) and any deficiencies promptly remedied. Of the 1,229 backflow prevention devices connected to the City's water system, 16 of them (or about 1 percent) serve "High Hazard Premises." 1,215 backflow prevention devices in the City were tested in 2017. This represents an approximately 99 percent compliance rate for the annual testing requirement. Improper operation of backflow prevention devices in the City is rare, with approximately 97 percent of tested devices passing inspection in 2017.

The City will continue to implement its Cross Connection Control Program and file the required Cross-Connection Control Activities Annual Summary Report with DOH.

CHAPTER 7

DISTRIBUTION FACILITIES DESIGN AND CONSTRUCTION STANDARDS

OBJECTIVE

The objective of this chapter is to document the City of DuPont's design and construction standards to allow the City to obtain DOH approval to utilize the alternative review process for construction of new and replaced water distribution facilities. Through this process, a purveyor needs no further approval from DOH for distribution project reports, construction documents, or installation of distribution mains, pipe linings, and tank coatings.

This chapter includes the following elements:

- System Standards, Policies and Procedures
- Project Review Procedures
- Design and Construction Standards
- Construction Certification and Follow-up Procedures

The City of DuPont's *Minimum Construction Standards* are located in Appendix L.

SYSTEM STANDARDS, POLICIES AND PROCEDURES

The City of DuPont has developed a *Public Works Standards* document to govern any improvements within the public right-of-way and/or public easements, all improvements required within the proposed right-of-way of new subdivisions and for all improvements intended for maintenance by the City.

PROJECT REVIEW PROCEDURES

Project review procedures vary with the level of complexity of the anticipated project. In general distribution projects identified in a Water System Plan do not require DOH review. Any distribution projects beyond those identified will require DOH review and approval.

The City of DuPont and their consulting engineer will review all distribution improvements and replacements during the design phase. This review will be to ensure the project is in compliance with City's *Water System Standards*. During construction, City personnel will make site visits to ensure the project is constructed in accordance with the specifications. Any changes from the City of DuPont's *Water System Standards*

will require written approval from the City's Public Works Director. A Construction Report for Public Water System Project form shall be submitted to the City's Public Works Director within 60 days of completion and prior to use of the installation. The report shall state that the project was constructed in accordance with the plans and specifications.

Connection of additional water customers will be requested on an on-going basis as the City of DuPont water system grows. Reviews for new customers will be done through the City's water service application process. The City of DuPont Commissioners and Water Manager will be involved in the review process. The City of DuPont Commission's review will be to ensure it is consistent with the planning goals of the City of DuPont and Pierce County. The Water System Manager will review the application for water availability according to the system's Operating Permit, water main extension requirement if any, and to ensure anticipated water use is consistent with water system guidelines. The Water System Manager will review the application for water use and its cross-connection control potential. Prior to the construction of the service connection, the Manager will review the backflow prevention assembly, if one is required, for compliance with Cross-Connection requirements.

DESIGN AND CONSTRUCTION STANDARDS

Design and construction of water facilities are to be in accordance with the design standards in Chapter 3 of this Water System Plan and the City of DuPont *Minimum Construction Standards* that are included in Appendix L. These standards are to be followed for any water facility design and construction project.

CONSTRUCTION CERTIFICATION AND FOLLOW-UP PROCEDURES

During the construction of any water facility, the City of DuPont will have a representative conduct periodic site visits. The representative will report progress and any variance from the construction documents to the consulting engineer responsible for construction management. Additionally, the representative will be present for all pressure tests, disinfection procedures and water quality sampling as defined in the Standards. In the future, the City may want to consider requiring the developer to hire an on-site representative to be present a minimum of four hours per day in addition to the testing and disinfection procedures.

Upon completion of the project, the engineer responsible for construction management will complete a Construction Report for Public Water System Projects form and submit it to DOH. This form is the Engineer's certification that the project was completed in conformance with the plans, specifications and City of DuPont standards. Additionally, the construction manager shall prepare record drawings and submit to the City of DuPont for their project files.

CHAPTER 8

CAPITAL IMPROVEMENT PROGRAM

OBJECTIVE

The objective of this chapter is to present a Capital Improvement Plan in accordance with the requirements of WAC 246-290. Recommended water system improvements and associated costs, along with scheduling information is presented in the following sections according to analyses, identified deficiencies, and recommendations identified in earlier chapters of the Plan. The preferred alternatives for correcting deficiencies are then assessed and prioritized for implementation over 6- and 20-year planning periods. Scheduling and financing of these improvements is further discussed in Chapter 9.

The chapter includes capital improvement projects for treatment, storage, metering, and other identified capital and non-capital improvements.

IDENTIFICATION OF SYSTEM IMPROVEMENTS

Water system improvements are listed by category in the following sections, specific projects are briefly described and assigned project numbers. Estimated costs and timeframe for completions are included in the following sections and summarized in Tables 8-1 and 8-2. Cost estimates are taken from the rate study included in Appendix B.

SOURCE

All water sources for the City of DuPont are currently performing well and no improvements are needed within the 10 year planning horizon. However, the well pumps and motors all have a limited life expectancy. Based on life expectancies and current ages of pumps and motors, it is anticipated that Bell Hill Well 2 pump and motor will be due for replacement in 2022, Bell Hill Well 3 pump and motor will be due for replacement in 2026, and Hoffman Hill Well 1 pump and motor will be due for replacement in 2024. Bell Hill Well 1 and Hoffman Hill Well 2 pumps and motors were recently replaced and it is not anticipated that they will need to be replaced within the 10 year planning horizon. Costs for replacing the Bell Hill Well 1 and Hoffman Hill Well 2 pumps and motors are included in the 20-year planning horizon. Costs for replacement of well pumps and motors are estimated $250,000 each in 2018 dollars.

Project S-1

Replace Bell Hill Well 2 Pump and Motor in 2022, $250,000 in 2018 dollars.

Project S-2

Replace Bell Hill Well 3 Pump and Motor in 2026, $250,000 in 2018 dollars.

Project S-3

Replace Hoffman Hill Well 1 Pump and Motor in 2024, $250,000 in 2018 dollars.

Note that this project also includes installation of a generator plug receptacle in order to simplify connection of the Hoffman Hill Well 1 pump to a portable generator when needed.

Project S-4

Replace Bell Hill Well 1 Pump and Motor in 20-year horizon, $250,000 in 2018 dollars.

Project S-5

Replace Hoffman Hill Well 2 Pump and Motor in 20-year horizon, $250,000 in 2018 dollars.

TREATMENT

Within the 10 year planning horizon, the City plans to replace the chlorination facilities at the Bell Hill wells, reservoir and booster pump station complex with an on-site chlorine generation facility. Possible water treatment projects proposed for the 20-year planning period may include installing iron and manganese treatment at Bell Hill Well 2. Currently blending water from Bell Hill Well 2 with water from Bell Hill Wells 1 and 3 is providing adequate quantity and quality of water from the Bell Hill facilities. However, if in the future more capacity is desired from Bell Hill Well 2, the City may consider adding treatment to Bell Hill Well 2 for removal of iron and manganese.

Within the 20 year planning horizon, the City may opt to install treatment facilities for the removal of Per- and polyfluoroalkyl substances (PFAS) from its water supply. The decision of whether or not to install these facilities will depend on the results of ongoing water-quality testing as well as regulatory and financial factors. A memorandum addressing potential PFAS treatment facilities is included in Appendix N.

Project T-1

Install an on-site sodium hypochlorite generation system at the Bell Hill complex, such as manufactured by MIOX®. This project is scheduled for year 2019 at an estimated cost of $400,000 in 2018 dollars.

Project T-2

Install a treatment system for removal of iron and manganese from water produced by Bell Hill Well 2. This project would be in the 20-year planning horizon at an estimated cost of $700,000 in 2018 dollars.

Project T-3

Install facilities for the removal of PFAS from the City's source water. This project would be in the 20-year planning horizon at an estimated cost of $5,912,000 in 2018 dollars.

STORAGE

As detailed in the storage analysis completed as a part of Chapter 3, the City does not have a storage capacity deficiency for the 20-year planning period of this document. However, an inspection in 2015 of the welded steel Hoffman Hill Reservoir showed that the reservoir coatings were in need of replacement.

Since the Hoffman Hill Reservoir was constructed over 20 years ago, the design should be reviewed to determine improvements needed to meet the current seismic design standards for water storage reservoirs.

The Bell Hill reservoir is also going to need maintenance work. It is currently estimated that approximately $750,000 of unspecified refurbishment work will be needed by the year 2028.

Project ST-1

Re-coat the Hoffman Hill reservoir both inside and outside. This project is scheduled for 2020 at an estimated cost of $1,800,000 in 2018 dollars.

Project ST-2

A review of the as-built drawings for the Hoffman Hill Reservoir show that the reservoir inlet, outlet and drain all have flexible expansion joints to allow for reservoir movement in the event of an earthquake. One item that might be considered in a seismic upgrade is a seismic valve on the reservoir outlet. A seismic valve would close if a seismic event is detected over a specific magnitude to protect against loss of stored water and flooding due to water main breaks that might be caused by a seismic event. Another issue that should be evaluated is reservoir freeboard. During a seismic event a wave can be generated in a reservoir that can damage the roof of the reservoir if there is inadequate freeboard. The reservoir has 2.5 feet of freeboard above the overflow. An analysis is required to determine if this amount of freeboard is adequate, and if not, how this can be mitigated.

Other improvements may also be identified in a seismic evaluation. Because the nature and extent of improvements necessary to meet seismic codes is unknown until a detailed seismic evaluation has been completed it is not possible at this time to state with any certainty how much seismic improvements will cost. Project ST-2 is scheduled for 2022 with an estimated cost of $100,000 in 2018 dollars.

Project ST-3

Refurbish the Bell Hill Reservoir in 2028 at an estimated cost of $750,000 in 2018 dollars.

DISTRIBUTION SYSTEM IMPROVEMENT PROGRAM

Since the majority of the City of DuPont water system has been constructed after 1992, the distribution system is relatively new. Older portions of the system within the DuPont Historic District, and within the El Rancho Madrona area have been replaced within the recent several years. Currently all water distribution system is now relatively new and in good condition. Hydraulic analysis of the distribution system as detailed in Chapter 3 shows that the current distribution system is capable of meeting all current and projected peak hour and fire flow demands.

At this time the City would like to install an advanced metering infrastructure (AMI) system. This would allow the City to more closely monitor water use and water system leakage, and acquire better water usage data for planning purposes.

Project D-1

Install a new advanced metering infrastructure (AMI) system. An in-depth review of AMI options was prepared by Gray & Osborne, Inc. in 2016, titled *Water Meter Radio Read Study*. The report evaluated six different approaches to install AMI systems. Options included retrofitting existing water meters with AMI devices, installing new mechanical meters with built-in AMI capabilities, and installing new solid state water meters with AMI capabilities. Each option was evaluated with options of having a contractor install the AMI meters and with having City staff install the meters. The report concluded that the best option, offering the shortest payback and best present worth is having City staff install all new solid state AMI water meters. The report estimated the cost of this option to be $2,097,000. Updating this cost to 2018 results in an updated estimated cost of $2,200,000 in 2018 dollars. Installation of an AMI system is scheduled to occur in 2021.

PUBLIC WORKS BUILDING

Project PW-1

The City does not currently have a Public Works building, but rather has Public Works facilities scattered among several buildings at various locations. Many of the buildings are old and facilities are inadequate for maintenance of vehicles and equipment, storage of supplies and materials, office and meeting space, and the locations are remote from City Hall. The City plans to construct a new public works facility next to City Hall and consolidate all public works offices, meeting rooms, shops, laboratory, and storage facilities at one site. The estimated cost of the new public works facility is $6 million in 2018 dollars, with $4 million allocated as the water utility portion of the project. The new public works building is planned for construction over a 3-year period from 2019 through 2021.

GENERAL BUDGETARY ITEMS

Project G-1

The City will upgrade their water billing software in conjunction with installation of Project D-1, a new AMI system. Project G-1 is scheduled to occur in year 2025 at an estimated cost of $20,000 in 2018 dollars.

Project G-2

Ongoing implementation of the City's Water Use Efficiency Program. This includes Annual Water Use Efficiency Reports, public outreach including mailers and bill inserts, as well as other forms of informing the public and departments of water conservation measures, at an estimated annual cost of $5,000 annually in 2018 dollars.

Project G-3

Production of the annually required Consumer Confidence Report (CCR). The report includes information on the systems water quality, water system assessment, and contact information for the public, at an estimated cost of $5,000 annually in 2018 dollars.

Project G-4

Update Water System Comprehensive Plan in year 2028 per Department of Health requirements, at an estimated cost of $100,000 in 2018 dollars.

SUMMARY OF RECOMMENDED IMPROVEMENTS

TEN-YEAR CAPITAL AND NON-CAPITAL IMPROVEMENTS

A prioritization schedule and cost summary for the recommended 10- year capital and non-capital improvements is shown in Table 8-1. All costs shown are in 2018 dollars. Figure 8-1 shows all of the site specific capital improvement projects detailed in this section.

LEGEND:

WATER LINES

- 3"
- 4"
- 6"
- 8"
- 10"
- 12"
- 16"

Pipes of diameter smaller than 3" not shown for clarity

- WATER VALVES
- PRV
- WATER WELLS
- DuPONT CITY LIMITS
- PROPERTY LINES
- S-1 CAPITAL PROJECT LOCATION

PUGET SOUND

N

PW-1

HOFFMAN HILL WELL #2

HOFFMAN HILL WELL #1 AND BOOSTER PUMP STATION

HOFFMAN HILL RESERVOIR

S-3

ST-1

ST-2

S-1

S-2

BELL HILL BOOSTER PUMP STATION

T-1

ST-3

WELL #3

WELL #2

BELL HILL RSERVOIR

WELL #1

0 600 1,200 2,400

SCALE: 1"=1,200'

CITY OF DUPONT

WATER SYSTEM PLAN

FIGURE 8-1

CAPITAL IMPROVEMENTS

Gray & Osborne, Inc.

CONSULTING ENGINEERS

L:\DUPONT\116249.00 2018 Water System Plan Update\Figures\Draft Figures\FIG 1-7 Water System Facilities.mxd

TABLE 8-1

Ten-Year Capital and Non-Capital Improvement Projects

Project No.	Project	Estimated Cost in 2018 Dollars	Schedule and Estimated Future Project Cost at 2.2% Annual Inflation Rate									
			2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Capital Improvements												
S-1	Replace Bell Hill Well 2 Pump and Motor	$250,000				$272,800						
S-2	Replace Bell Hill Well 3 Pump and Motor	$250,000								$297,600		
S-3	Replace Hoffman Hill Well 1 Pump and Motor	$250,000						$284,900				
T-1	Install On-Site Generation Sodium Hypochlorite Disinfection at Bell Hill	$400,000	$408,800									
ST-1	Re-Coat Hoffman Hill Reservoir	$1,800,000		$1,880,100								
ST-2	Seismic Retrofit of Hoffman Hill Reservoir	$100,000				$109,100						
ST-3	Bell Hill Reservoir Renovation	$750,000										$932,400
D-1	Install Automatic Meter Reading (AMR) System	$2,200,000			$2,348,500							
PW-1	New Public Works Building/Shop [3]	$4,000,000	$1,022,000	$2,089,000	$1,067,500							
G-1	Billing Software Upgrades	$20,000							$23,300			
Capital Improvements Subtotals		**$10,020,000**	**$1,430,800**	**$3,969,100**	**$3,416,000**	**$381,900**	**$0**	**$284,900**	**$23,300**	**$297,600**	**$0**	**$932,400**
Non- Capital Improvements												
G-2	Water Use Efficiency Program Implementation	Annual	5,200	5,300	5,400	5,500	5,600	5,700	5,900	6,000	6,100	$6,200
G-3	Annual Consumer Confidence Reports	Annual	5,200	5,300	5,400	5,500	5,600	5,700	5,900	6,000	6,100	$6,200
G-4	Water System Plan Update	$100,000					111,500					$124,300
Non-Capital Improvements Subtotals [1]		**$200,000**	**$10,400**	**$10,600**	**$10,800**	**$11,000**	**$122,700**	**$11,400**	**$11,800**	**$12,000**	**$12,200**	**$137,000**
Improvements Totals		**$10,220,000**	**$1,441,200**	**$3,979,700**	**$3,426,800**	**$392,900**	**$122,700**	**$296,300**	**$35,100**	**$309,600**	**$12,200**	**$1,069,400**

(1) Total includes 10 years of annual Water Use Efficiency Program Implementation and 10 years of Annual Consumer Confidence Reports at an estimated $5,000 per year each in 2018 dollars. Projections are in inflated future dollars.

TWENTY-YEAR CAPITAL AND NON-CAPITAL IMPROVEMENTS

Twenty-year capital and non-capital improvements, as discussed in previous sections, are summarized in Table 8-2.

TABLE 8-2

Twenty-Year Capital and Non-Capital Improvements

Project No.	Project	Estimated Cost in 2018 Dollars
Capital Improvements		
T-2	Install Iron and Manganese Treatment System for Bell Hill Well 2	$700,000
T-3	PFAS Treatment Facilities	$5,912,000
S-4	Replace Bell Hill Well 1 Pump and Motor	$250,000
S-5	Replace Hoffman Hill Well 2 Pump and Motor	$250,000
Non-Capital Improvements		
G-2	Water Use Efficiency Program Implementation	$5,000/yr
G-3	Annual Consumer Confidence Reports	$5,000/yr
G-4	Water System Plan Update	$100,000
Total [(1)]		**$7,312,000**

(1) Total includes 10 years of annual Water Use Efficiency Program Implementation and 10 years of Annual Consumer Confidence Reports at an estimated $5,000 per year each in 2018 dollars.

ADDITIONAL RECOMMENDATIONS/ACTION ITEMS

In addition to the capital improvements outlined above, the City plans on implementing the improvements discussed below.

OPERATIONS AND ADMINISTRATIVE RECOMMENDATIONS

Previous chapters of this Plan have specific recommendations for improvements to the operation of the water service utility. Table 8-3 lists actions based on these recommendations.

TABLE 8-3

System Operation and Administrative Action Plan

Action Item/Improvement	Purpose	Reference Page No. (1)
Water quality monitoring	Continue routine sampling per the monitoring plan in Table 3-10	3-17 – 3-21
Wellhead Protection Plan notification letters	Notify Owners of potential sources of contamination and local agencies of the need to protect wellheads	Chapter 5
Calibrate master meters at booster stations and wells	To ensure accurate record keeping of production and unaccounted for water	6-14 – 6-15
Inventory of service meter age	Maintain accurate records to assist in a service meter replacement program	6-14
Cross-connection control program	Continue to fully implement this program to protect the drinking water system from contamination	6-27 – 6-29
Implement as feasible the preventive maintenance tasks from Chapter 6	To improve water quality, customer service, and the life of the existing infrastructure per preventive maintenance recommendations in Chapter 6	6-8 – 6-15

(1) The reference page number in this column relates to further explanation of the rationale for this task within the text of a specific chapter of this Plan.

CHAPTER 9

FINANCIAL ANALYSIS

This chapter contains an analysis of how the City of DuPont can finance the water improvements outlined in the previous chapters. The potential funding sources, the financial status of the water utility, the funding required to pay for the scheduled improvements, and the impact of water improvements on monthly water rates are presented.

FINANCIAL STATUS OF EXISTING WATER UTILITY

CURRENT WATER RATES

Water rates for the City of DuPont, shown in Table 9-1, were adopted by City of DuPont Ordinance No. 17-1025, passed on October 10, 2017. A copy of Ordinance No. 17-1025 is included in Appendix E. The 2 percent rate increases in 2019 and 2020 were made based on a detailed asset management study that included the estimated value of all water system facilities, depreciation costs, life expectancy of system components, replacement costs, and all of the capital improvements identified in Chapter 8 of this water system plan. Copies of pertinent tables from the rate study are included in Appendix B.

The City charges water customers a monthly flat charge based on meter size, which includes 500 CF of water use per month, and a volume charge for all usage over 500 cubic feet per month. Ordinance 17-1025 includes rates for 2015 through 2020, but shows rates remaining constant from years 2015 through 2017, then increasing by approximately 2 percent per year from 2018 through 2020. Table 9-1 shows rates for 2015 through 2020 with rates for 2015 through 2017 in a single column since rates did not change over that time period.

TABLE 9-1

Monthly Water Service Rates [(1)]

Service Type	2015 - 2017	2018	2019	2020
Base Monthly Rates (Includes first 500 CF per Month)				
Single Family	$31.45	$32.08	$32.72	$33.37
Single Family - Lifeline	22.00	22.46	22.90	23.34
Non-Single Family				
3/4-Inch Meter	31.45	32.08	32.72	33.37
1-Inch Meter	52.52	53.57	54.64	55.74
1-1/2-Inch Meter	105.04	107.14	109.29	111.47
2-Inch Meter	167.63	170.98	174.40	177.89
3-Inch Meter	335.55	342.26	349.11	356.09
4-Inch Meter	524.25	534.74	545.43	556.34
6-Inch Meter	1,048.25	1,069.22	1,090.60	1,112.41
8-Inch Meter	1,677.25	1,710.80	1,745.01	1,779.91
10-Inch Meter	3,040.25	3,101.06	3,163.08	3,226.34
Undeveloped Land Charge	8.92	9.10	9.28	9.47
Fire Protection Service	29.55	30.14	30.74	31.26
Temporary Water Use	31.45	32.08	32.72	33.37
Water Hydrant Use	31.45	32.08	32.72	33.37
Excess Volume Rate per 100 CF over 500 CF per Month	2.20	2.24	2.29	2.33

(1) Source: City of DuPont Resolution No. 17-1025.
(2) Non-Single Family customers include commercial, industrial, and irrigation.

UTILITY FEES AND DEVELOPMENT CHARGES

Current Utility Fees and System Development Charges (SDCs), together with other various City service fees, were adopted by the City of DuPont by Resolution No. 17-530 on September 26, 2017. Fees and charges applicable to the water utility are summarized in Table 9-2.

TABLE 9-2

Utility Fees and System Development Charges

Meter Size	Utility Fee	System Development Charge [1]
Single-Family	$100.00	$2,888.00
Non-Single-Family		
3/4-Inch	$400.00	$2,888.00
1-Inch	$440.00	$4,822.96
1-1/2-Inch	$1,445.00	$9,617.04
2-Inch	$1,635.00	$15,393.04
3-Inch	Actual cost + 15%	$30,814.96
4-Inch	Actual cost + 15%	$48,142.96
6-Inch	Actual cost + 15%	$96,257.04
8-Inch	Actual cost + 15%	$154,017.04
10-Inch	Actual cost + 15%	$279,182.96
Hydrant Meter Permit	$50.00	
Hydrant Meter Deposit	$1,000.00	
Water Meter Connection (Contractor Installed)	$245.00	
Water Permit New Meter (Commercial)	$135.00	

(1) SDC does not include B&O Tax.

It should be noted that the portions of the water system were improved by a Local Improvement District in 1988, and therefore cannot be charged the system development charges. Areas that were not part of the 1988 LID include Sequalitchew Village, portions of Fort Lake Business and Technology Park, and an area in the northeast corner of the City designated as Military. As discussed in Chapter 2, the Sequalitchew Village area is not likely to develop until sometime after 2025. Therefore, the City expects collections from development charges to be limited until new areas of the City begin to develop. Areas in which the SDCs apply are shown in Figure 9-1.

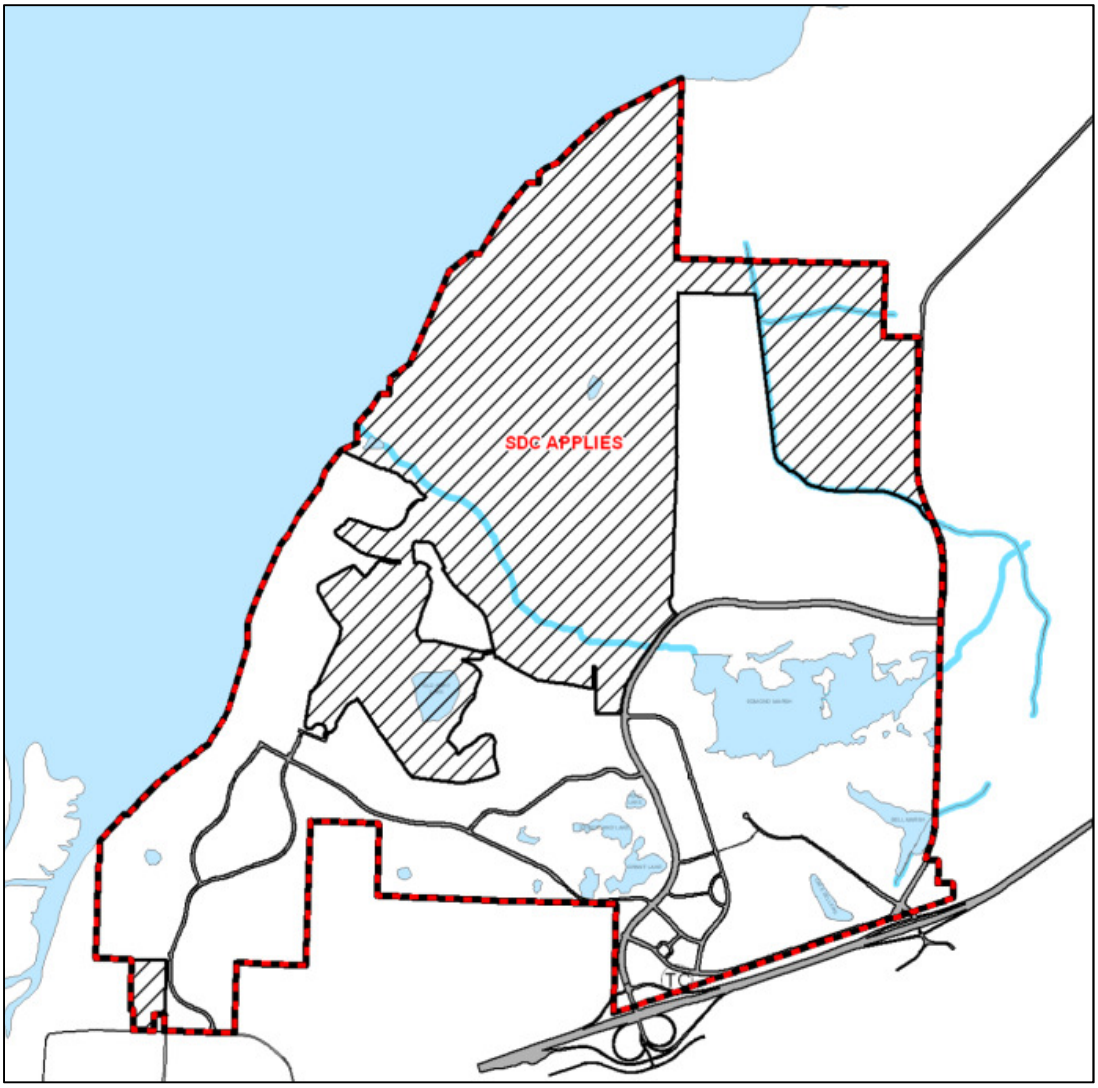


FIGURE 9-1

Area in which System Development Charges Apply

HISTORICAL FINANCIAL OPERATIONS

Historic water revenues and expenditures for the years 2006 through 2009 are summarized in Table 9-3. Expenditures have been relatively constant throughout the previous 4 years of operations. The only significant change from year to year has been in salaries and personnel benefits due to a programmatic increase of an additional full time employee (FTE). Additionally, debt service on the new City of DuPont Civic Center is included. Lastly, the water utility includes a PWTF loan of $1,452,000 with 1.0 percent annual interest and a term of 20 years. The loan funded construction of both water and sewer improvements in the Historic Village area.

In July 2008, the City of DuPont transferred to Pierce County its sewer system and all of its assets and liabilities, including the portion of the loan allocated to the sewer system. 58 percent of the loan was allocated to the sewer system and 42 percent to the water utility.

TABLE 9-3

Historic Revenues and Expenditures

Item	2014	2015	2016	2017	2018 Adopted
Start of Year Cash	**$1,270,690**	**$1,631,836**	**$1,915,282**	**$2,199,705**	**$1,869,651**
Water Sales Revenues	$1,913,704	$2,198,728	$2,483,752	$2,400,765	$2,594,460
Expenditures					
Salaries and Wages	$446,398	$467,174	$510,623	$539,891	$601,152
Overtime	6,837	7,050	7,697	7,987	11,307
Personnel Benefits	195,871	194,063	220,606	248,208	299,841
Uniform Cleaning	448	270	371	418	600
Uniforms	2,499	935	2,292	1,385	1,500
Total Salary, Wages and Benefits	**$652,053**	**$669,492**	**$741,588**	**$797,889**	**$914,400**
Operating Supplies	$38,651	$18,094	$31,231	$20,973	$35,000
Gas, Oil & Fuel	13,088	11,151	9,760	12,442	10,500
Small Tools & Equipment	13,160	21,730	11,902	14,762	15,600
Software	822		611	1,201	1,500
Professional Services	26,416	75,413	83,761	23,026	55,000
Professional Svcs - reimbursable	-	96	168		
Advertising	203	47		424	
Communications	4,708	4,855	5,942	6,073	5,000
Communications - Devices	3,058	3,941	3,611	6,862	4,940
Communications - Postage	5,939	7,013	5,964	6,717	7,500
Travel and Subsistence	-	138	239	37	1,200
Utility Tax	320,186	402,722	409,340	401,771	397,857
Operating Rental & Leases	247	1,310	3,675	1,582	1,675
AWC-RMSA Insurance	33,222	32,673	36,740	37,529	37,268
Utilities	136,989	151,387	155,757	162,811	158,100
Repair & Maintenance	11,366	16,183	30,881	6,173	20,000
Maintenance - Software	5,778	12,567	13,014	12,587	6,200
Maintenance - Vehicles	6,582	4,063	3,164	3,442	4,500
Conference/School/Training	3,226	2,851	2,920	2,718	4,000
Printing/Binding	1,921	893	142	281	1,500
Professional Dues & Subscriptions	6,467	6,751	6,374	6,395	7,000
Recordings	76				
Miscellaneous	1,768	14,490	11,456	19,772	13,500
Intergovernmental Services	31	32	31	38	100
Total Other Expenditures	**$633,905**	**$788,400**	**$826,686**	**$747,618**	**$787,940**

TABLE 9-3 – (continued)

Historic Revenues and Expenditures

Item	2014	2015	2016	2017	2018 Adopted
Buildings & Structures	$-	$-	$-	$-	$-
Capital Improvements	-	169,248	391,464	887,305	480,000
Machinery and Equipment	8,437	27,707	21,493	77,807	-
Debt Svc Principal - Civic Center	39,000	79,300	49,800	42,000	42,600
Principal - Public Works Trust Fund Loan	31,445	31,445	31,445	31,445	31,445
Debt Svc Interest - Civic Center	113,409	78,505	64,595	73,602	72,762
Interest - Public Works Trust Fund Loan	1,887	1,441	1,258	943	629
Equipment Replacement Charges	18,411	18,411	13,694	15,983	28,800
Utility Deposit Refunds	54,011	51,332	57,307	56,226	
Total Capital Outlay	$266,600	$457,389	$631,055	$1,185,312	$656,236
Total Expenditures	**$1,552,558**	**$1,915,282**	**$2,199,329**	**$2,730,819**	**$2,358,576**
Net Revenue	**$361,146**	**$283,446**	**$284,423**	**$(330,054)**	**$235,884**
End of Year Cash	**$1,631,836**	**$1,915,282**	**$2,199,705**	**$1,869,651**	**$2,105,535**

PROJECTED GROWTH

In 2018, the City of DuPont updated its water service utility rates based on a Utility Rate Analysis. The current and projected rates are a result of that analysis as shown in Table 9-1. Projected future revenues are based on future rates and the growth in the number of projected water system customers. Water service area population is projected to grow as presented in Chapter 2.

PROJECTED EXPENSES, REVENUES, AND CAPITAL RESERVES

FUTURE OPERATION AND MAINTENANCE EXPENSES

Future operation and maintenance expenses were projected for the 2018 Utility Rate Analysis based on a review of the historical costs shown in Table 9-3. Projections included all capital and non-capital projects as shown in Table 8-1. A complete printout of the detailed revenue and expense projections is included in Appendix B. Table 9-4 summarizes projected revenues, operating and maintenance expenses, debt payments, and capital and non-capital improvement expenses as determined by the 2018 Utility Rate Analysis.

TABLE 9-4

Projected Revenues and Expenditures

Items	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Beginning Balance of All Water Funds	**$3,862,921**	**$10,427,263**	**$6,540,489**	**$3,209,265**	**$2,918,491**	**$2,823,490**	**$2,425,893**	**$2,177,723**	**$1,919,210**	**$1,966,396**
Water Sales Revenues	2,497,300	2,597,700	2,649,100	2,701,600	2,755,100	2,809,700	2,865,300	2,922,000	2,979,900	3,038,900
Revenue Bonds	8,000,000	-	-	-	-	-	-	-	-	-
Interest Income	10,400	13,600	6,700	3,500	3,500	3,500	3,500	3,900	4,600	4,700
Total Projected Revenues	**$10,507,700**	**$2,611,300**	**$2,655,800**	**$2,705,100**	**$2,758,600**	**$2,813,200**	**$2,868,800**	**$2,925,900**	**$2,984,500**	**$3,043,600**
Operating Expenses	1,748,130	1,796,420	1,838,270	1,881,020	2,008,947	2,192,543	2,359,916	2,152,859	2,203,160	2,254,812
Debt Payments	754,028	721,954	721,954	721,954	721,954	721,954	721,954	721,954	721,954	721,954
Capital Improvement Expenses	1,441,200	3,979,700	3,426,800	392,900	122,700	296,300	35,100	309,600	12,200	1,069,400
Total Expenses	**$3,943,358**	**$6,498,074**	**$5,987,024**	**$2,995,874**	**$2,853,601**	**$3,210,797**	**$3,116,970**	**$3,184,413**	**$2,937,314**	**$4,046,166**
Ending Balance of All Water Funds	**$10,427,263**	**$6,540,489**	**$3,209,265**	**$2,918,491**	**$2,823,490**	**$2,425,893**	**$2,177,723**	**$1,919,210**	**$1,966,396**	**$963,830**

FINANCIAL VIABILITY TEST

The Financial Viability Test, formerly published by the Washington State Department of Health, includes the following criteria:

1. Revenues minus Expenses ≥ 0
2. Operating Cash Reserve ≥ 1/8 x Annual Operating Expenses
3. Emergency Reserves ≥ Cost of the Most Vulnerable Facility
4. Rates ≤ 1-1/2 percent of Median Household Income

The water utility is projected to generate more water sales revenues than operating expenses in each year from 2019 through 2028 as seen by comparing annual operating expenses in Table with annual water sales revenues listed in Table 9-4.

In the DOH Financial Viability Test, operating expenses do not include debt or capital costs. From Table 9-4, the utility's annual operating expenses are projected to range from $1,748,130 to $2,254,812. One eighth of the capital expenses ranges from $218,516 to $281,852. Table 9-4 projects the water utility to have at least $963,830 in reserves in each year and therefore exceeds this requirement.

The third test requires the water utility to have an emergency reserve equal to the cost of replacing the system's most vulnerable facility. Since insurance covers the replacement of above-ground facilities, the most vulnerable facility that the utility would have to fund would be either replacement of a well or repairing a major water main. Table 9-4 projects that the utility will have a minimum of $963,830 in reserves over the 10-year planning projection. Therefore, the utility has the resources available to respond to both a major water main and well repair.

According to the City of DuPont official web site, the current MHI for City of DuPont is $80,435 per year. One and one-half percent of MHI is $100.54 per month. With an average residential water use rate of 231 gallons per connection per day, the average monthly (30-day) use rate is 6,930 gallons per month, which is 926.4 cubic feet (CF) per month. From Table 9-1, the first 500 CF per month is covered by the 2019 base rate of $32.72 per month. The average overage of 426.4 CF per month is billed at the 2019 commodity rate of $2.29 per 100 CF. This makes a residential water bill of $42.48 per month at the average use rate.

RATE STRUCTURE ANALYSIS

The City of DuPont recently adopted new rates for water service and consumption (Resolution No. 17-1025 included in Appendix E). This current rate structure includes a meter charge (or base charge) that is based on meter size and a single commodity charge. At the residential Average Day Demand use rate of 231 gpd per ERU, based on 2019 rates, 77 percent of the average day bill is from the base rate and 23 percent is from the commodity rate. However, this is somewhat misleading because the City's base charge

includes 500 cubic feet per month. At 500 CF or less, 100 percent of the charge is from the base rate. At 1,000 CF, 74 percent of the charge is from the base rate and 26 percent is from the commodity rate. At 2,000 CF, 49 percent of the charge is from the base rate and 51 percent is from the commodity rate.

The Association of Washington Cities (AWC) completed a utility rate survey in 2018. Of 48 municipalities reporting water rates, the maximum, average, and minimum charges for 500 cubic feet (CF), 1,000 CF and 2,000 CF are shown in Table 9-5, together with City of DuPont charges for the same volume based on 2019 rates as shown i9n Table 9-1.

TABLE 9-5

Water Rates Comparison to AWC Utility Rate Study Data

Rate Basis	500 CF	1,000 CF	2,000 CF
Maximum Reported AWC Rate	$79.79	$82.35	$129.85
Average Reported AWC Rate	$31.73	$40.54	$59.36
Minimum Reported AWC Rate	$13.20	$23.70	$30.97
DuPont Rate	$32.72	$44.17	$67.07

City of DuPont rates are a little above average compared to the 48 municipalities that reported rates.

CONCLUSIONS AND RECOMMENDATIONS

The City has completed the process of a water utility rate study that provided a recommendation regarding monthly water rates. Based on the review of the City's water utility finances and planned capital improvements, planned rate increases in combination with planned growth will generate adequate revenue to fund depreciation and planned capital improvements.

ALTERNATIVE CAPITAL IMPROVEMENT FUNDING SOUCES

From, the foregoing analysis, it is anticipated that the City of DuPont will have adequate funds from rates and bond sales to cover water system operations and capital improvements needs for the 10-year planning horizon. However, if for unforeseen circumstances additional funding should be needed, the following are funding sources available for public water utility improvements.

Grants: US Economic Development Administration (US EDA)
US EPA State and Tribal Assistance Grant (STAG)
USDA Rural Development (RD)

Loans:	Public Works Trust Fund (PWTF) Community Economic Revitalization Board (CERB) Drinking Water State Revolving Fund (DWSRF) USDA Rural Development (RD)
Bonds:	Revenue Bonds General Obligation Bonds
Other:	Utility Local Improvement Districts (ULIDs) System Development Charges (SDCs)

APPENDIX A

DOH FORMS

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

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 1
Updated: 04/04/2016
Printed: 5/2/2018
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.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
20500 P	DUPONT WATER SYSTEM CITY OF	PIERCE	A	Comm

6. PRIMARY CONTACT NAME & MAILING ADDRESS	7. OWNER NAME & MAILING ADDRESS	8. OWNER NUMBER: 001618
FREDERICK D. FOREMAN [MANAGER] 1700 CIVIC DRIVE DUPONT, WA 98327	DUPONT, CITY OF FREDERICK D. FOREMAN MANAGER 1700 CIVIC DRIVE DUPONT, WA 98327	
STREET ADDRESS IF DIFFERENT FROM ABOVE	**STREET ADDRESS IF DIFFERENT FROM ABOVE**	
ATTN ADDRESS CITY STATE ZIP	ATTN ADDRESS CITY STATE ZIP	

9. 24 HOUR PRIMARY CONTACT INFORMATION		10. OWNER CONTACT INFORMATION	
Primary Contact Daytime Phone: (253) 912-5381		Owner Daytime Phone: (253) 912-5381	
Primary Contact Mobile/Cell Phone: (253) 377-4971		Owner Mobile/Cell Phone:	
Primary Contact Evening Phone: (xxx)-xxx-xxxx		Owner Evening Phone: (xxx)-xxx-xxxx	
Fax: (253) 964-1455	E-mail: xxxxxxxxxxxxxxxxxxx	Fax: (253) 964-1455	E-mail: xxxxxxxxxxxxxxxxxxx

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

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

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

SMA NAME: _____ SMA Number:

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

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

13. WATER SYSTEM OWNERSHIP (mark only one)

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

14. STORAGE CAPACITY (gallons)

4,000,000

- SEE NEXT PAGE FOR A COMPLETE LIST OF SOURCES -

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
20500 P	DUPONT WATER SYSTEM CITY OF	PIERCE	A	Comm

15	16	17	18										19			20	21						22	23	24			
	SOURCE NAME	INTERTIE	SOURCE CATEGORY										USE				TREATMENT								SOURCE LOCATION			
Source Number	LIST UTILITY'S NAME FOR SOURCE AND WELL TAG ID NUMBER. Example: WELL #1 XYZ456 IF SOURCE IS PURCHASED OR INTERTIED, LIST SELLER'S NAME Example: SEATTLE	INTERTIE SYSTEM ID NUMBER	WELL	WELL FIELD	WELL IN A WELL FIELD	SPRING	SPRING FIELD	SPRING IN SPRINGFIELD	SEA WATER	SURFACE WATER	RANNEY / INF. GALLERY	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
S01	Village Wells 1 & 2			X											X							X		200	NW NW	36	19N	01E
S02	26050Q/JBLM Fort Lewis	26050 Q													X							X		0			00N	00E
S03	Well 1 Bell Hill CAN722		X										X			Y		X					247	1000	NW SW	25	19N	01E
S04	Well 2 Bell Hill CAN756		X										X			Y		X					455	1800	NW SW	25	19N	01E
S05	Well 1 Hoffman Hill AAD989		X										X			Y		X					415	1200	SE NE	33	19N	01E
S06	Well 3 Bell Hill AEF217		X										X			Y		X					282	1000	NW SW	25	19N	01E
S07	Village Well 1 ABM995				X										X	N						X	0	0			00N	00E
S08	Village Well 2 AEF218				X										X	N						X	0	0			00N	00E
S09	Well 2 Hoffman Hill AHM258		X										X			Y		X					295	1200	NW NW	34	19N	01E

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
20500 P	DUPONT WATER SYSTEM CITY OF	PIERCE	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?)		3694	Unspecified
A. Full Time Single Family Residences (Occupied 180 days or more per year)	2768		
B. Part Time Single Family Residences (Occupied less than 180 days per year)	0		
26. MULTI-FAMILY RESIDENTIAL BUILDINGS (How many of the following do you have?)			
A. Apartment Buildings, condos, duplexes, barracks, dorms	0		
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	926		
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.	87	87	
28. TOTAL SERVICE CONNECTIONS		3781	

29. FULL-TIME RESIDENTIAL POPULATION

A. How many residents are served by this system 180 or more days per year? 8199

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?	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
B. How many days per month is water accessible to the public?	31	28	31	30	31	30	31	31	30	31	30	31
32. REGULAR NON-RESIDENTIAL USERS	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**
A. If you have schools, daycares, or businesses connected to your water system, how many students daycare children and/or employees are present each month?	3321	3321	3321	3321	3321	3321	3321	3321	3321	3321	3321	3321
B. How many days per month are they present?	31	28	31	30	31	30	31	31	30	31	30	31
33. ROUTINE COLIFORM SCHEDULE	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**
* Requirement is exception from WAC 246-290	10	10	10	10	10	10	10	10	10	10	10	10

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

35. Reason for Submitting WFI:

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

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

SIGNATURE: _____ **DATE:** _____

PRINT NAME: _____ **TITLE:** _____

APPENDIX B

RATE STUDY

System Valuation and Annual Replacement Costs				
Description	**Installed Cost**	**Annual Depreciation based on 2018 Installation Costs**	**Annual Depreciation based on 2018 Installation Cost less Fire Protection**	**2018 Replacement Costs**
Water Mains (6"-16")	$23,291,465	$357,706	$342,328	$35,770,623
Valves (6"-16")	$2,257,959	$69,374	$59,874	$3,468,700
Hydrants	$2,346,685	$117,973	$58,987	$3,539,200
Meters	$2,347,952	$172,813	$172,813	$3,456,250
Service Connections	$4,024,891	$117,640	$117,640	$5,882,000
Reservoir	$1,833,650	$52,000	$41,080	$3,300,000
Wells	$3,142,217	$212,000	$212,000	$5,300,000
Booster	$1,226,474	$79,207	$79,207	$2,250,000
Total	$40,471,292	$1,178,713	$1,083,928	$62,966,773
Total (less Meters and services)	$34,098,450	$1,005,901	$911,116	$53,628,523

Existing Facilities SDC		
Description	**Installed Cost**	**ERU (2)**
Water Mains (8"-16")	$21,477,700	9508
Valves (8"-16")	$1,519,000	9508
Hydrants (less fire protection)	$1,173,300	9508
Reservoir (1)	$1,442,500	9508
Wells	$0	0
Booster	$1,226,500	9508
Total	$26,839,000	
GFC, existing	$2,823	

(1) 2010 Water Plan, Figure 3-1, indicates .96 million gallons of storage is for Fire Flow. There is a total of 4.5 MG of storage. Therefore 21% is allocated to fire flow and 79% if storage costs is allocated to the water utility.

(2) 2018 Water Plan indicates the estimated number of ERUs at build out is 9,508

	Planned Facilities SDC				
Year	Description	2016 cost	Cost included in SDC	ERU (2)	$/ERU
2019	Recoat Hoffman Hill	1,650,000	660,000	9016	$73.20
2016	Security Wire and Camera System at Water Facilities (Hoffman Hill & Bell Hill)	25,000	25,000	9016	$2.77
2016	Rebuild Well Houses at Bell Hill, W	20,000	20,000	9016	$2.22
2016	Replacement of CL2 Delivery System at Bell Hill With MIOX	50,000	50,000	9016	$5.55
2016	Replace Historic Village Water Mains	$434,480	$434,480	9016	$48.19
2016	Replace Wilmington Drive Water Main	$200,640	$200,640	9016	$22.25
2020	Hoffman Hil Booster Pump Upgrades	$180,000	$180,000	9016	$19.96
2018	Water Meter Radio Read System	1,000,000	$200,000	9016	$22.18
2019	Recoat Bell Hill Reservoir	320,000	320,000	9016	$35.49
			$2,090,120.00		$231.82

Watermains

Description	Type	Quantity	Quantity	Year Constructed	CCI Value in Construction Yr	Sept 2018 CCI Value	Factor	2018 Value	Installed Value	Useful Life	2018 Value Annual Depreciation	Installed Value Annual Depreciation	Remaining Life
Watermain	10-inch	15.36	15	2001	7335.24	11525.00	0.6365	$2,490	$1,585	100	$24.90	$15.85	83
Watermain	10-inch	31.23	31	2007	8618.49	11525.00	0.7478	$5,146	$3,848	100	$51.46	$38.48	89
Watermain	10-inch	72.86	73	2008	8738.00	11525.00	0.7582	$12,118	$9,188	100	$121.18	$91.88	90
Watermain	12-inch	20.68	21	1990	4933.39	11525.00	0.4281	$2,625	$1,124	100	$26.25	$11.24	72
Watermain	12-inch	13093.45	13,093	1992	5320.37	11525.00	0.4616	$1,636,625	$755,527	100	$16,366.25	$7,555.27	74
Watermain	12-inch	7557.49	7,557	1994	5818.49	11525.00	0.5049	$944,625	$476,902	100	$9,446.25	$4,769.02	76
Watermain	12-inch	1295.44	1,295	1996	6086.77	11525.00	0.5281	$161,875	$85,492	100	$1,618.75	$854.92	78
Watermain	12-inch	7271.47	7,271	1997	6639.85	11525.00	0.5761	$908,875	$523,626	100	$9,088.75	$5,236.26	79
Watermain	12-inch	1189.07	1,189	1998	6957.81	11525.00	0.6037	$148,625	$89,727	100	$1,486.25	$897.27	80
Watermain	12-inch	999.62	1,000	1999	7137.17	11525.00	0.6193	$125,000	$77,410	100	$1,250.00	$774.10	81
Watermain	12-inch	639.97	640	2000	7368.25	11525.00	0.6393	$80,000	$51,146	100	$800.00	$511.46	82
Watermain	12-inch	1375.15	1,375	2001	7335.24	11525.00	0.6365	$171,875	$109,392	100	$1,718.75	$1,093.92	83
Watermain	12-inch	1443.98	1,444	2002	7561.98	11525.00	0.6561	$180,500	$118,433	100	$1,805.00	$1,184.33	84
Watermain	12-inch	481.56	482	2003	7866.58	11525.00	0.6826	$60,250	$41,125	100	$602.50	$411.25	85
Watermain	12-inch	1508.03	1,508	2004	8165.36	11525.00	0.7085	$188,500	$133,551	100	$1,885.00	$1,335.51	86
Watermain	12-inch	3006.20	3,006	2005	8458.55	11525.00	0.7339	$375,750	$275,774	100	$3,757.50	$2,757.74	87
Watermain	12-inch	5277.75	5,278	2006	8640.58	11525.00	0.7497	$659,750	$494,631	100	$6,597.50	$4,946.31	88
Watermain	12-inch	5914.90	5,915	2007	8618.49	11525.00	0.7478	$739,375	$552,911	100	$7,393.75	$5,529.11	89
Watermain	12-inch	1292.04	1,292	2008	8738.00	11525.00	0.7582	$161,500	$122,446	100	$1,615.00	$1,224.46	90
Watermain	12-inch	319.50	320	2009	8647.10	11525.00	0.7503	$40,000	$30,012	100	$400.00	$300.12	91
Watermain	12-inch	3979.51	3,980	2010	8645.35	11525.00	0.7501	$497,500	$373,194	100	$4,975.00	$3,731.94	92
Watermain	12-inch	2864.83	2,865	2013	10143.00	11525.00	0.8801	$358,125	$315,181	100	$3,581.25	$3,151.81	95
Watermain	16-inch	9952.25	9,952	1992	5320.37	11525.00	0.4616	$1,313,664	$606,436	100	$13,136.64	$6,064.36	74
Watermain	16-inch	1550.35	1,550	1996	6086.77	11525.00	0.5281	$204,600	$108,057	100	$2,046.00	$1,080.57	78
Watermain	16-inch	4942.14	4,942	1997	6639.85	11525.00	0.5761	$652,344	$375,832	100	$6,523.44	$3,758.32	79
Watermain	16-inch	6771.84	6,772	1998	6957.81	11525.00	0.6037	$893,904	$539,663	100	$8,939.04	$5,396.63	80
Watermain	16-inch	5457.08	5,457	1999	7137.17	11525.00	0.6193	$720,324	$446,080	100	$7,203.24	$4,460.80	81
Watermain	16-inch	54.35	54	2001	7335.24	11525.00	0.6365	$7,128	$4,537	100	$71.28	$45.37	83
Watermain	16-inch	696.23	696	2004	8165.36	11525.00	0.7085	$91,872	$65,090	100	$918.72	$650.90	86
Watermain	16-inch	779.04	779	2005	8458.55	11525.00	0.7339	$102,828	$75,469	100	$1,028.28	$754.69	87
Watermain	16-inch	268.05	268	2007	8618.49	11525.00	0.7478	$35,376	$26,454	100	$353.76	$264.54	89
Watermain	6-inch	5.10	5	1990	4933.39	11525.00	0.4281	$585	$250	100	$5.85	$2.50	72
Watermain	6-inch	1157.78	1,158	1992	5320.37	11525.00	0.4616	$135,486	$62,545	100	$1,354.86	$625.45	74
Watermain	6-inch	1788.33	1,788	1994	5818.49	11525.00	0.5049	$209,196	$105,614	100	$2,091.96	$1,056.14	76
Watermain	6-inch	153.09	153	1995	5924.09	11525.00	0.5140	$17,901	$9,201	100	$179.01	$92.01	77
Watermain	6-inch	1263.82	1,264	1996	6086.77	11525.00	0.5281	$147,888	$78,105	100	$1,478.88	$781.05	78
Watermain	6-inch	3463.97	3,464	1997	6639.85	11525.00	0.5761	$405,288	$233,497	100	$4,052.88	$2,334.97	79
Watermain	6-inch	1925.43	1,925	1998	6957.81	11525.00	0.6037	$225,225	$135,972	100	$2,252.25	$1,359.72	80
Watermain	6-inch	3071.89	3,075	1999	7137.17	11525.00	0.6193	$359,775	$222,800	100	$3,597.75	$2,228.00	81
Watermain	6-inch	62.74	63	2000	7368.25	11525.00	0.6393	$7,371	$4,712	100	$73.71	$47.12	82
Watermain	6-inch	1420.55	1,421	2001	7335.24	11525.00	0.6365	$166,257	$105,816	100	$1,662.57	$1,058.16	83
Watermain	6-inch	767.13	767	2002	7561.98	11525.00	0.6561	$89,739	$58,881	100	$897.39	$588.81	84
Watermain	6-inch	757.67	758	2003	7866.58	11525.00	0.6826	$88,686	$60,534	100	$886.86	$605.34	85
Watermain	6-inch	481.28	481	2004	8165.36	11525.00	0.7085	$56,277	$39,872	100	$562.77	$398.72	86
Watermain	6-inch	726.84	727	2005	8458.55	11525.00	0.7339	$85,059	$62,427	100	$850.59	$624.27	87

Description	Type	Quantity	Quantity	Year Constructed	CCI Value in Construction Yr	Sept 2018 CCI Value	Factor	2018 Value	Installed Value	Useful Life	2018 Value Annual Depreciation	Installed Value Annual Depreciation	Remaining Life
Watermain	6-inch	617.28	617	2006	8640.58	11525.00	0.7497	$72,189	$54,122	100	$721.89	$541.22	88
Watermain	6-inch	769.17	769	2007	8618.49	11525.00	0.7478	$89,973	$67,283	100	$899.73	$672.83	89
Watermain	6-inch	666.28	666	2008	8738.00	11525.00	0.7582	$77,922	$59,079	100	$779.22	$590.79	90
Watermain	6-inch	605.42	605	2009	8647.10	11525.00	0.7503	$70,785	$53,109	100	$707.85	$531.09	91
Watermain	6-inch	536.90	537	2010	8645.35	11525.00	0.7501	$62,829	$47,130	100	$628.29	$471.30	92
Watermain	6-inch	160.55	161	2011	9060.00	11525.00	0.7861	$18,837	$14,808	100	$188.37	$148.08	93
Watermain	6-inch	346.16	346	2013	10143.00	11525.00	0.8801	$40,482	$35,628	100	$404.82	$356.28	95
Watermain	6-inch	190.75	191	2014	10385.00	11525.00	0.9011	$22,347	$20,137	100	$223.47	$201.37	96
Watermain	6-inch	321.00	321	2016	10398.00	11525.00	0.9022	$37,557	$33,884	100	$375.57	$338.84	98
Watermain	8-inch	45.28	45	1990	4933.39	11525.00	0.4281	$6,750	$2,889	100	$67.50	$28.89	72
Watermain	8-inch	5058.57	5,059	1992	5320.37	11525.00	0.4616	$758,850	$350,313	100	$7,588.50	$3,503.13	74
Watermain	8-inch	2398.33	2,398	1994	5818.49	11525.00	0.5049	$359,700	$181,597	100	$3,597.00	$1,815.97	76
Watermain	8-inch	3950.65	3,951	1995	5924.09	11525.00	0.5140	$592,650	$304,634	100	$5,926.50	$3,046.34	77
Watermain	8-inch	4639.82	4,640	1996	6086.77	11525.00	0.5281	$696,000	$367,583	100	$6,960.00	$3,675.83	78
Watermain	8-inch	4454.64	4,455	1997	6639.85	11525.00	0.5761	$668,250	$384,996	100	$6,682.50	$3,849.96	79
Watermain	8-inch	7146.54	7,147	1998	6957.81	11525.00	0.6037	$1,072,050	$647,212	100	$10,720.50	$6,472.12	80
Watermain	8-inch	14755.69	14,756	1999	7137.17	11525.00	0.6193	$2,213,400	$1,370,708	100	$22,134.00	$13,707.08	81
Watermain	8-inch	3355.56	3,356	2000	7368.25	11525.00	0.6393	$503,400	$321,837	100	$5,034.00	$3,218.37	82
Watermain	8-inch	6342.39	6,342	2001	7335.24	11525.00	0.6365	$951,300	$605,468	100	$9,513.00	$6,054.68	83
Watermain	8-inch	8011.73	8,012	2002	7561.98	11525.00	0.6561	$1,201,800	$788,546	100	$12,018.00	$7,885.46	84
Watermain	8-inch	14062.84	14,062	2003	7866.58	11525.00	0.6826	$2,109,300	$1,439,738	100	$21,093.00	$14,397.38	85
Watermain	8-inch	4222.86	4,222	2004	8165.36	11525.00	0.7085	$633,300	$448,687	100	$6,333.00	$4,486.87	86
Watermain	8-inch	18229.35	18,229	2005	8458.55	11525.00	0.7339	$2,734,350	$2,006,823	100	$27,343.50	$20,068.23	87
Watermain	8-inch	11867.48	11,867	2006	8640.58	11525.00	0.7497	$1,780,050	$1,334,548	100	$17,800.50	$13,345.48	88
Watermain	8-inch	9526.88	9,527	2007	8618.49	11525.00	0.7478	$1,429,050	$1,068,655	100	$14,290.50	$10,686.55	89
Watermain	8-inch	9903.11	9,903	2008	8738.00	11525.00	0.7582	$1,485,450	$1,126,235	100	$14,854.50	$11,262.35	90
Watermain	8-inch	3460.38	3,460	2009	8647.10	11525.00	0.7503	$519,000	$389,401	100	$5,190.00	$3,894.01	91
Watermain	8-inch	5666.53	5,667	2010	8645.35	11525.00	0.7501	$850,050	$637,656	100	$8,500.50	$6,376.56	92
Watermain	8-inch	2909.13	2,909	2011	9060.00	11525.00	0.7861	$436,350	$343,022	100	$4,363.50	$3,430.22	93
Watermain	8-inch	1393.40	1,393	2013	10143.00	11525.00	0.8801	$208,950	$183,894	100	$2,089.50	$1,838.94	95
Watermain	8-inch	2096.68	2,097	2014	10385.00	11525.00	0.9011	$314,550	$283,436	100	$3,145.50	$2,834.36	96
Watermain	8-inch	1835.00	1,835	2017	10398.00	11525.00	0.9022	$275,250	$248,334	100	$2,752.50	$2,483.34	99
Total		**254,880**	**254,879**					**$35,770,623**	**$23,291,465**		**$357,706.23**	**$232,914.65**	

Subtotal, 12"-16" **$6,875,221.09**
Subtotal, 8"-16" plus 50% 6" **$21,477,722** **$342,328** **$222,435**
Used 1978 CCI for 1973 as no 1973 data for Seattle is available

Valves

Description	Type	Quantity	Year Constructed	CCI Value in Construction Yr	Sept 2018 CCI Value	Factor	2018 Value	Installed Value	Useful Life	2018 Annual Depreciation (Replacement) Costs	Annual Depreciation (Installation) Costs	Remaining Life
Valve	10-inch	2	2007	8618.49	11525.00	0.74781	$5,800	$4,337	50	$116	$87	39
Valve	10-inch	1	2008	8738.00	11525.00	0.75818	$2,900	$2,199	50	$58	$44	40
Valve	12-inch	22	1992	5320.37	11525.00	0.46164	$88,000	$40,624	50	$1,760	$812	24
Valve	12-inch	25	1994	5818.49	11525.00	0.50486	$100,000	$50,486	50	$2,000	$1,010	26
Valve	12-inch	7	1996	6086.77	11525.00	0.52814	$28,000	$14,788	50	$560	$296	28
Valve	12-inch	10	1997	6639.85	11525.00	0.57613	$40,000	$23,045	50	$800	$461	29
Valve	12-inch	16	1998	6957.81	11525.00	0.60371	$64,000	$38,638	50	$1,280	$773	30
Valve	12-inch	2	1999	7137.17	11525.00	0.61928	$8,000	$4,954	50	$160	$99	31
Valve	12-inch	2	2000	7368.25	11525.00	0.63933	$8,000	$5,115	50	$160	$102	32
Valve	12-inch	3	2001	7335.24	11525.00	0.63646	$12,000	$7,638	50	$240	$153	33
Valve	12-inch	6	2002	7561.98	11525.00	0.65614	$24,000	$15,747	50	$480	$315	34
Valve	12-inch	1	2004	8165.36	11525.00	0.70849	$4,000	$2,834	50	$80	$57	36
Valve	12-inch	5	2005	8458.55	11525.00	0.73393	$20,000	$14,679	50	$400	$294	37
Valve	12-inch	15	2006	8640.58	11525.00	0.74972	$60,000	$44,983	50	$1,200	$900	38
Valve	12-inch	11	2007	8618.49	11525.00	0.74781	$44,000	$32,904	50	$880	$658	39
Valve	12-inch	10	2008	8738.00	11525.00	0.75818	$40,000	$30,327	50	$800	$607	40
Valve	12-inch	2	2009	8647.10	11525.00	0.75029	$8,000	$6,002	50	$160	$120	41
Valve	12-inch	9	2010	8645.35	11525.00	0.75014	$36,000	$27,005	50	$720	$540	42
Valve	12-inch	18	2013	10143.00	11525.00	0.88009	$72,000	$63,366	50	$1,440	$1,267	45
Valve	16-inch	1	1990	4933.39	11525.00	0.42806	$5,800	$2,483	50	$116	$50	22
Valve	16-inch	15	1992	5320.37	11525.00	0.46164	$87,000	$40,162	50	$1,740	$803	24
Valve	16-inch	1	1996	6086.77	11525.00	0.52814	$5,800	$3,063	50	$116	$61	28
Valve	16-inch	1	1997	6639.85	11525.00	0.57613	$5,800	$3,342	50	$116	$67	29
Valve	16-inch	16	1998	6957.81	11525.00	0.60371	$92,800	$56,025	50	$1,856	$1,120	30
Valve	16-inch	6	1999	7137.17	11525.00	0.61928	$34,800	$21,551	50	$696	$431	31
Valve	16-inch	12	2002	7561.98	11525.00	0.65614	$69,600	$45,667	50	$1,392	$913	34
Valve	16-inch	3	2004	8165.36	11525.00	0.70849	$17,400	$12,328	50	$348	$247	36
Valve	16-inch	3	2005	8458.55	11525.00	0.73393	$17,400	$12,770	50	$348	$255	37
Valve	16-inch	2	2007	8618.49	11525.00	0.74781	$11,600	$8,675	50	$232	$173	39
Valve	6-inch	37	1992	5320.37	11525.00	0.46164	$70,300	$32,453	50	$1,406	$649	24
Valve	6-inch	32	1994	5818.49	11525.00	0.50486	$60,800	$30,695	50	$1,216	$614	26
Valve	6-inch	3	1995	5924.09	11525.00	0.51402	$5,700	$2,930	50	$114	$59	27
Valve	6-inch	16	1996	6086.77	11525.00	0.52814	$30,400	$16,055	50	$608	$321	28
Valve	6-inch	21	1997	6639.85	11525.00	0.57613	$39,900	$22,987	50	$798	$460	29
Valve	6-inch	46	1998	6957.81	11525.00	0.60371	$87,400	$52,765	50	$1,748	$1,055	30
Valve	6-inch	48	1999	7137.17	11525.00	0.61928	$91,200	$56,478	50	$1,824	$1,130	31
Valve	6-inch	4	2000	7368.25	11525.00	0.63933	$7,600	$4,859	50	$152	$97	32
Valve	6-inch	12	2001	7335.24	11525.00	0.63646	$22,800	$14,511	50	$456	$290	33
Valve	6-inch	33	2002	7561.98	11525.00	0.65614	$62,700	$41,140	50	$1,254	$823	34
Valve	6-inch	27	2003	7866.58	11525.00	0.68257	$51,300	$35,016	50	$1,026	$700	35
Valve	6-inch	12	2004	8165.36	11525.00	0.70849	$22,800	$16,154	50	$456	$323	36
Valve	6-inch	35	2005	8458.55	11525.00	0.73393	$66,500	$48,806	50	$1,330	$976	37

Description	Type	Quantity	Year Constructed	CCI Value in Construction Yr	Sept 2018 CCI Value	Factor	2018 Value	Installed Value	Useful Life	2018 Annual Depreciation (Replacement) Costs	Annual Depreciation (Installation) Costs	Remaining Life
Valve	6-inch	38	2006	8640.58	11525.00	0.74972	$72,200	$54,130	50	$1,444	$1,083	38
Valve	6-inch	35	2007	8618.49	11525.00	0.74781	$66,500	$49,729	50	$1,330	$995	39
Valve	6-inch	32	2008	8738.00	11525.00	0.75818	$60,800	$46,097	50	$1,216	$922	40
Valve	6-inch	16	2009	8647.10	11525.00	0.75029	$30,400	$22,809	50	$608	$456	41
Valve	6-inch	23	2010	8645.35	11525.00	0.75014	$43,700	$32,781	50	$874	$656	42
Valve	6-inch	8	2011	9060.00	11525.00	0.78612	$15,200	$11,949	50	$304	$239	43
Valve	6-inch	15	2013	10143.00	11525.00	0.88009	$28,500	$25,082	50	$570	$502	45
Valve	6-inch	7	2014	10385.00	11525.00	0.90108	$13,300	$11,984	50	$266	$240	46
Valve	8-inch	1	1990	4933.39	11525.00	0.42806	$2,200	$942	50	$44	$19	22
Valve	8-inch	28	1992	5320.37	11525.00	0.46164	$61,600	$28,437	50	$1,232	$569	24
Valve	8-inch	26	1994	5818.49	11525.00	0.50486	$57,200	$28,878	50	$1,144	$578	26
Valve	8-inch	19	1995	5924.09	11525.00	0.51402	$41,800	$21,486	50	$836	$430	27
Valve	8-inch	23	1996	6086.77	11525.00	0.52814	$50,600	$26,724	50	$1,012	$534	28
Valve	8-inch	22	1997	6639.85	11525.00	0.57613	$48,400	$27,884	50	$968	$558	29
Valve	8-inch	63	1998	6957.81	11525.00	0.60371	$138,600	$83,675	50	$2,772	$1,673	30
Valve	8-inch	46	1999	7137.17	11525.00	0.61928	$101,200	$62,671	50	$2,024	$1,253	31
Valve	8-inch	7	2000	7368.25	11525.00	0.63933	$15,400	$9,846	50	$308	$197	32
Valve	8-inch	14	2001	7335.24	11525.00	0.63646	$30,800	$19,603	50	$616	$392	33
Valve	8-inch	40	2002	7561.98	11525.00	0.65614	$88,000	$57,740	50	$1,760	$1,155	34
Valve	8-inch	55	2003	7866.58	11525.00	0.68257	$121,000	$82,591	50	$2,420	$1,652	35
Valve	8-inch	23	2004	8165.36	11525.00	0.70849	$50,600	$35,850	50	$1,012	$717	36
Valve	8-inch	57	2005	8458.55	11525.00	0.73393	$125,400	$92,035	50	$2,508	$1,841	37
Valve	8-inch	40	2006	8640.58	11525.00	0.74972	$88,000	$65,976	50	$1,760	$1,320	38
Valve	8-inch	41	2007	8618.49	11525.00	0.74781	$90,200	$67,452	50	$1,804	$1,349	39
Valve	8-inch	39	2008	8738.00	11525.00	0.75818	$85,800	$65,052	50	$1,716	$1,301	40
Valve	8-inch	12	2009	8647.10	11525.00	0.75029	$26,400	$19,808	50	$528	$396	41
Valve	8-inch	22	2010	8645.35	11525.00	0.75014	$48,400	$36,307	50	$968	$726	42
Valve	8-inch	11	2011	9060.00	11525.00	0.78612	$24,200	$19,024	50	$484	$380	43
Valve	8-inch	10	2013	10143.00	11525.00	0.88009	$22,000	$19,362	50	$440	$387	45
Valve	8-inch	6	2014	10385.00	11525.00	0.90108	$13,200	$11,894	50	$264	$238	46
Valve	PRV	3	1999	7137.17	11525.00	0.61928	$105,000	$65,024	50	$2,100	$1,300	31
Valve	PRV	2	2001	7335.24	11525.00	0.63646	$70,000	$44,552	50	$1,400	$891	33
Totals:		**1337**					**$3,468,700**	**$2,257,959**		**$69,374**	**$45,159**	
					6" Valves (50% of valves provide fire protection)					**$9,500**		
					Total less fire protection					**$59,874**		

Subtotal, 12"-16" $629,200
Subtotal, 8"-16" $1,518,971
Used 1978 CCI for 1973 as no 1973 data for Seattle is available

Hydrants

Description	Quantity	Year Constructed	CCI Value in Construction Yr	Sept 2018 CCI Value	Factor	2018 Value	Installed Value	Useful Life	2018 Annual Depreciation (Replacement) Costs	Installed Annual Depreciation (Replacement) Costs	Remaining Life
Hydrants	44	1992	5320.37	11525.00	0.46164	$347,600	$160,465	30	$11,587	$5,349	4
Hydrants	24	1994	5818.49	11525.00	0.50486	$189,600	$95,721	30	$6,320	$3,191	6
Hydrants	16	1996	6086.77	11525.00	0.52814	$126,400	$66,756	30	$4,213	$2,225	8
Hydrants	23	1997	6639.85	11525.00	0.57613	$181,700	$104,682	30	$6,057	$3,489	9
Hydrants	12	1998	6957.81	11525.00	0.60371	$94,800	$57,232	30	$3,160	$1,908	10
Hydrants	51	1999	7137.17	11525.00	0.61928	$402,900	$249,507	30	$13,430	$8,317	11
Hydrants	5	2000	7368.25	11525.00	0.63933	$39,500	$25,253	30	$1,317	$842	12
Hydrants	11	2001	7335.24	11525.00	0.63646	$86,900	$55,309	30	$2,897	$1,844	13
Hydrants	25	2002	7561.98	11525.00	0.65614	$197,500	$129,587	30	$6,583	$4,320	14
Hydrants	26	2003	7866.58	11525.00	0.68257	$205,400	$140,199	30	$6,847	$4,673	15
Hydrants	14	2004	8165.36	11525.00	0.70849	$110,600	$78,359	30	$3,687	$2,612	16
Hydrants	48	2005	8458.55	11525.00	0.73393	$379,200	$278,306	30	$12,640	$9,277	17
Hydrants	29	2006	8640.58	11525.00	0.74972	$229,100	$171,762	30	$7,637	$5,725	18
Hydrants	30	2007	8618.49	11525.00	0.74781	$237,000	$177,231	30	$7,900	$5,908	19
Hydrants	28	2008	8738.00	11525.00	0.75818	$221,200	$167,709	30	$7,373	$5,590	20
Hydrants	14	2009	8647.10	11525.00	0.75029	$110,600	$82,982	30	$3,687	$2,766	21
Hydrants	22	2010	8645.35	11525.00	0.75014	$173,800	$130,374	30	$5,793	$4,346	22
Hydrants	9	2011	9060.00	11525.00	0.78612	$71,100	$55,893	30	$2,370	$1,863	23
Hydrants	10	2013	10143.00	11525.00	0.88009	$79,000	$69,527	30	$2,633	$2,318	25
Hydrants	7	2014	10385.00	11525.00	0.90108	$55,300	$49,830	30	$1,843	$1,661	26
Totals:	**448**					**$3,539,200**	**$2,346,685**		**$117,973**	**$78,223**	
						Total - 50% for fire protection			**$58,987**		

Used 1978 CCI for 1973 as no 1973 data for Seattle is available

Water Meters

Description	Type	Quantity		Year Constructed	CCI Value in Construction Yr	Sept 2018 CCI Value	Factor	2018 Value	Installed Value	Useful Life	2018 Annual Depreciation (Replacement) Costs	Installed Annual Depreciation Costs	Remaining Life
Water Meter	1 1/2-inch	1		1996	6086.77	11525.00	0.52814	$1,000	$528	20	$50	$26	-2
Water Meter	1 1/2-inch	1		1998	6957.81	11525.00	0.60371	$1,000	$604	20	$50	$30	0
Water Meter	1 1/2-inch	1		1999	7137.17	11525.00	0.61928	$1,000	$619	20	$50	$31	1
Water Meter	1 1/2-inch	1		2002	7561.98	11525.00	0.65614	$1,000	$656	20	$50	$33	4
Water Meter	1 1/2-inch	2		2004	8165.36	11525.00	0.70849	$2,000	$1,417	20	$100	$71	6
Water Meter	1 1/2-inch	1		2006	8640.58	11525.00	0.74972	$1,000	$750	20	$50	$37	8
Water Meter	1 1/2-inch	9	8	2007	8618.49	11525.00	0.74781	$9,000	$6,730	20	$450	$337	9
Water Meter	1 1/2-inch	1		2009	8647.10	11525.00	0.75029	$1,000	$750	20	$50	$38	11
Water Meter	1 1/2-inch	4		2010	8645.35	11525.00	0.75014	$4,000	$3,001	20	$200	$150	12
Water Meter	1 1/2-inch	3		2013	10143.00	11525.00	0.88009	$3,000	$2,640	20	$150	$132	15
Water Meter	1 1/2-inch	1		2014	10385.00	11525.00	0.90108	$1,000	$901	20	$50	$45	16
Water Meter	1-inch	81		1994	5818.49	11525.00	0.50486	$60,750	$30,670	20	$3,038	$1,534	-4
Water Meter	1-inch	35		1995	5924.09	11525.00	0.51402	$26,250	$13,493	20	$1,313	$675	-3
Water Meter	1-inch	69	71	1996	6086.77	11525.00	0.52814	$51,000	$26,935	20	$2,550	$1,347	-2
Water Meter	1-inch	63		1997	6639.85	11525.00	0.57613	$47,250	$27,222	20	$2,363	$1,361	-1
Water Meter	1-inch	188		1998	6957.81	11525.00	0.60371	$141,000	$85,124	20	$7,050	$4,256	0
Water Meter	1-inch	2	3	1999	7137.17	11525.00	0.61928	$1,500	$929	20	$75	$46	1
Water Meter	1-inch	330	334	1999	7137.17	11525.00	0.61928	$247,500	$153,271	20	$12,375	$7,664	1
Water Meter	1-inch	86		2000	7368.25	11525.00	0.63933	$64,500	$41,237	20	$3,225	$2,062	2
Water Meter	1-inch	3		2001	7335.24	11525.00	0.63646	$2,250	$1,432	20	$113	$72	3
Water Meter	1-inch	120		2002	7561.98	11525.00	0.65614	$90,000	$59,052	20	$4,500	$2,953	4
Water Meter	1-inch	1		2003	7866.58	11525.00	0.68257	$750	$512	20	$38	$26	5
Water Meter	1-inch	296		2003	7866.58	11525.00	0.68257	$222,000	$151,530	20	$11,100	$7,576	5
Water Meter	1-inch	109		2004	8165.36	11525.00	0.70849	$81,750	$57,919	20	$4,088	$2,896	6
Water Meter	1-inch	71		2005	8458.55	11525.00	0.73393	$53,250	$39,082	20	$2,663	$1,954	7
Water Meter	1-inch	230		2005	8458.55	11525.00	0.73393	$172,500	$126,603	20	$8,625	$6,330	7
Water Meter	1-inch	32		2006	8640.58	11525.00	0.74972	$24,000	$17,993	20	$1,200	$900	8
Water Meter	1-inch	254		2006	8640.58	11525.00	0.74972	$190,500	$142,823	20	$9,525	$7,141	8
Water Meter	1-inch	42		2007	8618.49	11525.00	0.74781	$31,500	$23,556	20	$1,575	$1,178	9
Water Meter	1-inch	239		2007	8618.49	11525.00	0.74781	$179,250	$134,045	20	$8,963	$6,702	9
Water Meter	1-inch	2		2008	8738.00	11525.00	0.75818	$1,500	$1,137	20	$75	$57	10
Water Meter	1-inch	120	116	2008	8738.00	11525.00	0.75818	$90,000	$68,236	20	$4,500	$3,412	10
Water Meter	1-inch	5		2009	8647.10	11525.00	0.75029	$3,750	$2,814	20	$188	$141	11
Water Meter	1-inch	30		2010	8645.35	11525.00	0.75014	$22,500	$16,878	20	$1,125	$844	12
Water Meter	1-inch	111		2010	8645.35	11525.00	0.75014	$83,250	$62,449	20	$4,163	$3,122	12
Water Meter	1-inch	33		2011	9060.00	11525.00	0.78612	$24,750	$19,456	20	$1,238	$973	13
Water Meter	1-inch	1		2013	10143.00	11525.00	0.88009	$750	$660	20	$38	$33	15
Water Meter	1-inch	1		2013	10143.00	11525.00	0.88009	$750	$660	20	$38	$33	15
Water Meter	2-inch	4		1996	6086.77	11525.00	0.52814	$9,000	$4,753	20	$450	$238	-2
Water Meter	2-inch	5	4	1998	6957.81	11525.00	0.60371	$11,250	$6,792	20	$563	$340	0
Water Meter	2-inch	4		1999	7137.17	11525.00	0.61928	$9,000	$5,573	20	$450	$279	1
Water Meter	2-inch	127		2001	7335.24	11525.00	0.63646	$285,750	$181,869	20	$14,288	$9,093	3
Water Meter	2-inch	7		2002	7561.98	11525.00	0.65614	$15,750	$10,334	20	$788	$517	4
Water Meter	2-inch	6		2003	7866.58	11525.00	0.68257	$13,500	$9,215	20	$675	$461	5

Description	Type	Quantity		Year Constructed	CCI Value in Construction Yr	Sept 2018 CCI Value	Factor	2018 Value	Installed Value	Useful Life	2018 Annual Depreciation (Replacement) Costs	Installed Annual Depreciation Costs	Remaining Life
Water Meter	2-inch	43		2005	8458.55	11525.00	0.73393	$96,750	$71,008	20	$4,838	$3,550	7
Water Meter	2-inch	22		2006	8640.58	11525.00	0.74972	$49,500	$37,111	20	$2,475	$1,856	8
Water Meter	2-inch	61		2007	8618.49	11525.00	0.74781	$137,250	$102,637	20	$6,863	$5,132	9
Water Meter	2-inch	88		2008	8738.00	11525.00	0.75818	$198,000	$150,119	20	$9,900	$7,506	10
Water Meter	2-inch	3		2009	8647.10	11525.00	0.75029	$6,750	$5,064	20	$338	$253	11
Water Meter	2-inch	9		2010	8645.35	11525.00	0.75014	$20,250	$15,190	20	$1,013	$760	12
Water Meter	2-inch	2		2011	9060.00	11525.00	0.78612	$4,500	$3,538	20	$225	$177	13
Water Meter	2-inch	20		2013	10143.00	11525.00	0.88009	$45,000	$39,604	20	$2,250	$1,980	15
Water Meter	2-inch	1		2014	10385.00	11525.00	0.90108	$2,250	$2,027	20	$113	$101	16
Water Meter	3-inch	4	5	1990	4933.39	11525.00	0.42806	$18,000	$7,705	20	$900	$385	-8
Water Meter	3-inch	3	4	1992	5320.37	11525.00	0.46164	$13,500	$6,232	20	$675	$312	-6
Water Meter	3-inch	1		1994	5818.49	11525.00	0.50486	$4,500	$2,272	20	$225	$114	-4
Water Meter	3-inch	13	15	1996	6086.77	11525.00	0.52814	$58,500	$30,896	20	$2,925	$1,545	-2
Water Meter	3-inch	2	1	1997	6639.85	11525.00	0.57613	$9,000	$5,185	20	$450	$259	-1
Water Meter	3-inch	14	13	1999	7137.17	11525.00	0.61928	$63,000	$39,014	20	$3,150	$1,951	1
Water Meter	3-inch	17		2001	7335.24	11525.00	0.63646	$76,500	$48,689	20	$3,825	$2,434	3
Water Meter	3-inch	41		2002	7561.98	11525.00	0.65614	$184,500	$121,057	20	$9,225	$6,053	4
Water Meter	3-inch	2		2005	8458.55	11525.00	0.73393	$9,000	$6,605	20	$450	$330	7
Water Meter	3-inch	2		2009	8647.10	11525.00	0.75029	$9,000	$6,753	20	$450	$338	11
Water Meter	3-inch	1		2010	8645.35	11525.00	0.75014	$4,500	$3,376	20	$225	$169	12
Water Meter	3-inch	2		2011	9060.00	11525.00	0.78612	$9,000	$7,075	20	$450	$354	13
Water Meter	3-inch	2		2013	10143.00	11525.00	0.88009	$9,000	$7,921	20	$450	$396	15
Water Meter	4-inch	2		2013	10143.00	11525.00	0.88009	$9,000	$7,921	20	$450	$396	15
Water Meter	6-inch	3		1996	6086.77	11525.00	0.52814	$45,000	$23,766	20	$2,250	$1,188	-2
Water Meter	6-inch	6		1998	6957.81	11525.00	0.60371	$90,000	$54,334	20	$4,500	$2,717	0
Water Meter	10-inch	1		1996	6086.77	11525.00	0.52814	$1,000	$528	20	$50	$26	-2
Totals:		**3096**						**$3,456,250**	**$2,347,952**		**$172,813**	**$117,398**	

*.75-inch water meters were counted as 1-inch water meters in this worksheet.

Water Service Connection

Description	Type	Quantity	Year Constructed	CCI Value in Construction Yr	Jan 2018 CCI Value	Factor	2018 Value	Installed Value	Useful Life	2018 Annual Depreciation (Replacement) Costs	Installed Annual Depreciation Costs	Remaining Life
Water Service Connection	1 1/2-inch	1	1996	6086.77	11525.00	0.5281	$2,200	$1,162	50	$44	$23	28
Water Service Connection	1 1/2-inch	1	1998	6957.81	11525.00	0.6037	$2,200	$1,328	50	$44	$27	30
Water Service Connection	1 1/2-inch	1	1999	7137.17	11525.00	0.6193	$2,200	$1,362	50	$44	$27	31
Water Service Connection	1 1/2-inch	1	2002	7561.98	11525.00	0.6561	$2,200	$1,444	50	$44	$29	34
Water Service Connection	1 1/2-inch	2	2004	8165.36	11525.00	0.7085	$4,400	$3,117	50	$88	$62	36
Water Service Connection	1 1/2-inch	1	2006	8640.58	11525.00	0.7497	$2,200	$1,649	50	$44	$33	38
Water Service Connection	1 1/2-inch	9	2007	8618.49	11525.00	0.7478	$19,800	$14,807	50	$396	$296	39
Water Service Connection	1 1/2-inch	1	2009	8647.10	11525.00	0.7503	$2,200	$1,651	50	$44	$33	41
Water Service Connection	1 1/2-inch	4	2010	8645.35	11525.00	0.7501	$8,800	$6,601	50	$176	$132	42
Water Service Connection	1 1/2-inch	3	2013	10143.00	11525.00	0.8801	$6,600	$5,809	50	$132	$116	45
Water Service Connection	1 1/2-inch	1	2014	10385.00	11525.00	0.9011	$2,200	$1,982	50	$44	$40	46
Water Service Connection	1-inch	81	1994	5818.49	11525.00	0.5049	$121,500	$61,340	50	$2,430	$1,227	26
Water Service Connection	1-inch	35	1995	5924.09	11525.00	0.5140	$52,500	$26,986	50	$1,050	$540	27
Water Service Connection	1-inch	68	1996	6086.77	11525.00	0.5281	$102,000	$53,870	50	$2,040	$1,077	28
Water Service Connection	1-inch	63	1997	6639.85	11525.00	0.5761	$94,500	$54,444	50	$1,890	$1,089	29
Water Service Connection	1-inch	188	1998	6957.81	11525.00	0.6037	$282,000	$170,247	50	$5,640	$3,405	30
Water Service Connection	1-inch	2	1999	7137.17	11525.00	0.6193	$3,000	$1,858	50	$60	$37	31
Water Service Connection	1-inch	330	1999	7137.17	11525.00	0.6193	$495,000	$306,542	50	$9,900	$6,131	31
Water Service Connection	1-inch	86	2000	7368.25	11525.00	0.6393	$129,000	$82,473	50	$2,580	$1,649	32
Water Service Connection	1-inch	3	2001	7335.24	11525.00	0.6365	$4,500	$2,864	50	$90	$57	33
Water Service Connection	1-inch	120	2002	7561.98	11525.00	0.6561	$180,000	$118,105	50	$3,600	$2,362	34
Water Service Connection	1-inch	1	2003	7866.58	11525.00	0.6826	$1,500	$1,024	50	$30	$20	35
Water Service Connection	1-inch	296	2003	7866.58	11525.00	0.6826	$444,000	$303,060	50	$8,880	$6,061	35
Water Service Connection	1-inch	109	2004	8165.36	11525.00	0.7085	$163,500	$115,838	50	$3,270	$2,317	36
Water Service Connection	1-inch	71	2005	8458.55	11525.00	0.7339	$106,500	$78,164	50	$2,130	$1,563	37
Water Service Connection	1-inch	230	2005	8458.55	11525.00	0.7339	$345,000	$253,206	50	$6,900	$5,064	37
Water Service Connection	1-inch	32	2006	8640.58	11525.00	0.7497	$48,000	$35,987	50	$960	$720	38
Water Service Connection	1-inch	254	2006	8640.58	11525.00	0.7497	$381,000	$285,645	50	$7,620	$5,713	38
Water Service Connection	1-inch	42	2007	8618.49	11525.00	0.7478	$63,000	$47,112	50	$1,260	$942	39
Water Service Connection	1-inch	239	2007	8618.49	11525.00	0.7478	$358,500	$268,089	50	$7,170	$5,362	39
Water Service Connection	1-inch	2	2008	8738.00	11525.00	0.7582	$3,000	$2,275	50	$60	$45	40
Water Service Connection	1-inch	120	2008	8738.00	11525.00	0.7582	$180,000	$136,472	50	$3,600	$2,729	40
Water Service Connection	1-inch	5	2009	8647.10	11525.00	0.7503	$7,500	$5,627	50	$150	$113	41
Water Service Connection	1-inch	30	2010	8645.35	11525.00	0.7501	$45,000	$33,756	50	$900	$675	42
Water Service Connection	1-inch	111	2010	8645.35	11525.00	0.7501	$166,500	$124,898	50	$3,330	$2,498	42
Water Service Connection	1-inch	33	2011	9060.00	11525.00	0.7861	$49,500	$38,913	50	$990	$778	43
Water Service Connection	1-inch	1	2013	10143.00	11525.00	0.8801	$1,500	$1,320	50	$30	$26	45
Water Service Connection	1-inch	1	2013	10143.00	11525.00	0.8801	$1,500	$1,320	50	$30	$26	45
Water Service Connection	2-inch	2	1996	6086.77	11525.00	0.5281	$7,000	$3,697	50	$140	$74	28
Water Service Connection	2-inch	5	1998	6957.81	11525.00	0.6037	$17,500	$10,565	50	$350	$211	30
Water Service Connection	2-inch	4	1999	7137.17	11525.00	0.6193	$14,000	$8,670	50	$280	$173	31
Water Service Connection	2-inch	127	2001	7335.24	11525.00	0.6365	$444,500	$282,908	50	$8,890	$5,658	33

Description	Type	Quantity	Year Constructed	CCI Value in Construction Yr	Jan 2018 CCI Value	Factor	2018 Value	Installed Value	Useful Life	2018 Annual Depreciation (Replacement) Costs	Installed Annual Depreciation Costs	Remaining Life
Water Service Connection	2-inch	7	2002	7561.98	11525.00	0.6561	$24,500	$16,075	50	$490	$322	34
Water Service Connection	2-inch	6	2003	7866.58	11525.00	0.6826	$21,000	$14,334	50	$420	$287	35
Water Service Connection	2-inch	43	2005	8458.55	11525.00	0.7339	$150,500	$110,457	50	$3,010	$2,209	37
Water Service Connection	2-inch	22	2006	8640.58	11525.00	0.7497	$77,000	$57,729	50	$1,540	$1,155	38
Water Service Connection	2-inch	61	2007	8618.49	11525.00	0.7478	$213,500	$159,657	50	$4,270	$3,193	39
Water Service Connection	2-inch	88	2008	8738.00	11525.00	0.7582	$308,000	$233,519	50	$6,160	$4,670	40
Water Service Connection	2-inch	3	2009	8647.10	11525.00	0.7503	$10,500	$7,878	50	$210	$158	41
Water Service Connection	2-inch	9	2010	8645.35	11525.00	0.7501	$31,500	$23,629	50	$630	$473	42
Water Service Connection	2-inch	2	2011	9060.00	11525.00	0.7861	$7,000	$5,503	50	$140	$110	43
Water Service Connection	2-inch	20	2013	10143.00	11525.00	0.8801	$70,000	$61,606	50	$1,400	$1,232	45
Water Service Connection	2-inch	1	2014	10385.00	11525.00	0.9011	$3,500	$3,154	50	$70	$63	46
Water Service Connection	3-inch	4	1990	4933.39	11525.00	0.4281	$20,000	$8,561	50	$400	$171	22
Water Service Connection	3-inch	3	1992	5320.37	11525.00	0.4616	$15,000	$6,925	50	$300	$138	24
Water Service Connection	3-inch	1	1994	5818.49	11525.00	0.5049	$5,000	$2,524	50	$100	$50	26
Water Service Connection	3-inch	13	1996	6086.77	11525.00	0.5281	$65,000	$34,329	50	$1,300	$687	28
Water Service Connection	3-inch	2	1997	6639.85	11525.00	0.5761	$10,000	$5,761	50	$200	$115	29
Water Service Connection	3-inch	14	1999	7137.17	11525.00	0.6193	$70,000	$43,349	50	$1,400	$867	31
Water Service Connection	3-inch	17	2001	7335.24	11525.00	0.6365	$85,000	$54,099	50	$1,700	$1,082	33
Water Service Connection	3-inch	41	2002	7561.98	11525.00	0.6561	$205,000	$134,508	50	$4,100	$2,690	34
Water Service Connection	3-inch	2	2005	8458.55	11525.00	0.7339	$10,000	$7,339	50	$200	$147	37
Water Service Connection	3-inch	2	2009	8647.10	11525.00	0.7503	$10,000	$7,503	50	$200	$150	41
Water Service Connection	3-inch	1	2010	8645.35	11525.00	0.7501	$5,000	$3,751	50	$100	$75	42
Water Service Connection	3-inch	2	2011	9060.00	11525.00	0.7861	$10,000	$7,861	50	$200	$157	43
Water Service Connection	3-inch	2	2013	10143.00	11525.00	0.8801	$10,000	$8,801	50	$200	$176	45
Water Service Connection	4-inch	2	2013	10143.00	11525.00	0.8801	$10,000	$8,801	50	$200	$176	45
Water Service Connection	6-inch	3	1996	6086.77	11525.00	0.5281	$22,500	$11,883	50	$450	$238	28
Water Service Connection	6-inch	6	1998	6957.81	11525.00	0.6037	$45,000	$27,167	50	$900	$543	30
Totals:		**3093**					**$5,882,000**	**$4,024,891**		**$117,640**	**$80,498**	

*.75-inch water meters were counted as 1-inch water meters in this worksheet.

RESERVOIRS												
RESERVOIRS	Year	Volume, gals	Material	CCI for Construction Year	2018 CCI	Life	2018 Est. Cost	Est cost at time installation	Remaining Life	Installed Annual Depreciation Costs	2018 Annual Depreciation (Replacement) Costs
BELL HILL	1991	1000000	Concrete	5121	11525	50	$ 1,200,000	$533,168	23	$10,663	$24,000
HOFFMAN HILL	1999	3000000	Steel	7137	11525	75	$ 2,100,000	$1,300,482	56	$17,340	$28,000
~~*EL RANCHO MADRONA*~~	~~1968~~	~~38000~~	~~Concrete~~		~~11525~~	~~50~~	ABANDONED ~~in 2010 or 2011~~				
						TOTAL	$ 3,300,000	$1,833,650		$28,003	$52,000

WELLS											
WELLS	Year	Capacity (gpm)		CCI for Construction Year	2018 CCI	Life	2018 Est. Cost	Est cost at time installation	Remaining Life	Installed Annual Depreciation Costs	2018 Annual Depreciation (Replacement) Costs
BELL HILL 1	1995	900		5924	11525	25	$ 1,000,000	$514,021	2	$20,561	$40,000
BELL HILL 2	1995	1000		5924	11525	25	$ 1,100,000	$565,423	2	$22,617	$44,000
~~*EL RANCHO MADRONA*~~	~~1968~~	~~50~~			~~11525~~	~~25~~	ABANDONED ~~in 2010 or 2011~~				
HOFFMAN HILL 1	1997	1100		6640	11525	25	$ 1,100,000	$633,738	4	$25,350	$44,000
BELL HILL 3	1998	1000		6958	11525	25	$ 1,000,000	$603,715	5	$24,149	$40,000
HOFFMAN HILL 2	2009	1100		8647	11525	25	$ 1,100,000	$825,320	16	$33,013	$44,000
						TOTAL	$ 5,300,000	$3,142,217		$125,689	$212,000

BOOSTER STATIONS											
BOOSTER STATIONS	Year	Capacity (gpm)	No. of Pumps	CCI for Construction Year	2018 CCI	Life	2018 Est. Cost	Est cost at time installation	Remaining Life	Installed Annual Depreciation Costs	2018 Annual Depreciation (Replacement) Costs
BELL HILL	1992	4050	6	5320	11525	25	$ 1,400,000	$646,292	-1	$25,852	$56,000
HOFFMAN HILL	2003	1350	4	7867	11525	25	$ 850,000	$580,182	10	$23,207	$23,207
~~*EL RANCHO MADRONA*~~	~~1980~~	~~380~~	2		~~10398~~	~~25~~	ABANDONED ~~in 2010 or 2011~~				
						TOTAL	$ 2,250,000	$1,226,474		$49,059	$79,207

TOTAL

TOTAL $10,850,000

Sampling Stations

Description	Quantity		Year Constructed	CCI Value in Construction Yr	Sept 2018 CCI Value	Factor	2018 Value	Installed Value	Useful Life	2018 Annual Depreciation (Replacement) Costs	Installed Annual Depreciation (Replacement) Costs	Remaining Life
Sampling Station	4		1992	5320.37	11525.00	0.46164	$12,000	$5,540	25	$480	$222	-1
Sampling Station	1		1993	5630.25	11525.00	0.48852	$3,000	$1,466	25	$120	$59	0
Sampling Station	2	3	1997	6639.85	11525.00	0.57613	$6,000	$3,457	25	$240	$138	4
Sampling Station	1		1998	6957.81	11525.00	0.60371	$3,000	$1,811	25	$120	$72	5
Sampling Station	3		2001	7335.24	11525.00	0.63646	$9,000	$5,728	25	$360	$229	8
Sampling Station	2		2003	7866.58	11525.00	0.68257	$6,000	$4,095	25	$240	$164	10
Sampling Station	1		2004	8165.36	11525.00	0.70849	$3,000	$2,125	25	$120	$85	11
Sampling Station	5	4	2005	8458.55	11525.00	0.73393	$15,000	$11,009	25	$600	$440	12
Sampling Station	7		2006	8640.58	11525.00	0.74972	$21,000	$15,744	25	$840	$630	13
Sampling Station	2		2007	8618.49	11525.00	0.74781	$6,000	$4,487	25	$240	$179	14
Sampling Station	1		2008	8738.00	11525.00	0.75818	$3,000	$2,275	25	$120	$91	15
Sampling Station	2		2010	8645.35	11525.00	0.75014	$6,000	$4,501	25	$240	$180	17
Sampling Station	1		2011	9060.00	11525.00	0.78612	$3,000	$2,358	25	$120	$94	18
Sampling Station	2		2013	10143.00	11525.00	0.88009	$6,000	$5,281	25	$240	$211	20
Totals:	**34**						**$102,000**	**$69,876**		**$4,080**	**$2,795**	

CITY OF DuPONT WATER RATE MODEL - 50% DEPRECIATION, 1.98% GROWTH

NAVIGATION	Start of Year Cash	Operational Summary	Operating Revenues	Operating Expenditures	Debt Payments	Capital Reserves	Capital Expenses		Orange-shaded cells denote possible user inputs					
Residential Water Monthly Bill					$32.08	$32.72	$33.38	$33.38	$33.38	$33.38	$33.38	$33.38	$33.38	$33.38
% Rate Increase						2.0%	2.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
General Facility Charge					$500.00	$500.00	$500.00	$500.00	$500.00	$500.00	$500.00	$500.00	$500.00	$500.00
General Facility Charge Increase						$0	$0	$0	$0	$0	$0	$0	$0	$0
New Full Time Employee (FTE)						0	0	0	0	1	0	0	0	0
New Part Time Employee (FTE)						0	0	0	0	0	0	0	0	0
		<-- HISTORICAL BUDGETS			START YEAR	FORECAST YEARS -->								
Accounts	2015	2016	2017	Other Baseline	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
START OF YEAR CASH		1,915,282	1,630,859		3,769,297	3,862,921	3,395,940	3,002,498	2,607,738	2,211,632	1,729,663	1,106,932	360,302	134,639	633,905
OPERATIONAL SUMMARY															
(+) Total Operating Revenues	0	2,483,752	2,400,765		2,448,300	10,497,300	2,597,700	2,649,100	2,701,600	2,755,100	2,809,700	2,865,300	2,922,000	2,979,900	3,038,900
(-) Total Operation & Maintenance and Debt	1,915,282	2,199,328	2,730,819		2,358,576	2,502,160	2,518,380	2,560,230	2,602,980	2,730,910	2,914,500	3,081,880	2,874,820	2,925,120	2,976,770
(-) Depreciation Transfer					0	465,521	475,762	486,229	496,926	507,859	519,032	530,450	542,120	554,047	566,236
(-) Transfer to Capital Reserves					0	8,000,000	0	0	0	0	0	0	0	0	0
(+) Interest Earned					3,900	3,400	3,000	2,600	2,200	1,700	1,100	400	0	0	0
END OF YEAR CASH	1,915,282	1,630,859	1,960,914		3,862,921	3,395,940	3,002,498	2,607,738	2,211,632	1,729,663	1,106,932	360,302	134,639	633,905	1,138,011
					TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE
OPERATING REVENUES															
Water Service					2,448,300	2,497,300	2,597,700	2,649,100	2,701,600	2,755,100	2,809,700	2,865,300	2,922,000	2,979,900	3,038,900
Water Turn-On Fee					0	0	0	0	0	0	0	0	0	0	0
Permits/Inspection Fees					0	0	0	0	0	0	0	0	0	0	0
Hydrant Use					0	0	0	0	0	0	0	0	0	0	0
Other Misc. Revenues-Penalties					0	0	0	0	0	0	0	0	0	0	0
Fire Protection Transfer from General Fund					0	0	0	0	0	0	0	0	0	0	0
Investment					0	0	0	0	0	0	0	0	0	0	0
Other Revenues															
Misc. Revenue					0	0	0	0	0	0	0	0	0	0	0
DOE Grant					0	0	0	0	0	0	0	0	0	0	0
Grant					0	0	0	0	0	0	0	0	0	0	0
Revenue Bond Income					0	8,000,000	0	0	0	0	0	0	0	0	0
TOTAL REVENUES	0	2,483,752	2,400,765		2,448,300	10,497,300	2,597,700	2,649,100	2,701,600	2,755,100	2,809,700	2,865,300	2,922,000	2,979,900	3,038,900

Accounts	2015	2016	2017	Other Baseline	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
OPERATING EXPENDITURES															
O&M Expenses															
11-00 Salary & Wages	467,174	510,623	539,881		601,152	614,380	627,900	641,720	655,840	670,270	685,020	700,100	715,510	731,260	747,350
12-00 Overtime	7,050	7,697	7,987		11,307	11,560	11,820	12,090	12,360	12,640	12,920	13,210	13,510	13,810	14,120
21-00 Benefits	194,063	220,606	248,208		299,841	276,470	282,560	288,780	295,130	327,720	334,930	342,300	349,830	357,530	365,400
21-01 Tuition Reimbursement	0	0	0		0	0	0	0	0	0	0	0	0	0	0
New Full Time Employee (FTE)						0	0	0	0	57,977	59,253	60,555	61,889	63,250	64,642
New Part Time Employee (FTE)						0	0	0	0	0	0	0	0	0	0
26-00 Uniform Cleaning	270	371	418		600	620	640	660	680	700	720	740	760	780	800
27-00 Uniforms	935	2,292	1,385		1,500	1,540	1,580	1,620	1,660	1,700	1,740	1,780	1,820	1,870	1,920
31-00 Operating Supplies	18,094	31,231	20,973		35,000	35,770	36,560	37,370	38,200	39,050	39,910	40,790	41,690	42,610	43,550
32-00 Gas, Oil, Fuel	11,151	9,760	12,442		10,500	10,740	10,980	11,230	11,480	11,740	12,000	12,270	12,540	12,820	13,110
35-00 Small Tools and Equipment	21,730	11,902	14,762		15,600	15,950	16,310	16,670	17,040	17,420	17,810	18,210	18,620	19,030	19,450
39-00 Software	0	611	1,201		1,500	1,540	1,580	1,620	1,660	1,700	1,740	1,780	1,820	1,870	1,920
41-00PS	75,413	83,761	23,026		55,000	56,210	57,450	58,720	60,020	61,350	62,700	64,080	65,490	66,940	68,420
41-01PS Reimbursable	96	168	0		0	0	0	0	0	0	0	0	0	0	0
41-03 Advertising	47	0	424		0	0	0	0	0	0	0	0	0	0	0
42-00 Communications	4,855	5,942	6,073		5,000	5,110	5,230	5,350	5,470	5,600	5,730	5,860	5,990	6,130	6,270
42-01 Communications - other	3,941	3,611	6,862		4,940	5,050	5,170	5,290	5,410	5,530	5,660	5,790	5,920	6,060	6,200
42-01 Communications- postage	7,013	5,964	6,717		7,500	7,670	7,840	8,020	8,200	8,390	8,580	8,770	8,970	9,170	9,380
43-00 Travel & Subsistence	138	239	37		1,200	1,230	1,260	1,290	1,320	1,350	1,380	1,420	1,460	1,500	1,540
44-00 Utility Tax	402,722	409,340	401,771		397,857	412,600	428,500	437,100	445,800	454,700	463,800	473,100	482,600	492,200	502,100
45-00 Operating Rental & Leases	1,310	3,675	1,582		1,675	1,720	1,760	1,800	1,840	1,890	1,940	1,990	2,040	2,090	2,140
46-00 AWC-RMSA Insurance	32,673	36,740	37,529		37,268	38,020	38,790	39,570	40,370	41,180	42,010	42,860	43,720	44,600	45,500
47-00 Utilities	151,387	155,757	162,811		158,100	164,430	171,010	177,860	184,980	192,380	200,080	208,090	216,420	225,080	234,090
48-00 Repairs and Maintenance	16,183	30,881	6,173		20,000	20,440	20,890	21,350	21,820	22,310	22,810	23,320	23,840	24,370	24,910
48-01 Maintenance -Software	12,567	13,014	12,587		6,200	6,340	6,480	6,630	6,780	6,930	7,090	7,250	7,410	7,580	7,750
48-02 Maintenance - Vehicles	4,063	3,164	3,442		4,500	4,600	4,710	4,820	4,930	5,040	5,160	5,280	5,400	5,520	5,650
49-01 Conference, School/Training	2,851	2,920	2,716		4,000	4,090	4,180	4,280	4,380	4,480	4,580	4,690	4,800	4,910	5,020
49-02 Printing/Binding	893	142	281		1,500	1,540	1,580	1,620	1,660	1,700	1,740	1,780	1,820	1,870	1,920
49-03 Professions Dues & Subscriptions (includes permits)	6,751	6,374	6,395		7,000	7,160	7,320	7,490	7,660	7,830	8,010	8,190	8,380	8,570	8,760
49-05 Miscellaneous	14,490	11,456	19,772		13,500	13,800	14,110	14,430	14,750	15,080	15,420	15,760	16,110	16,470	16,840
51-00 Intergovernment Services	32	31	38		100	110	120	130	140	150	160	170	180	190	200
63-00 Capital Improvements	169,248	391,464	887,305		480,000	0	0	0	0	0	0	0	0	0	0
64-00 Machinery and Equipment	27,707	21,493	77,807		0	0	0	0	0	0	0	0	0	0	0
John Deere 410G					0	0	0	0	0	0	136,800	0	0	0	0
Vactor HXX Paradigm					0	0	0	0	0	0	0	256,200	0	0	0
91-00 Equipment Replacement Reserve Transfer	18,411	13,594	15,983		28,800	29,440	30,090	30,760	31,440	32,140	32,850	33,580	34,320	35,080	35,860
Additional Expenses	0	0	0		0	0	0	0	0	0	0	0	0	0	0
Utility Deposit Refunds	51,332	57,307	56,226		0	0	0	0	0	0	0	0	0	0	0
OPERATING EXPENDITURES SUBTOTAL	**1,724,591**	**2,052,232**	**2,582,829**		**2,211,140**	**1,748,130**	**1,796,420**	**1,838,270**	**1,881,020**	**2,008,947**	**2,192,543**	**2,359,916**	**2,152,859**	**2,203,160**	**2,254,812**

Accounts	2015	2016	2017	Other Baseline	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
DEBT PAYMENTS															
Civic Center Principal 2018					42,600	0	0	0	0	0	0	0	0	0	0
PWTF Principal					31,445	31,445	0	0	0	0	0	0	0	0	0
Civic Center Interest 2018					72,762	0	0	0	0	0	0	0	0	0	0
PWTF Interest					629	629	0	0	0	0	0	0	0	0	0
Revenue Bond Debt					0	588,654	588,654	588,654	588,654	588,654	588,654	588,654	588,654	588,654	588,654
Civic Center Principal and Interest 2019					0	133,300	133,300	133,300	133,300	133,300	133,300	133,300	133,300	133,300	133,300
TOTAL DEBT PAYMENTS	190,691	147,097	147,990		147,436	754,028	721,954	721,954	721,954	721,954	721,954	721,954	721,954	721,954	721,954
TOTAL O&M EXPENSES	1,915,282	2,199,329	2,730,819		2,358,576	2,502,160	2,518,380	2,560,230	2,602,980	2,730,910	2,914,500	3,081,880	2,874,820	2,925,120	2,976,770
CAPITAL RESERVES															
Start of Year Reserve Balance		0	0		0	0	7,031,321	3,537,983	601,513	706,839	1,093,798	1,318,929	1,817,379	2,053,800	2,600,246
(+) Capital Reserve Transfer					0	8,000,000	0	0	0	0	0	0	0	0	0
(+) Depreciation Transfer					0	465,521	475,762	486,229	496,926	507,859	519,032	530,450	542,120	554,047	566,236
(+) Connection Charges					0	0	0	0	0	0	0	0	0	0	0
(+) New Revenue Bond Funds					0	0	0	0	0	0	0	0	0	0	0
(+) DOE Capital Grant					0	0	0	0	0	0	0	0	0	0	0
(+) Interest Earned					0	7,000	10,600	4,100	1,300	1,800	2,400	3,100	3,900	4,600	4,700
TOTAL CAPITAL RESERVE	0	0	0		0	8,472,521	7,517,683	4,028,313	1,099,739	1,216,498	1,615,229	1,852,479	2,363,400	2,612,446	3,171,182
CAPITAL EXPENSES															
Install On-Site Generation Sodium Hypochlorite Disinfection at Bell Hill					0	408,800	0	0	0	0	0	0	0	0	0
Install Iron and Manganese Treatment System for Bell Hill Well 2					0	0	0	0	0	0	0	0	0	0	0
Re-Coat Hoffman Hill Reservoir					0	0	1,880,100	0	0	0	0	0	0	0	0
Seismic Evaluation of Hoffman Hill Reservoir					0	0	0	0	0	0	0	0	0	0	0
Seismic Retrofit for Hoffman Hill Reservoir					0	0	0	0	109,100	0	0	0	0	0	0
Install Automatic Meter Reading (AMR) System					0	0	0	2,348,500	0	0	0	0	0	0	0
Billing Software Upgrades					0	0	0	0	0	0	0	23,300	0	0	0
Water Use Efficiency Program Implementation					0	5,200	5,300	5,400	5,500	5,600	5,700	5,900	6,000	6,100	6,300
Annual Consumer Confidence Reports					0	5,200	5,300	5,400	5,500	5,600	5,700	5,900	6,000	6,100	6,300
Water System Plan Update					0	0	0	0	0	111,500	0	0	0	0	0
New Public Works Building/Shop Phase 2019					0	1,022,000	0	0	0	0	0	0	0	0	0
Water System Plan Update 2					0	0	0	0	0	0	0	0	0	0	124,400
Replace Bell Hill Well 2 Motor and Pump					0	0	0	0	272,800	0	0	0	0	0	0
Replace Bell Hill Well 3 Motor and Pump					0	0	0	0	0	0	0	0	297,600	0	0
Replace Hoffman Hill Well 1 Motor and Pump					0	0	0	0	0	0	284,900	0	0	0	0
Bell Hill Reservoir Renovation					0	0	0	0	0	0	0	0	0	0	932,400
New Public Works Building/Shop Phase 2020					0	0	2,089,000	0	0	0	0	0	0	0	0
New Public Works Building/Shop Phase 2021					0	0	0	1,067,500	0	0	0	0	0	0	0
TOTAL CAPITAL EXPENSES					0	1,441,200	3,979,700	3,426,800	392,900	122,700	296,300	35,100	309,600	12,200	1,069,400
END OF YEAR CAPITAL RESERVE BALANCE	0	0	0		0	7,031,321	3,537,983	601,513	706,839	1,093,798	1,318,929	1,817,379	2,053,800	2,600,246	2,101,782
SUMMARY															
OPERATIONAL END OF YEAR CASH					3,862,921	3,395,940	3,002,498	2,607,738	2,211,632	1,729,663	1,106,932	360,302	134,639	633,905	1,138,011
CAPITAL RESERVE END OF YEAR CASH					0	7,031,321	3,537,983	601,513	706,839	1,093,798	1,318,929	1,817,379	2,053,800	2,600,246	2,101,782
TOTAL END OF YEAR CASH					3,862,921	10,427,261	6,540,481	3,209,251	2,918,471	2,823,461	2,425,861	2,177,681	1,919,161	1,966,341	963,771

APPENDIX C

WATER RIGHTS AND WELL LOGS

Water Right Self-Assessment Form for Water System Plan

Mouse-over any link for more information. Click on any link for more detailed instructions.

Water Right Permit, Certificate, or Claim # *If water right is interruptible, identify limitation in yellow section below	WFI Source # If a source has multiple water rights, list each water right on separate line	Existing Water Rights Qi= Instantaneous Flow Rate Allowed (GPM or CFS) Qa= Annual Volume Allowed (Acre-Feet/Year) This includes wholesale water sold				Current Source Production – Most Recent Calendar Year Qi = Max Instantaneous Flow Rate Withdrawn (GPM or CFS) Qa = Annual Volume Withdrawn (Acre-Feet/Year) This includes wholesale water sold				10-Year Forecasted Source Production (determined from WSP) This includes wholesale water sold				20-Year Forecasted Source Production (determined from WSP) This includes wholesale water sold			
		Primary Qi Maximum Rate Allowed, gpm	Non-Additive Qi Maximum Rate Allowed, gpm	Primary Qa Maximum Volume Allowed	Non-Additive Qa Maximum Volume Allowed	Total Qi Maximum Instantaneous Flow Rate Withdrawn	Current Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume Withdrawn	Current Excess or (Deficiency) Qa	Total Qi Maximum Instantaneous Flow Rate in 10 Years	10-Year Forecasted Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume in 10 Years	10-Year Forecasted Excess or (Deficiency) Qa	Total Qi Maximum Instantaneous Flow Rate in 20 Years	20-Year Forecasted Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume in 20 Years	20-Year Forecasted Excess or (Deficiency) Qa
1. G2-27326C	S03: Bell Hill Well 1	900		1,149	0	900	0	79.7	1,069.3	900	0	391	758	900	0	509	640
2. G2-27450P	S04: Bell Hill Well 2	1,000		1,237	0	1,000	0	0.5	1,236.5	1,000	0	421	816	1,000	0	548	689
3. G2-29489	S06: Bell Hill Well 3	1,000		0	1,210	1,000	0	442.5	767.5 (1)	1,000	0	412	798	1,000	0	536	674
4. G2-27663	S05: Hoffman Hill Well 1 S09: Hoffman Hill Well 2	2,200		774	1,922	2,200	0	1,062.0	1634.0 (1)	2,200	0	918	1,778	2,200	0	1194	1,502
5. G2-00800	S07: Historic Village Well 1	60		44		0	60	0	44	0	60	0	44	0	60	0	44
6. G2-00799	S08: Historic Village Well 2	150		138		0	150	0	138	0	150	0	138	0	150	0	138
7. G2-20970	El Rancho Madrona Well	80		18		0	80	0	18	0	80	0	18	0	80	0	18
	TOTALS =	5,390		3,360		5,100	290	1,584.7	1,775.3 (1)	5,100	290	2,142	1,218	5,100	290	2,787	573
Column Identifiers for Calculations:		A		B		C	=A-C	D	=B-D	E	= A-E	F	=B-F	G	=A-G	H	=B-H

(1) Current, 10-year, and 20-year Excess or (Deficiency) Qa for water rights G2-29489 and G2-27663 are Primary PLUS Non-Additive Existing Rights, minus most recent or projected annual usage. Current, 10-year, and 20-year Excess or (Deficiency) Qa TOTALS are sum of above MINUS the non-additive rights.

PENDING WATER RIGHT APPLICATIONS: Identify any water right applications that have been submitted to Ecology.

Application Number	New or Change Application?	Date Submitted	Quantities Requested			
			Primary Qi	Non-Additive Qi	Primary Qa	Non-Additive Qa
G2-30221	New	12-15-2004	3,150 gpm		3,811 ac-ft/yr	
CG2-GWC170@2	Change	6-22-2009	450 gpm		320 ac-ft/yr	

INTERTIES: Systems receiving wholesale water complete this section. Wholesaling systems must include water sold through intertie in the current and forecasted source production columns above.

Name of Wholesaling System Providing Water	Quantities Allowed In Contract		Expiration Date of Contract	Currently Purchased Current quantity purchased through intertie				10-Year Forecasted Purchase Forecasted quantity purchased through intertie				20-Year Forecasted Purchase Forecasted quantity purchased through intertie			
	Maximum Qi Instantaneous Flow Rate	Maximum Qa Annual Volume		Maximum Qi Instantaneous Flow Rate	Current Excess or (Deficiency) Qi	Maximum Qa Annual Volume	Current Excess or (Deficiency) Qa	Maximum Qi 10-Year Forecast	Future Excess or (Deficiency) Qi	Maximum Qa 10-Year Forecast	Future Excess or (Deficiency) Qa	Maximum Qi 20-Year Forecast	Future Excess or (Deficiency) Qi	Maximum Qa 20-Year Forecast	Future Excess or (Deficiency) Qa
1. JBLM Intertie (1)	1,000 gpm	None	None	None		None		None		None		None		None	
TOTALS =	1,000 gpm	None		None		None		None		None		None		None	
Column Identifiers for Calculations:	A	B		C	=A-C	D	=B-D	E	=A-E	F	=B-F	G	=A-G	H	=B-H

(1) The intertie with JBLM is for emergency use only. The City has not used this intertie since 1991, but it remains available in the event of an emergency.

INTERRUPTIBLE WATER RIGHTS: Identify limitations on any water rights listed above that are interruptible.

Water Right #	Conditions of Interruption	Time Period of Interruption
1. None		

ADDITIONAL COMMENTS:

RECEIVED
01 MAY -3 P2:03

STATE OF WASHINGTON

APPLICATION FOR CHANGE/TRANSFER OF WATER RIGHT

For filing with Ecology or with County Conservancy Boards

A MINIMUM FEE OF $10.00 PAYABLE TO ECOLOGY MUST ACCOMPANY THIS APPLICATION

(Check all that apply.)

- ☐ Change purpose(s) of use
- ☐ Add purpose(s) of use
- ☒ Change point(s) of diversion/withdrawal
- ☐ Add point(s) of diversion/withdrawal
- ☒ Change/transfer place of use
- ☐ Other (i.e. consolidation, intertie, trust water)

Explain:_____

FOR OFFICE USE ONLY

CHANGE No. 170 WRIA 11

DATE ACCEPTED 5/3/01 BY SC

FEE $ 1000 REC'D 5/3/01

CHECK No. _____

SEPA: ☒ Exempt ☐ Not exempt

IF MORE SPACE IS NEEDED, ATTACH ADDITIONAL SHEETS (PLEASE PRINT OR TYPE CLEARLY)*

1. Applicant Information:

APPLICANT/BUSINESS NAME	PHONE NO.	FAX NO.
Weyerhaeuser Company	(253) 964-1153	(253) 964-8050
ADDRESS: PO Box 100		
CITY: DuPont	STATE: WA	ZIP CODE: 98327

CONTACT NAME (IF DIFFERENT FROM ABOVE)	PHONE NO.	FAX NO.
Jim Odendahl	(253) 964-1153	(253) 964-8050
ADDRESS: PO Box 100		
CITY: DuPont	STATE: WA	ZIP CODE: 98327

2. Water Right Information:

WATER RIGHT OR CLAIM NUMBER	RECORDED NAME(S)
Groundwater Permit No. 170	Weyerhaeuser Company
DO YOU OWN THE RIGHT TO BE CHANGED? ☒ YES ☐ NO	
IF NO, PROVIDE OWNER(S) NAME:	
HAS THE WATER BEEN PUT TO BENEFICIAL USE IN THE LAST FIVE (5) YEARS? ☒ YES ☐ NO	

Please attach copies of any documentation that demonstrates consistent, historical use of water since the right was established. Also, if you have a water system plan or conservation plan, please include a copy with your application.

FOR OFFICE USE ONLY

APP. NO._____ PERMIT NO. 765 CERT. NO. 170 CERT. OF CHANGE NO. 170

WRIA 11

3. Point(s) of Diversion/Withdrawal:

A. Existing

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #
Well/groundwater	1	NE	NW	27	19	1E	01-19-27-1-001	AEB509
Well/groundwater	2	NE	NW	27	19	1E	01-19-27-1-001	AEB510
Well/groundwater	3	NE	NW	27	19	1E	01-19-27-1-001	AEB511

B. Proposed

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #
Well/groundwater	4	SE	SE	27	19	1E	01-19-27-1-001	

DO YOU OWN THE EXISTING AND PROPOSED POINT(S) OF DIVERSION/WITHDRAWAL?

EXISTING: ☒ YES ☐ NO PROPOSED: ☒ YES ☐ NO – IF NO, PROVIDE OWNER(S) NAME:

Please include copies of all water well reports involved with this proposal. Also, if you know the distances from the nearest section corner to the above point(s) of diversion/withdrawal, please include that information in Item No. 6 (remarks) or as an attachment.

4. Purpose of Use:

A. Existing

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE
Irrigation & Site Remediation	1250	690.5	1948 to present
			(1948-1998 was used as
			industrial. On 2/98
			Weyerhaeuser relinquished

2 Water Rights & had use changed to Irrigation/Remed.)

B. Proposed

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE
Irrigation & Site Remediation	1250	690.5	Indefinitely

5. Place of Use:

A. Existing

LEGAL DESCRIPTION OF LANDS WHERE WATER IS PRESENTLY USED:

(See ATTACHED LEGAL DESCRIPTION)

¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES
NE	NW	27	19	1E	Pierce	01-19-27-1-001	636

DO YOU OWN ALL THE LANDS IN THE EXISTING PLACE OF USE? ☒ YES ☐ NO – IF NO, PROVIDE OWNER(S) NAME:

B. Proposed

LEGAL DESCRIPTION OF LANDS WHERE NEW USE IS PROPOSED:

(See ATTACHED LEGAL DESCRIPTION)

¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES
SE	SE	27	19	1E	Pierce	01-19-27-1-001	636

DO YOU OWN ALL THE LANDS IN THE PROPOSED PLACE OF USE? ☒ YES ☐ NO – IF NO, PROVIDE OWNER(S) NAME:

Attach a detailed map of your proposed change/transfer. The map should show existing and proposed point(s) of diversion/withdrawal, place of use and any other features involved with this application. If platted property, please include a certified copy of the plat map.

Are there any ADDITIONAL WATER rights OR CLAIMS RELATED to the same property as the ONE PROPOSED FOR CHANGE/TRANSFER?
☐ YES ☒ NO – IF YES, PROVIDE THE WATER RIGHT/CLAIM NUMBER(S):

6. Remarks and Other Relevant Information:

This site is under a Consent Decree, with oversight from Department of Ecology; Mike Blum is the Manager. Contaminated soils will be capped under the fairways of a golf course. The well location needs to be changed to fit in with the design of the golf course and also to be used during remediation and screening of site soils. A Temporary Permit has been requested in order to keep work moving along.

IF FOR SEASONAL OR TEMPORARY, START DATE ____/____/____ END DATE ____/____/____ (Permanent)

7. Signatures:

I certify that the information above is true and accurate to the best of my knowledge. I understand that in order to process my application, I am hereby granting staff from the Department of Ecology or the County Conservancy Board access to the above site(s) for inspection and monitoring purposes. If assisted in the preparation of the above application, I understand that all responsibility for the accuracy of the information rests with me.

Jim Odendahl — 5/2/01
(Applicant) *(Date)*

Weyerhaeuser Company — 5/2/01
(Water Right Holder) *(Date)*

Weyerhaeuser Company — 5/2/01
(Land Owner(s) of Existing Place of Use) *(Date)*

IMPORTANT! APPLICATION FILING INFORMATION IS PROVIDED ON THE NEXT PAGE.

WE ARE RETURNING YOUR APPLICATION FOR THE FOLLOWING REASON(S):

☐ APPLICATION FEE NOT ENCLOSED ☐ MAP NOT INCLUDED or INCOMPLETE

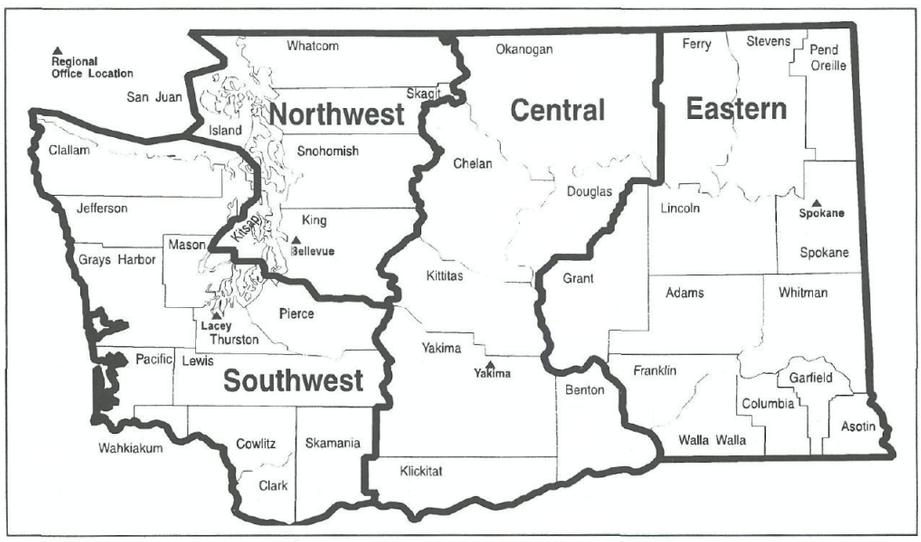
☐ ADDITIONAL SIGNATURES REQUIRED ☐ SECTION _____ IS INCOMPLETE

☐ OTHER/EXPLANATION:_____

STAFF: _____ ***DATE:*** ____/____/____

IMPORTANT!

Submit your application to Ecology at the regional office for the area of proposed or existing water use or at a Conservancy Board with jurisdiction. Below is a map of the State of Washington, with outlines of the four Ecology regional offices. If you have questions about your application or whether a County Conservancy Board with jurisdiction exists, contact the Water Resources program at the regional office in which your project is located.



Department of Ecology
Central Regional Office
15 W. Yakima Avenue, Suite 200
Yakima, WA 98902
Telephone: (509) 575-2490

Department of Ecology
Eastern Regional Office
N. 4601 Monroe, Suite 202
Spokane, WA 99205-1295
Telephone: (509) 456-2926

Department of Ecology
Northwest Regional Office
3190 – 160th Avenue SE
Bellevue, WA 98008-5452
Telephone: (425) 649-7000

Department of Ecology
Southwest Regional Office
PO Box 47775
Olympia, WA 98504-7775
Telephone: (360) 407-6300

Persons of disability needing assistance in the application process or those needing this application in an alternate format, may call (360) 407-6607 (voice) or (360) 407-6006 (TDD).

Ecology is an Equal Opportunity and Affirmative Action employer...

WASHINGTON STATE DEPARTMENT OF ECOLOGY

State of Washington
Application for a Water Right

Please follow the attached instructions to avoid unnecessary delays.

RECEIVED
DEC 15 2004
DEPT. OF ECOLOGY/SWRO

For Ecology Use

Fee Paid _____

Date _____

Section 1. APPLICANT - PERSON, ORGANIZATION, OR WATER SYSTEM

Name **City of DuPont** Home Tel: (____)_____ - _____

Mailing Address **303 Barksdale Avenue** Work Tel: **(253) 912-5381**

City **DuPont** State **WA** Zip+4 **98327** + **9002** FAX: **(253) 964** - **1455**

Section 2. CONTACT - PERSON TO CALL ABOUT THE APPLICATION

☐ **Same as above**

Name **Ric Leir, Quadrant Corporation** Home Tel: (____)_____ - _____

Mailing Address **1408 Palisade Boulevard** Work Tel: **(253) 964** - **4674**

City **DuPont** State **WA** Zip+4 **98327** + **9002** FAX: **(253) 964** - **2326**

Relationship to applicant: **Developer**

Section 3. STATEMENT OF INTENT

The applicant requests a permit to use not more than **3,150** (☒ gallons per minute or ☐ cubic feet per second) from a ☐ surface water source or ☒ ground water source (check only one) for the purpose(s) of **municipal supply**. **ATTACH A "LEGAL" DESCRIPTION OF THE PLACE OF USE.** (**See instructions**.) *NOTE: A tax parcel number or a plat number is not sufficient.* **City of DuPont water service area as defined by current approved water system comprehensive plan and urban growth area as established by current adopted comprehensive plan.**

Estimate a maximum annual quantity to be used in acre-feet per year: **3,811**

☐ Check if the water use is proposed for a short-term project. Indicate the period of time that the water will be needed:

From ___/___/___ to ___/___/___

Section 4. WATER SOURCE

If SURFACE WATER	If GROUNDWATER
Name the water source and indicate if stream, spring, lake, etc. If unnamed, write "unnamed spring," "unnamed stream," etc.: Number of diversions: _____	A permit is desired for **2** well(s). **Wells tentatively denoted Center Drive-1 and Center Drive-2.**
Source flows into (name of body of water):	Size & depth of well(s): **20-inch wells to depths of approximately 300 feet.**

LOCATION

Enter the north-south and east-west distances in feet from the point of diversion or withdrawal to the nearest section corner: **Center Drive-1 is 900 ft south and 2,670 ft west of the northeast corner of Section 35. Center Drive-2 is 940 ft north and 2,180 ft east of the southwest corner of Section 26. See Figure 1 (attached).**

¼ of	¼ of	Section	Township	Range(E/W)	County	If location of source is platted, complete below:		
						Lot	Block	Subdivision
NW	**NE**	**35**	**19 N**	**1 E**	**Pierce**	Tract C of City of DuPont short plat 98-3. Recording no. 9906175001.		
SE	**SW**	**26**	**19 N**	**1 E**	**Pierce**			Unplatted.

For Ecology Use Date Received: 12-15-04 Priority Date: 12-15-04

SEPA: Exempt/Not Exempt FERC License #_____ Dept. Of Health #_____

Date Accepted As Complete 12/20/04 By SC Date Returned_____ By_____ WRIA: ~~35~~ 12

ECY 040-1-14
Rev. 7/97 * * f

APPLICATION

Appl. No.: G2-30221

Section 5. GENERAL WATER SYSTEM INFORMATION

A. Name of system, if named: **City of DuPont**

B. Briefly describe your proposed water system. **(See instructions.)**

Refer to City of DuPont Water System Comprehensive Plan submitted with this application.

C. Do you already have any water rights or claims associated with this property or system? ☒ YES ☐ NO
PROVIDE DOCUMENTATION. **G2-00799S; G2-00800; G2-27450; G2-27326C; G2-27663; G2-29489**

Section 6. DOMESTIC / PUBLIC WATER SUPPLY SYSTEM INFORMATION
(Completed for all domestic/public supply uses.)

A. Number of "connections" requested:_____ Type of connection _____
(Homes, Apartment, Recreational, etc.)

B. Are you within the area of an approved water system? ☒ YES ☐ NO
If yes, explain why you are unable to connect to the system. *Note: Regional water systems are identified by your County Health Department.* **Refer to City of DuPont Water System Comprehensive Plan submitted with this application.**

Complete C. and D. only if the proposed water system will have fifteen or more connections.

C. Do you have a current water system plan approved by the
Washington State Department of Health? ☒ YES ☐ NO
If yes, when was it approved? **2004** Please attach the current approved version of your plan.

D. Do you have an approved conservation plan? ☒ YES ☐ NO
If yes, when was it approved? **2004** Please attach the current approved version of your plan.

Section 7. IRRIGATION/AGRICULTURAL/FARM INFORMATION
(Complete for all irrigation and agriculture uses.)

A. Total number of acres to be irrigated: ___

B. List total number of acres for other specified agricultural uses:

Use_____Acres_____
Use_____Acres_____
Use_____Acres_____

C. Total number of acres to be covered by this application: _____

D. Family Farm Act (Initiative Measure Number 59, November 3, 1977, as amended by Chapter 237, Laws of 2001)
Add up the acreage in which you have a controlling interest, including only:
‡ Acreage irrigated under water rights acquired after December 8, 1977;
‡ Acreage proposed to be irrigated under this application;
‡ Acreage proposed to be irrigated under other pending application(s).

1. Is the combined acreage greater than 6000 acres? ☐ YES ☐ NO
2. Do you have a controlling interest in a Family Farm Development Permit? ☐ YES ☐ NO
If yes, enter permit no:_____

E. Farm uses:
Stockwater - Total # of animals _____ Animal type _____ (If dairy cattle, see below)
Dairy - # Milking _____ # Non-milking _____

Section 8. WATER STORAGE

Will you be using a dam, dike, or other structure to retain or store water? ☒ YES ☐ NO

Reservoirs as described in the City of DuPont Water System Comprehensive Plan submitted with this application.

NOTE: If you will be storing 10 acre-feet or more of water and/or if the water depth will be 10 feet or more at the deepest point, and some portion of the storage will be above grade, you must also apply for a reservoir permit. You can get a reservoir permit application from the Department of Ecology.

Section 9. DRIVING DIRECTIONS

Provide detailed driving instructions to the project site.

From Interstate 5, take exit 118 (Center Drive) at DuPont. Proceed north on Center Drive. The Center Drive-1 well is approximately 0.5 mile north of I-5 on the west side of Center Drive. Proceeding north from the Center Drive-1 well location approximately 0.4 mile, take a left onto Bob's Hollow Lane and proceed approximately 100 feet west. The Center Drive-2 well is on the south side of Bob's Hollow Lane. Refer to Figure 1 (attached).

Section 10. REQUIRED MAP

A. Attach a map of the project. **(See instructions.)**
Proposed well locations are depicted on Figure 1 (attached). The City of DuPont Water System Comprehensive Plan submitted with this application includes a map depicting the City's water service area.

Section 11. PROPERTY OWNERSHIP

A. Does the applicant own the land on which the water will be used? ☒ YES ☒ NO
If no, explain the applicant's interest in the place of use and provide the name(s) and address(es) of the owner(s):

The City of DuPont (applicant) and Quadrant Corporation (developer) both currently own some of the property within the City of DuPont water service area, which is the proposed place of use.

B. Does the applicant own the land on which the water source is located? ☐ YES ☒ NO
If no, submit a copy of agreement:
Following development of each well source, the land on which each well is located will be transferred by Quadrant Corporation to the City of DuPont (applicant).

I certify that the information above is true and accurate to the best of my knowledge. I understand that in order to process my application, I grant staff from the Department of Ecology access to the site for inspection and monitoring purposes. Even though I may have been assisted in the preparation of the above application by the employees of the Department of Ecology, all responsibility for the accuracy of the information rests with me.

Steven Hay — 12/7/04
Applicant (or authorized representative) — Date

Richard Mohn — 11/23/04
Landowner for place of use (if same as applicant, write "same") — Date
FOR QUADRANT CORPORATION

S. F. No. 7362.—9-47—1M. 16556 .

CERTIFICATE RECORD NO. 2 PAGE NO. 635-D UNDER DECLARATION OF CLAIM NO. 799

STATE OF WASHINGTON, COUNTY OF Pierce

Certificate of Ground Water Right

Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and the rules and regulations of the State Supervisor of Hydraulics thereunder.

THIS IS TO CERTIFY That E. I. DU PONT DE NEMOURS & COMPANY, INC.

of Du Pont, Washington has filed

in the office of the State Supervisor of Hydraulics of Washington Declaration of Claim No. 799

to withdraw ground waters of the State from a Pump Well,

located within the NE¼ of NE¼ of Sec. 35, Twp. 19 N., Rge. 1 E.W.M.

for the purpose of Domestic supply and fire protection

The right to the use of said ground waters has been sustained and approved by the Supervisor of Hydraulics in accordance with Chapter 263, Laws of Washington for 1945, and is hereby entered of record in Volume 2 of Ground Water Certificates at page 635-D; the right approved has a priority of November 1, 1925; the amount of water which the Declarant is entitled to withdraw for the aforesaid purpose is limited to the amount actually beneficially used and shall not exceed 150 gallons per minute; 138 acre-feet per year; and is appurtenant to the following described lands or place of use:

Village of Du Pont located in Sections 25, 26, 35 and 36,
Twp. 19 N., Rge. 1 E.W.M.

The right to the use of the ground water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in Sections 6 and 7, Chapter 122, Laws of 1929.

WITNESS the seal and signature of the State Supervisor of Hydraulics affixed this 20th day of July, 1948.

State Supervisor of Hydraulics.

Declaration of Claim No. 799

CERTIFICATE OF GROUND WATER RIGHT

Recorded in the office of State Supervisor of Hydraulics, Olympia, Washington, in Book No. 2 *of Ground Water Right Certificates, on page* 635-D *on the* 20th *day of* July, 19 48

STATE OF WASHINGTON,
County of Pierce } *ss.*

I certify that the within was received and duly recorded by me in Volume _____ *of Book of Water Right Certificates, page* _____ *on the* _____ *day of* _____, 19____

_____

STATE PRINTING PLANT, OLYMPIA, WASH.

DEPARTMENT OF ECOLOGY
State of Washington

WATER RESOURCES
Application for Change/Transfer of a Water Right

For Ecology Use
(Date Stamp)

You must include a $50.00 minimum filing fee with this application for:

(Check all that apply.)
- ☐ Change purpose(s) of use
- ☐ Add purpose(s) of use
- ☐ Change/transfer place of use
- ☒ Change point(s) of diversion/withdrawal
- ☐ Add point(s) of diversion/withdrawal
- ☐ Other (i.e. consolidation, intertie, trust water)

Explain: _____

No filing fee is required for applications for:
- ☐ Drought
- ☐ Cost Reimbursement
- ☐ Water Conservancy Board

FOR OFFICIAL USE ONLY

DATE APPLICATION RECEIVED _____
CHECK NO. _____ FEE $ _____
DATE ACCEPTED _____ BY _____
CHANGE NO. _____
COUNTY _____ WRIA _____
SPECIAL AREA _____

SEPA: ☐ EXEMPT ☐ NOT EXEMPT

ECY CODING: 001-002-WR10285-000011

APP NO. _____ PERMIT NO. _____
CERT NO. _____ CERT OF CHG NO. _____

☐ **I have completed a pre-application consultation with Ecology.**

1. Applicant Information

APPLICANT/BUSINESS NAME	PHONE NO.	FAX NO.
City of DuPont	253-912-5381	253-964-1455
ADDRESS		
1700 Civic Center Drive		
CITY	STATE	ZIP CODE
DuPont	WA	98327
EMAIL ADDRESS (IF AVAILABLE)		

CONTACT (IF DIFFERENT FROM ABOVE)	PHONE NO.	FAX NO.
Dominic Miller, Gray & Osborne Engineers	360-292-7481	360-292-7517
ADDRESS		
2102 Carriage Drive SW		
CITY	STATE	ZIP CODE
Olympia	WA	98502
EMAIL ADDRESS (IF AVAILABLE)		
dmiller@g-o.com		

LEGAL LAND OWNER or PART OWNER OF PROPOSED PLACE OF USE	PHONE NO.	FAX NO.
All land owners within City of DuPont water service area		
ADDRESS		
CITY	STATE	ZIP CODE
DuPont	WA	
EMAIL ADDRESS (IF AVAILABLE)		

2. Water Right Information

WATER RIGHT OR CLAIM NUMBER	RECORDED NAME(S)
G2-00799 (635)	E. I. Du Pont De Nemours & Co., Inc.

DO YOU OWN THE RIGHT TO BE CHANGED? ☒ YES ☐ NO

IF NO, PROVIDE OWNER(S) NAME and ADDRESS: _____

HAS THE WATER BEEN USED AS AUTHORIZED IN THE LAST FIVE (5) YEARS? ☒ YES ☐ NO

- Attach copies of any documentation that shows the historical use of water that has occurred since the right was established.
- If you have a water system plan or conservation plan, please include a copy with your application.

3. Point(s) of Diversion/Withdrawal:

A. Existing

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #
Historic Village Well 2	1	NE	NE	35	19N	01E	3575001280	AEF218

B. Proposed (if different from 3.A.)

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #
Bell Hill Well 1	1	NW	SW	25	19N	01E	0119252010	CAN722
Bell Hill Well 3	2	NE	SW	25	19N	01E	0119256007	AEF217

C. DO YOU OWN THE EXISTING AND PROPOSED POINT(S) OF DIVERSION/WITHDRAWAL?

EXISTING: ☒ YES ☐ NO PROPOSED: ☒ YES ☐ NO – IF NO, PROVIDE OWNER NAME(S): _____

- Include copies of all associated water well reports.
- If you know the distances from the nearest section corner to the above point(s) of diversion/withdrawal, please include that information in Item No. 6 (remarks) or as an attachment.

4. Purpose of Use:

A. Existing

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE
Domestic Supply and Fire Protection	150 gpm	138	Continuously

B. Proposed (if different from 4.A.)

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE

5. Place of Use:

A. Existing

LEGAL DESCRIPTION OF LANDS WHERE WATER IS PRESENTLY USED:							
Water Service Area of the City of DuPont							
¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES

DO YOU OWN ALL THE LANDS IN THE EXISTING PLACE OF USE? ☐ YES ☐ NO

IF NO, PROVIDE OWNER NAME(S):

B. Proposed (if different than 5.A.)

LEGAL DESCRIPTION OF LANDS WHERE NEW USE IS PROPOSED:							
¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES

DO YOU OWN ALL THE LANDS IN THE PROPOSED PLACE OF USE? ☐ YES ☐ NO

IF NO, PROVIDE OWNER NAME(S):

- Attach a detailed map of your proposed change/transfer. The map should show existing and proposed point(s) of diversion/withdrawal, place of use and any other features involved with this application.
- If platted property, please include a certified copy of the plat map.

C. Are there any additional water rights or claims related to the same property as the one proposed for change/transfer?

☐ YES ☒ NO – IF YES, PROVIDE THE WATER RIGHT/CLAIM NUMBER(S):

6. Remarks and Other Relevant Information:

Bell Hill Well 1 is 1,225 feet south and 1,000 feet west of west quarter corner of Section 25.

Bell Hill Well 3 is 800 feet south and 400 feet west of the center of Section 25.

IF FOR SEASONAL OR TEMPORARY, START DATE ___/___/____ END DATE ___/___/____

Certain applications may incur a Real Estate Excise Tax liability for the seller of the water rights. The Department of Revenue has requested notification of potential taxable water right related actions and therefore may be provided with a copy of this request. For further information, contact:

Department of Revenue
Real Estate Excise Tax
PO Box 47477
Olympia, WA 98504-7477

Phone (360) 570-3265

7. Signatures:

I certify that the information above is true and accurate to the best of my knowledge. I understand that in order to process my application, I hereby grant staff from the Department of Ecology or the County Conservancy Board access to the above site(s) for inspection and monitoring purposes. If assisted in preparing this above application, I understand that all responsibility for the accuracy of the information rests with me.

Applicant Printed Name – Title	**Applicant Signature**	**(Date: MM/DD/YYYY)**
Water Right Holder Printed Name	**Water Right Holder Signature**	**(Date: MM/DD/YYYY)**
Land Owner of Existing Place of Use Printed Name	**Land Owner of Existing Place of Use Signature**	**(Date: MM/DD/YYYY)**
Land Owner of Proposed Place of Use Printed Name	**Land Owner of Proposed Place of Use Signature**	**(Date: MM/DD/YYYY)**

***Submit your application to:** DEPARTMENT OF ECOLOGY CASHIERING SECTION PO BOX 47611 OLYMPIA, WA 98504-7611	☐ Central Regional Office 1250 W. Alder Street Union Gap, WA 98903-0009 (509) 575-2490	☐ Eastern Regional Office 4601 N. Monroe Street Spokane, WA 99205-1265 (509) 329-3400
	☐ Northwest Regional Office 3190 – 160th Avenue SE Bellevue, WA 98008-5452 (425) 649-7000	☒ Southwest Regional Office PO Box 47775 Olympia, WA 98504-7775 (360) 407-6300

S. F. No. 7362—9-47—1M. 16556

CERTIFICATE RECORD No. 2 PAGE No. 636-D UNDER DECLARATION OF CLAIM No. 800

STATE OF WASHINGTON, COUNTY OF Pierce

Certificate of Ground Water Right

Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and the rules and regulations of the State Supervisor of Hydraulics thereunder.

THIS IS TO CERTIFY *That* E. I. DU PONT DE NEMOURS & CO., INC.

of Du Pont, Washington *has filed*

in the office of the State Supervisor of Hydraulics of Washington Declaration of Claim No. 800

to withdraw ground waters of the State from a Pump Well,

located within the NE¼ of NE¼ of Sec. 35, Twp. 19 N., Rge. 1 E.W.M.

for the purpose of Domestic supply and fire protection

The right to the use of said ground waters has been sustained and approved by the Supervisor of Hydraulics in accordance with Chapter 263, Laws of Washington for 1945, and is hereby entered of record in Volume 2 *of Ground Water Certificates at page* 636-D*; the right approved has a priority of* November 1, 1925*; the amount of water which the Declarant is entitled to withdraw for the aforesaid purpose is limited to the amount actually beneficially used and shall not exceed* 60 *gallons per minute;* 44 *acre-feet per year; and is appurtenant to the following described lands or place of use:*

Village of Du Pont located in Sections 25, 26, 35 and 36,
Twp. 19 N., Rge. 1 E.W.M.

The right to the use of the ground water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in Sections 6 and 7, Chapter 122, Laws of 1929.

WITNESS the seal and signature of the State Supervisor of Hydraulics affixed this 20th *day of* July, 1948

State Supervisor of Hydraulics.

Declaration of Claim No. 800

CERTIFICATE OF GROUND WATER RIGHT

Recorded in the office of State Supervisor of Hydraulics, Olympia, Washington, in Book No. 2 of Ground Water Right Certificates, on page 636-D on the 20th day of July, 19 48

STATE OF WASHINGTON,
County of Pierce } ss.

I certify that the within was received and duly recorded by me in Volume _____ of Book of Water Right Certificates, page _____ on the _____ day of _____, 19____

_____

STATE PRINTING PLANT, OLYMPIA, WASH.

DEPARTMENT OF ECOLOGY
State of Washington

For Ecology Use
(Date Stamp)

WATER RESOURCES
Application for Change/Transfer of a Water Right

You must include a $50.00 minimum filing fee with this application for:

(Check all that apply.)
- ☐ Change purpose(s) of use
- ☐ Add purpose(s) of use
- ☐ Change/transfer place of use
- ☒ Change point(s) of diversion/withdrawal
- ☐ Add point(s) of diversion/withdrawal
- ☐ Other (i.e. consolidation, intertie, trust water)

Explain: _____

No filing fee is required for applications for:
- ☐ Drought
- ☐ Cost Reimbursement
- ☐ Water Conservancy Board

FOR OFFICIAL USE ONLY

DATE APPLICATION RECEIVED _____
CHECK NO. _____ FEE $ _____
DATE ACCEPTED _____ BY _____
CHANGE NO. _____
COUNTY _____ WRIA _____
SPECIAL AREA _____

SEPA: ☐ EXEMPT ☐ NOT EXEMPT

ECY CODING: 001-002-WR10285-000011

APP NO. _____ PERMIT NO. _____
CERT NO. _____ CERT OF CHG NO. _____

☐ **I have completed a pre-application consultation with Ecology.**

1. Applicant Information

APPLICANT/BUSINESS NAME	PHONE NO.	FAX NO.
City of DuPont	253-912-5381	253-964-1455
ADDRESS		
1700 Civic Center Drive		
CITY	STATE	ZIP CODE
DuPont	WA	98327
EMAIL ADDRESS (IF AVAILABLE)		

CONTACT (IF DIFFERENT FROM ABOVE)	PHONE NO.	FAX NO.
Dominic Miller, Gray & Osborne Engineers	360-292-7481	360-292-7517
ADDRESS		
2102 Carriage Drive SW		
CITY	STATE	ZIP CODE
Olympia	WA	98502
EMAIL ADDRESS (IF AVAILABLE)		
dmiller@g-o.com		

LEGAL LAND OWNER or PART OWNER OF PROPOSED PLACE OF USE	PHONE NO.	FAX NO.
All land owners within City of DuPont water service area		
ADDRESS		
CITY	STATE	ZIP CODE
DuPont	WA	
EMAIL ADDRESS (IF AVAILABLE)		

2. Water Right Information

WATER RIGHT OR CLAIM NUMBER	RECORDED NAME(S)
G2-00800 (636)	E. I. Du Pont De Nemours & Co., Inc.

DO YOU OWN THE RIGHT TO BE CHANGED? ☒ YES ☐ NO

IF NO, PROVIDE OWNER(S) NAME and ADDRESS: _____

HAS THE WATER BEEN USED AS AUTHORIZED IN THE LAST FIVE (5) YEARS? ☒ YES ☐ NO

- Attach copies of any documentation that shows the historical use of water that has occurred since the right was established.
- If you have a water system plan or conservation plan, please include a copy with your application.

3. Point(s) of Diversion/Withdrawal:

A. Existing

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #
Historic Village Well 1	1	NE	NE	35	19N	01E	3575001280	ABM995

B. Proposed (if different from 3.A.)

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #
Bell Hill Well 1	1	NW	SW	25	19N	01E	0119252010	CAN722
Bell Hill Well 3	2	NE	SW	25	19N	01E	0119256007	AEF217

C. DO YOU OWN THE EXISTING AND PROPOSED POINT(S) OF DIVERSION/WITHDRAWAL?

EXISTING: ☒ YES ☐ NO PROPOSED: ☒ YES ☐ NO – IF NO, PROVIDE OWNER NAME(S): _____

- Include copies of all associated water well reports.
- If you know the distances from the nearest section corner to the above point(s) of diversion/withdrawal, please include that information in Item No. 6 (remarks) or as an attachment.

4. Purpose of Use:

A. Existing

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE
Domestic Supply and Fire Protection	60 gpm	44	Continuously

B. Proposed (if different from 4.A.)

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE

5. Place of Use:

A. Existing

LEGAL DESCRIPTION OF LANDS WHERE WATER IS PRESENTLY USED:							
Water Service Area of the City of DuPont							
¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES

DO YOU OWN ALL THE LANDS IN THE EXISTING PLACE OF USE? ☐ YES ☐ NO

IF NO, PROVIDE OWNER NAME(S):

B. Proposed (if different than 5.A.)

LEGAL DESCRIPTION OF LANDS WHERE NEW USE IS PROPOSED:							
¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES

DO YOU OWN ALL THE LANDS IN THE PROPOSED PLACE OF USE? ☐ YES ☐ NO

IF NO, PROVIDE OWNER NAME(S):

- Attach a detailed map of your proposed change/transfer. The map should show existing and proposed point(s) of diversion/withdrawal, place of use and any other features involved with this application.
- If platted property, please include a certified copy of the plat map.

C. Are there any additional water rights or claims related to the same property as the one proposed for change/transfer?

☐ YES ☒ NO – IF YES, PROVIDE THE WATER RIGHT/CLAIM NUMBER(S):

6. Remarks and Other Relevant Information:

Bell Hill Well 1 is 1,225 feet south and 1,000 feet west of west quarter corner of Section 25.

Bell Hill Well 3 is 800 feet south and 400 feet west of the center of Section 25.

IF FOR SEASONAL OR TEMPORARY, START DATE ___/___/____ END DATE ___/___/____

Certain applications may incur a Real Estate Excise Tax liability for the seller of the water rights. The Department of Revenue has requested notification of potential taxable water right related actions and therefore may be provided with a copy of this request. For further information, contact:

Department of Revenue
Real Estate Excise Tax
PO Box 47477
Olympia, WA 98504-7477

Phone (360) 570-3265

7. Signatures:

I certify that the information above is true and accurate to the best of my knowledge. I understand that in order to process my application, I hereby grant staff from the Department of Ecology or the County Conservancy Board access to the above site(s) for inspection and monitoring purposes. If assisted in preparing this above application, I understand that all responsibility for the accuracy of the information rests with me.

Applicant Printed Name – Title	**Applicant Signature**	**(Date: MM/DD/YYYY)**
Water Right Holder Printed Name	**Water Right Holder Signature**	**(Date: MM/DD/YYYY)**
Land Owner of Existing Place of Use Printed Name	**Land Owner of Existing Place of Use Signature**	**(Date: MM/DD/YYYY)**
Land Owner of Proposed Place of Use Printed Name	**Land Owner of Proposed Place of Use Signature**	**(Date: MM/DD/YYYY)**

***Submit your application to:** DEPARTMENT OF ECOLOGY CASHIERING SECTION PO BOX 47611 OLYMPIA, WA 98504-7611	☐ Central Regional Office 1250 W. Alder Street Union Gap, WA 98903-0009 (509) 575-2490	☐ Eastern Regional Office 4601 N. Monroe Street Spokane, WA 99205-1265 (509) 329-3400
	☐ Northwest Regional Office 3190 – 160th Avenue SE Bellevue, WA 98008-5452 (425) 649-7000	☒ Southwest Regional Office PO Box 47775 Olympia, WA 98504-7775 (360) 407-6300

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

CERTIFICATE OF WATER RIGHT

☐ *Surface Water* (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ *Ground Water* (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

CERTIFICATE NUMBER	PERMIT NUMBER	APPLICATION NUMBER	PRIORITY DATE
G2-20970C	G2-20970P	G2-20970	April 27, 1979

NAME
RICHARDSON WATER CO.

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
PO Box 44408	Tacoma	Washington	98444

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown.

PUBLIC WATER TO BE APPROPRIATED

SOURCE
well

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	60	18

QUANTITY, TYPE OF USE, PERIOD OF USE		
18 acre-feet per year	community domestic supply	continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
1220 feet east and 100 feet south of the center of Sec. 33

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, E. OR W. W.M.	W.R.I.A.	COUNTY
NE¼SW¼SE¼	33	19	1 E	11	Pierce

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY WATER TO BE USED ON

E½W½SE¼, Sec. 33, T. 19 N., R. 1 E.W.M.;
EXCEPT the SE¼SE¼W½SE¼;
AND EXCEPT the following described tract: commencing at a point on the south line of said W½SE¼ 607.5 feet east of the southwest corner thereof; east 105 feet; thence north 412.5 feet; thence west 105 feet; thence south 412.5 feet to point of beginning; AND EXCEPT road.

PROVISIONS

The access port as required on your permit, shall be maintained at all times.

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.020.

This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Olympia, Washington, this 26th *day of* September, *19* 75

JOHN A. BIGGS, *Director*
Department of Ecology

by E. W. Anselstine, Regional Manager

ENGINEERING DATA
OK P

FOR COUNTY USE ONLY

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PERMIT

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ SURFACE WATER ☒ GROUND WATER

PERMIT NUMBER	APPLICATION NUMBER	PRIORITY DATE	
G2-20970P	G2-20970	April 27, 1973	220970

NAME: FAYE COLBERT AND FLOYD SINGLETARY — Acpt'd: Richardson Water Co. Tacoma, Wn. 1-20-75

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
10307 Bridgeport Way SW	Tacoma	Washington	98499

The applicant is, pursuant to the Report of Examination which has been accepted by the applicant, hereby granted a permit to appropriate the following described public waters of the State of Washington, subject to existing rights and to the limitations and provisions set out herein.

PUBLIC WATER TO BE APPROPRIATED

SOURCE: well

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	80	18

QUANTITY, TYPE OF USE, PERIOD OF USE: 18 acre-feet per year — community domestic supply — continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL: 1220 feet east and 100 feet south of the center of Sec. 33

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
NE¼NW¼SE¼	33	19	1 E	11	Pierce

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY WATER TO BE USED ON

E½NW¼SE¼, Sec. 33, T. 19 N., R. 1 E.W.M.;
EXCEPT the SE¼SE¼NW¼SE¼;
AND EXCEPT the following described tract: commencing at a point on the south line of said NE¼SE¼ 607.5 feet east of the southwest corner thereof; east 105 feet; thence north 412.5 feet; thence west 105 feet; thence south 412.5 feet to point of beginning;
AND EXCEPT road.

DESCRIPTION OF PROPOSED WORKS

well 8" x 300'

DEVELOPMENT SCHEDULE

BEGINNING DATE	COMPLETION DATE	DATE COMPLETE APPLICATION OF WATER TO BE MADE
February 1, 1975	February 1, 1976	February 1, 1977

PROVISIONS

Nothing in this permit shall be construed as excusing the permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations including those administered by local agencies under the Shoreline Management Act of 1971.

The installation of an access port as described in Ground Water Bulletin No 1 shall be required prior to issuance of final Certificate of Water Right.

Permittee is advised that notice of proof of appropriation of water (under which final certificate of water right issues) should not be filed until the permanent diversion facilities have been installed together with a mainline system capable of delivering the recommended quantity of water to an existing or proposed distribution system within the area to be served.

This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or fail to give notice to the Department of Ecology on forms provided by that Department documenting such compliance

Given under my hand and the seal of this office at Olympia, Washington, this 19th *day of* March, 19 74.

JOHN A. BIGGS, *Director*
Department of Ecology

by R. Jerry Bollen
R. Jerry Bollen
Assistant Director

ENGINEERING DATA
OK

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

REPORT OF EXAMINATION
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ SURFACE WATER ☒ GROUND WATER

APPLICATION NO.	PRIORITY DATE OF APPLICATION
G2-20970	April 27, 1973

NAME
PETE COLBERT AND WLOYD SINGLETARY

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
10207 Bridgeport Way SW	Tacoma	Washington	98499

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
well

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	80	18

QUANTITY, TYPE OF USE, PERIOD OF USE		
18 acre-feet per year	community domestic supply	continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
1220 feet east and 100 feet south of the center of Sec. 33

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	W.R.I.A.	COUNTY
NE¼NE¼SE¼	33	19	1 E	11	Pierce

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY WATER TO BE USED ON

E½NW¼SE¼, Sec. 33, T. 19 N., R. 1 E.W.M.;
EXCEPT the SE¼SE¼NW¼SE¼;
AND EXCEPT the following described tract: commencing at a point on the south line of said NW¼SE¼ 607.5 feet east of the southwest corner thereof; east 105 feet; thence north 412.5 feet; thence west 105 feet; thence south 412.5 feet to point of beginning;
AND EXCEPT road.

(SEE REVERSE SIDE)

DESCRIPTION OF PROPOSED WORKS

well 8" x 300'

DEVELOPMENT SCHEDULE

BEGINNING DATE	COMPLETION DATE	DATE COMPLETE APPLICATION OF WATER TO BE MADE
February 1, 1975	February 1, 1976	February 1, 1977

PROVISIONS AND RECOMMENDATIONS

"The installation of an access port as described in attached Ground Water Bulletin No. 1 shall be required prior to issuance of final certificate of water right. The applicant may, for his own convenience, wish to install an airline and gage in addition to the access port."

Use of the waters to be appropriated under this application will be for a public water supply. State Board of Health rules require every owner of a public water supply to obtain written approval from the Assistant Secretary, Health Services Division prior to any new construction or alterations of a public water supply.

There are no ground water rights of record with this office within ½ mile of applicants' well site.

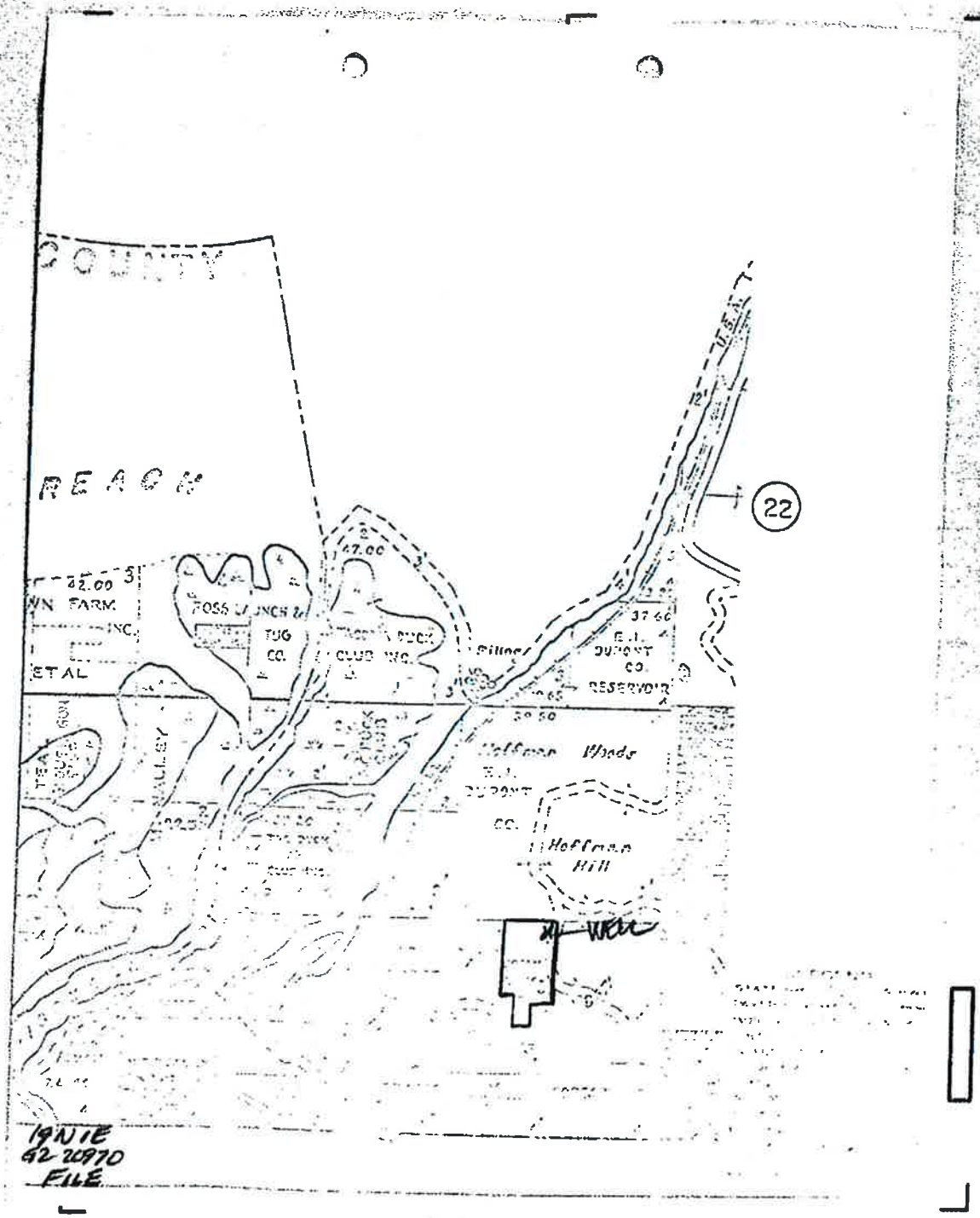
The water requirement for this development is based on an average use of 500 gallons per day per lot, or 18 acre-feet per year for 32 lots.

Applicant is advised that notice of proof of appropriation of water (under which final certificate of water right issues) should not be filed until the permanent diversion facilities have been installed together with a mainline system capable of delivering the recommended quantity of water to an existing or proposed distribution system within the area to be served.

Additionally, the permit when issued shall carry the following provision: "Nothing in this permit shall be construed as excusing the permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations including those administered by local agencies under the Shoreline Management Act of 1971."

Signed at Olympia, Washington,
this 19 day of Feb, 1974.

DEAN WOOD, Resources Management
Department of Ecology


COUNTY
BEACH
22
22.00
FARM
INC.
ET AL
TUG
CO.
CLUB HO.
Pillbox
E.I.
DUPONT
CO.
RESERVOIR
37.60
47.00
Hoffman Woods
E.I.
DUPONT
CO.
Hoffman
Hill
VALLEY
TRAIL
19NIE
62 20970
FILE

For Ecology Use
(Date Stamp)

DEPARTMENT OF ECOLOGY
State of Washington

WATER RESOURCES
Application for Change/Transfer of a Water Right

You must include a $50.00 minimum filing fee with this application for:

(Check all that apply.)
- ☐ Change purpose(s) of use
- ☐ Add purpose(s) of use
- ☐ Change/transfer place of use
- ☒ Change point(s) of diversion/withdrawal
- ☐ Add point(s) of diversion/withdrawal
- ☐ Other (i.e. consolidation, intertie, trust water)

Explain: _____

No filing fee is required for applications for:
- ☐ Drought
- ☐ Cost Reimbursement
- ☐ Water Conservancy Board

FOR OFFICIAL USE ONLY

DATE APPLICATION RECEIVED _____
CHECK NO. _____ FEE $ _____
DATE ACCEPTED _____ BY _____
CHANGE NO. _____
COUNTY _____ WRIA _____
SPECIAL AREA _____

SEPA: ☐ EXEMPT ☐ NOT EXEMPT

ECY CODING: 001-002-WR10285-000011

APP NO. _____ PERMIT NO. _____
CERT NO. _____ CERT OF CHG NO. _____

☐ **I have completed a pre-application consultation with Ecology.**

1. Applicant Information

APPLICANT/BUSINESS NAME	PHONE NO.	FAX NO.
City of DuPont	253-912-5381	253-964-1455
ADDRESS		
1700 Civic Center Drive		
CITY	STATE	ZIP CODE
DuPont	WA	98327
EMAIL ADDRESS (IF AVAILABLE)		

CONTACT (IF DIFFERENT FROM ABOVE)	PHONE NO.	FAX NO.
Dominic Miller, Gray & Osborne Engineers	360-292-7481	360-292-7517
ADDRESS		
2102 Carriage Drive SW		
CITY	STATE	ZIP CODE
Olympia	WA	98502
EMAIL ADDRESS (IF AVAILABLE)		
dmiller@g-o.com		

LEGAL LAND OWNER or PART OWNER OF PROPOSED PLACE OF USE	PHONE NO.	FAX NO.
All land owners within City of DuPont water service area		
ADDRESS		
CITY	STATE	ZIP CODE
DuPont	WA	
EMAIL ADDRESS (IF AVAILABLE)		

2. Water Right Information

WATER RIGHT OR CLAIM NUMBER	RECORDED NAME(S)
G2-20970	Richardson Water Company

DO YOU OWN THE RIGHT TO BE CHANGED? ☒ YES ☐ NO

IF NO, PROVIDE OWNER(S) NAME and ADDRESS: _____

HAS THE WATER BEEN USED AS AUTHORIZED IN THE LAST FIVE (5) YEARS? ☒ YES ☐ NO

- Attach copies of any documentation that shows the historical use of water that has occurred since the right was established.
- If you have a water system plan or conservation plan, please include a copy with your application.

3. Point(s) of Diversion/Withdrawal:

A. Existing

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #
El Rancho Madrona Well	1	NW	SE	33	19N	01E	3693000121	AEF218

B. Proposed (if different from 3.A.)

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #
Hoffman Hill Well 1	1	SE	NE	33	19N	01E	3001061610	AAD989
Hoffman Hill Well 2	2	NW	NW	34	19N	01E	3001091120	AHM258

C. DO YOU OWN THE EXISTING AND PROPOSED POINT(S) OF DIVERSION/WITHDRAWAL?

EXISTING: ☒ YES ☐ NO PROPOSED: ☒ YES ☐ NO – IF NO, PROVIDE OWNER NAME(S): _____

- Include copies of all associated water well reports.
- If you know the distances from the nearest section corner to the above point(s) of diversion/withdrawal, please include that information in Item No. 6 (remarks) or as an attachment.

4. Purpose of Use:

A. Existing

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE

B. Proposed (if different from 4.A.)

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE

5. Place of Use:

A. Existing

LEGAL DESCRIPTION OF LANDS WHERE WATER IS PRESENTLY USED:							
Water Service Area of the City of DuPont							
¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES

DO YOU OWN ALL THE LANDS IN THE EXISTING PLACE OF USE? ☐ YES ☐ NO

IF NO, PROVIDE OWNER NAME(S):

B. Proposed (if different than 5.A.)

LEGAL DESCRIPTION OF LANDS WHERE NEW USE IS PROPOSED:							
Water Service Area of the City of DuPont							
¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES

DO YOU OWN ALL THE LANDS IN THE PROPOSED PLACE OF USE? ☐ YES ☐ NO

IF NO, PROVIDE OWNER NAME(S):

- Attach a detailed map of your proposed change/transfer. The map should show existing and proposed point(s) of diversion/withdrawal, place of use and any other features involved with this application.
- If platted property, please include a certified copy of the plat map.

C. Are there any additional water rights or claims related to the same property as the one proposed for change/transfer?

☐ YES ☒ NO – IF YES, PROVIDE THE WATER RIGHT/CLAIM NUMBER(S):

6. Remarks and Other Relevant Information:

El Rancho Madrona Well is 1,220 feet east and 100 feet south of the center of Section 33.

Hoffman Hill Well 1 is 440 feet west and 840 feet north of the SE corner of the NE quarter of Section 33.

Hoffman Hill Well 2 is 940 feet east and 2,030 feet north of the SW corner of the NW quarter of Section 34

IF FOR SEASONAL OR TEMPORARY, START DATE ___/___/____ END DATE ___/___/____

Certain applications may incur a Real Estate Excise Tax liability for the seller of the water rights. The Department of Revenue has requested notification of potential taxable water right related actions and therefore may be provided with a copy of this request. For further information, contact:

Department of Revenue
Real Estate Excise Tax
PO Box 47477
Olympia, WA 98504-7477

Phone (360) 570-3265

7. Signatures:

I certify that the information above is true and accurate to the best of my knowledge. I understand that in order to process my application, I hereby grant staff from the Department of Ecology or the County Conservancy Board access to the above site(s) for inspection and monitoring purposes. If assisted in preparing this above application, I understand that all responsibility for the accuracy of the information rests with me.

Applicant Printed Name – Title	**Applicant Signature**	**(Date: MM/DD/YYYY)**
Water Right Holder Printed Name	**Water Right Holder Signature**	**(Date: MM/DD/YYYY)**
Land Owner of Existing Place of Use Printed Name	**Land Owner of Existing Place of Use Signature**	**(Date: MM/DD/YYYY)**
Land Owner of Proposed Place of Use Printed Name	**Land Owner of Proposed Place of Use Signature**	**(Date: MM/DD/YYYY)**

***Submit your application to:** DEPARTMENT OF ECOLOGY CASHIERING SECTION PO BOX 47611 OLYMPIA, WA 98504-7611	☐ Central Regional Office 1250 W. Alder Street Union Gap, WA 98903-0009 (509) 575-2490	☐ Eastern Regional Office 4601 N. Monroe Street Spokane, WA 99205-1265 (509) 329-3400
	☐ Northwest Regional Office 3190 – 160th Avenue SE Bellevue, WA 98008-5452 (425) 649-7000	☒ Southwest Regional Office PO Box 47775 Olympia, WA 98504-7775 (360) 407-6300

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

CERTIFICATE OF WATER RIGHT

☐ Surface Water (issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
April 22, 1988	G2-27326	G2-27326 P	G2-27326 C

NAME
City of Dupont

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
Post Office Box 455	Dupont	Washington	98327-0455

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown, but is limited to an amount actually beneficially used.

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Bell Hill Well No. 1

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	900	1149

QUANTITY, TYPE OF USE, PERIOD OF USE		
1149 acre-feet per year	Municipal Supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
1225 feet south and 1000 feet east of the west quarter corner of Section 25.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
NW¼SW¼	25	19	1E	11	Pierce

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by City of Dupont, Pierce County, Washington.

PROVISIONS

The well access port shall be maintained at all times.

An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through -040. Meter readings shall be recorded at least monthly.

The Water Resources Act of 1971 specifies certain criteria regarding utilization and management of the waters of the state in the best public interest. Use of water may be subject to regulation at certain times, based on the necessity to maintain water quantities sufficient for preservation of the natural environment.

"Water level measurements of Bell Hill Well #1 shall be made and recorded at least twice per month during the first year of operation, and at least monthly there after. The measurements shall be made using a consistent methodology in accordance with accepted industry standards. A yearly summary of monthly water level data and monthly totals of water pumped from Well #1 shall be submitted annually to the Department of Ecology, Southwest Regional Office. The above data shall be submitted during the moth of February, or more frequently if requested by Ecology."

"It is recommended that stream flow monitoring of Sequalitchew Creek by reestablished, and a management plan for the creek developed."

"In conjunction with Washington State Department of Health routine bacteriological sampling requirements, quarterly chloride samples shall be taken. The sampling results shall be submitted yearly to the Department of Ecology's Water Resource Program."

"Wells completed within 2 miles of Bell Hill Well No. 1 in the Flett Creek Glacial Unit, may be adversely impacted, and the applicant is reminded that should adverse consequences develop, the withdrawal from Bell Hill Well No. 1 may be regulated."

This permit is subject to the implementation of the minimum requirements established in the Interim Guidelines for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology and Conservation Programs, July 1990.

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.020.

This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Olympia, Washington,

this 21 *day of* October, *19*92.

Fred Olson, Acting Director
Department of Ecology

ENGINEERING DATA
OK GB

by Jane Bloomstrom

FOR COUNTY USE ONLY

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

SUPERSEDING PERMIT
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
November 7, 1988	G2-27450	G2-27450	

NAME
City of DuPont

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
301 Barksdale Avenue	DuPont	Washington	98327

The applicant is hereby granted a permit to appropriate the following public waters of the State of Washington, subject to existing rights and to the limitations and provisions set herein.

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Bell Hill Well #2

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE FEET PER YEAR
	1000	1237

QUANTITY, TYPE OF USE, PERIOD OF USE		
1237 Acre-feet per year	Municipal supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION--WITHDRAWAL
1200 feet South and 900 feet East of the West quarter corner of Section 25.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N	RANGE, (E OR W) W M	W R I A	COUNTY
NW¼ SW¼	25	19	1E	11	Pierce

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by City of DuPont, Pierce County, Washington.

DESCRIPTION OF PROPOSED WORKS

A 16" X 516' well equipped with a pump capable of discharging 1000 gpm.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	Completed	January 1, 2016

PROVISIONS

All wells constructed in the State shall meet the construction requirements of Chapter 173-160 WAC entitled "Minimum Standards for the Construction and Maintenance of Wells" and Chapter 18-104 RCW entitled "Water Well Construction, Act (1971)."

Installation and maintenance of an access port as described in Chapter 173-160 is required. An air line and gauge may be installed in addition to the access port.

An approved measuring device shall be installed and maintained for each of the sources identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", Chapter 173-173 WAC.

Water use data shall be recorded weekly. The maximum rate of diversion/withdrawal and the annual total volume shall be submitted to Ecology by January 31st of each calendar year.

The following information shall be included with each submittal of water use data: owner, contact name if different, mailing address, daytime phone number, WRIA, Permit/Certificate/Claim No., source name, annual quantity used including units, maximum rate of diversion including units, monthly meter readings including units, peak monthly flow including units, Department of Health WFI water system number and source number(s), purpose of use, well tag number, open channel flow or pressurized diversion and period of use. In the future, Ecology may require additional parameters to be reported or more frequent reporting. Ecology prefers web based data entry, but does accept hard copies. Ecology will provide forms and electronic data entry information. Submit data to: Department of Ecology, SWRO/WR PO Box 47775, Olympia, WA 98504-7775.

Chapter 173-173 WAC describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition Ecology for modifications to some of the requirements. Installation, operation and maintenance requirements are enclosed as a document entitled "Water Measurement Device Installation and Operation Requirements".

Department of Ecology personnel, upon presentation of proper credentials, shall have access at reasonable times, to the records of water use that are kept to meet the above conditions, and to inspect at reasonable times any measuring device used to meet the above conditions.

(continued on page 3)

This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or to give notice to the Department of Ecology on forms provided by that Department documenting such compliance.

Given under my hand and the seal of this office at Olympia, Washington,

this 6th *day of* February, *2007.*

Department of Ecology

by Thomas Loranger

Thomas Loranger, Section Manager

OK_____

If you require this publication in an alternate format, please contact Water Resources at (360) 407-6300, or TTY (for the speech or hearing impaired) 711 or 800-833-6388.

Provisions Continued

"Water level measurements of Bell Hill #2 shall be made and recorded at least twice per month during the first year of operation, and at least monthly there after. The measurements shall be made using consistent methodology in accordance with accepted industry standards. A yearly summary of monthly water level data and monthly totals of water pumped from Well #2 shall be submitted annually to the Department of Ecology, Southwest Regional Office. The above data shall be submitted during the month of February, or more frequently if requested by Ecology."

"In conjunction with Washington State Department of Health routine bacteriological sampling requirements, quarterly chloride samples shall be taken. The sampling results shall be submitted yearly to the Department of Ecology's Water Resources Program."

The Water Resources Act of 1971 specifies certain criteria regarding utilization and management of the waters of the state in the best public interest. Use of water may be subject to regulation at certain times, based on the necessity to maintain water quantities sufficient for preservation of the natural environment.

Issuance of this water right is subject to the implementation of the minimum requirements established in the Conservation Planning Requirements, Guideline and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the states water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

SUPERSEDING PERMIT
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
December 1, 1989	G2-27663	G2-27663	

NAME
City of DuPont

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
303 Barksdale Ave	DuPont	Washington	98327-9002

The applicant is pursuant to the Report of Examination which has been accepted by the applicant, hereby granted a permit to appropriate the following public waters of the State of Washington, subject to existing rights and to the limitations and provisions set herein.

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Hoffman Hill Wells 1 & 2
TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE FEET PER YEAR
	2200	2696 (Partially Supplemental)

QUANTITY, TYPE OF USE, PERIOD OF USE		
774 Acre-feet per year (Primary)	Municipal supply	Year-round, as needed
1922 Acre-feet per year (Supple.)	Municipal supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION--WITHDRAWAL
Well 1: 440 feet West and 840 feet North of the Southeast corner of Section 33.
Well 2: 940 feet East and 2030 feet North of the Southwest corner of Section 34.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼ NE¼ and NW¼ NW¼	33 & 34	19	1E	11	Pierce

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

City of DuPont Water Service area as described in the City's Water Comprehensive Plan and Urban Growth Boundary as established by currently adopted comprehensive plan (2002).

DESCRIPTION OF PROPOSED WORKS

Two wells, completed in Salmon Springs/Flett Creek Formation.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	September 1, 2003	September 1, 2008

PROVISIONS

The permittee is advised that the quantity of water allocated by this permit may be reduced at the time of final certification to reflect system capacity and actual usage.

An approved measuring device shall be installed and maintained for each of the sources identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", Chapter 173-173 WAC.

Water use data shall be recorded weekly. The maximum monthly rate of diversion/withdrawal and the monthly total volume shall be submitted to Ecology by January 31st of each calendar year. Ecology is requiring submittal of monthly meter readings to collect seasonal information for water resource planning, management and compliance.

The following information shall be included with each submittal of water use data: owner, contact name if different, mailing address, daytime phone number, WRIA, Permit/Certificate/Claim No., source name, annual quantity used including units, maximum rate of diversion including units,

1. monthly meter readings including units,
2. Department of Health WFI water system number and source number(s), and period of use. In the future, Ecology may require additional parameters to be reported or more frequent reporting. Ecology prefers web based data entry, but does accept hard copies. Ecology will provide forms and electronic data entry information.

Chapter 173-173 WAC describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition Ecology for modifications to some of the requirements. Installation, operation and maintenance requirements are enclosed as a document entitled "Water Measurement Device Installation and Operation Requirements".

Department of Ecology personnel, upon presentation of proper credentials, shall have access at reasonable times, to the records of water use that are kept to meet the above conditions, and to inspect at reasonable times any measuring device used to meet the above conditions.

This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or to give notice to the Department of Ecology on forms provided by that Department documenting such compliance.

Given under my hand and the seal of this office at Olympia, Washington,

this 6th *day of* February, *2003.*

Department of Ecology

ENGINEERING DATA
OK JW

by
J. Mike Harris, Section Supervisor

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
AMENDED

REPORT OF EXAMINATION

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ **Surface Water** (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ **Ground Water** (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
December 1, 1989	G2-27663		

NAME
City of DuPont

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
PO Box 455	DuPont	Washington	98327-0455

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Hoffman Hill 1 & 2

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	2200	2696 (Partially Supplemental)

QUANTITY, TYPE OF USE, PERIOD OF USE		
774 Acre-feet per year(Primary)	Municipal supply	Year-round, as needed
1922 Acre-feet per year (supplemental)	Municipal supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION–WITHDRAWAL
750 feet North and 500 feet West of the East quarter corner of Section 33.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼ NE¼	33	19	1E	11	Pierce

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the City of DuPont as described in a Department of Health approved Water System Plan.

DESCRIPTION OF PROPOSED WORKS

Two wells, 20-inch casing completed at approximately 500 feet below ground level.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
September 1, 1998	September 1, 2003	September 1, 2008

REPORT

BACKGROUND:

On December 1, 1989, on behalf of the City of DuPont, Weyerhaeuser Real Estate Company filed an application requesting a permit to withdraw public ground water from two wells, at a withdrawal rate of 2,200 gallons per minute (gpm), for municipal supply. These wells are to be located at Hoffman Hill and will be connected to a water system that includes Bell Hill Wells 1 and 2. The well site is located within Nisqually Water Resource Inventory Area (WRIA) 11.

Legal notices of the proposed appropriation have been published, and no objections have been received.

Based on the following report and the provisions of Chapters 90.03 and 90.44 Revised Code of Washington (RCW), I recommend approval of Permit G2-27663.

INVESTIGATIONS:

In consideration of this application, I reviewed the information submitted by the applicant, along with pertinent State records such as well drilling reports, recorded water rights, and stream-flow and precipitation data.

Documents reviewed included the Lake Sellers Groundwater Development, Phase I Feasibility Assessment, DuPont, Washington prepared by Hart-Crowser (1987), the City of DuPont, Draft Water System Comprehensive Plan prepared by Gray & Osborne, Inc. (1997), the Hydrologic Report for Bell Hill No. 1 and the Hydrologic Report for Bell Hill No. 2, both prepared by Hart-Crowser (1988 and 1990), and Ecology's Reports of Examination for G2-27326 and G2-27450.

Project Description

The town of DuPont, located between the Nisqually Delta, Fort Lewis, and the Town of Steilicoom, until recently has remained small and undeveloped. The city limits encompass approximately 3,736 acres, the majority of which is still undeveloped. Growth in the DuPont area is expected to increase dramatically with the addition of the 3,000-acre planned Weyerhaeuser/Northwest Landing community. The City of DuPont is expected to reach "build-out" with a population of approximately 11,000 in the next twenty years.

The intent of this application is to secure a permit for the construction of 2 deep wells to be located at the City of DuPont's Hoffman Hill site. Hoffman Hill is situated in the southwest corner of the City's service area and about one-half mile east of the Nisqually delta.

Hydrogeology

The Northwest Landing/DuPont project site straddles the surface water divide between the Clover-Chambers Water Resources Inventory Area (WRIA 12) and the Nisqually River (WRIA 11). Sequalitchew Creek flows through the project site. The Hoffman Hill site is situated about 2 1/2 miles southwest of the Bell Hill site, in the southwest corner of the city limits, within WRIA 11.

The area surrounding DuPont is characterized by surficial deposits of outwash gravel deposited during the most recent glaciation, the Vashon Stade of the Fraser Glaciation. Well drilling in the DuPont area has shown the presence of several aquifers in the underlying sands and gravels. The Bell Hill wells penetrated three of these aquifers.

The aquifer system in this area consists of hydrogeologic units of alternating higher and lower hydraulic conductivity, mainly glacial outwash alternating with layers of till and non-glacial clay, silt, and sand. Hart-Crowser (Lake Sellers Groundwater Development Phase I Feasibility Assessment, 1987) named the three

principal aquifers, from shallowest to deepest, as the Vashon aquifer, the Salmon Springs aquifer, and an older undifferentiated outwash aquifer - possibly identified as the Lakewood Glacial aquifer (Noble 1990).

The uppermost, or Vashon, aquifer occurs at depths of 150 to 200 feet below ground surface and is unconfined in most areas. Due to its high susceptibility for contamination and large seasonal water-level fluctuations, the Vashon aquifer is not considered to be a viable source for water.

The Salmon Springs aquifer occurs at depths of between 200 and 400 feet and is separated from the overlying Vashon aquifer by a layer of low permeability silt and glacial till.

The older outwash aquifer occurs at depths of below 600 feet and is separated from the Salmon Springs aquifer by 150 to 300 feet of interglacial deposits with relatively much lower permeability.

Ground water in this vicinity is recharged by precipitation on the upland area to the east and northeast. It then flows both horizontally and vertically through aquifers and aquitards and finally discharges to Puget Sound, on the west, to the lower reaches of the Nisqually River on the south, and to springs along the marine bluffs. The deepest ground water probably follows the longest flow paths and may be recharged in areas lying several miles inland. The ground water flows generally to the northwest.

DISCUSSION:

DuPont proposes to complete the subject wells in either the Salmon Springs aquifer, where Bell Hill 1 is completed or the deeper Lakewood aquifer in which Bell Hill Well 2 is completed. In the opinion of Hart-Crowser consultants, pumping from either zone will not induce additional leakage from the upper aquifer system. Most of the water that will be pumped would, otherwise, discharge to Puget Sound or to the lowest reach of the Nisqually River within its zone of tidal effect. Therefore, the proposed pumping will not adversely affect the shallower aquifers and springs, and no senior ground-water or surface-water rights (including instream flows) will be impaired.

I recommend issuance of a permit, under the condition that the proposed wells withdraw from a confined aquifer, where it is unlikely to affect the flow of surface water in WRIA 11 or 12.

Existing Water Rights

The City of DuPont holds the following water rights:

Number	Name	GPM	Ac-ft/Year	
G2-27326 C	Bell Hill 1	950	1,149	
G2-27450 P	Bell Hill 2	1000	1,237	**
G2-20970 C	El Rancho M.	80	18	***
636-D	Village 1	60	44	*
635-D	Village 2	150	138	*
Total		2240	2586	

** The above totals include all water rights currently allocated to City of DuPont. Due to poor water quality, the City is unable to use the Village wells. Certificate 636-D and 635-D have, however, been issued as municipal water rights and are not automatically subject to relinquishment for non-use.*

*** Although Bell Hill 2 can produce 1000 gpm, the well is routinely limited to a withdrawal rate of about 300 gpm due to high manganese concentrations. Permit G2-27450 may, ultimately, be certificated for less than the entire annual allocation.*

**** El Rancho Madrona is operated as a separate system but will eventually be interconnected with the rest of the system as development in that part of the service area increases.*

Current Annual Water Use/Demand Projection

The City's Comprehensive Plan has projected a "built-out" population of approximately 11,000 persons over the next twenty to thirty years. The residential water-demand projections are based on a per capita demand of 105 gpcd and residential densities consistent with the City of DuPont comprehensive plan. To accommodate this growth, the City projects a need for an average daily water demand of approximately 3 million gallons per

day by the year 2019 (3,360 acre-feet per year). To meet this demand projection, DuPont will need an additional 774 acre-feet per year.

Quantities For Permit

A withdrawal rate of 2,200 gpm has been requested for the two proposed production wells, and this rate will be authorized as the interim production rate . The final withdrawal rate and annual allocation will be based on actual capacity and may be reduced to reflect a safe, sustainable yield.

The annual quantity permitted from these wells will be based on a 12 to 14-hour-per-day pumping schedule at a rate of 2,200 gpm. On this basis, the Hoffman Hill wells will produce approximately 1,922 acre-feet per year. The permit will authorize that annual quantity, with 774 acre-feet per year as a primary allocation, and the remaining 1,148 as supplemental to rights already held by the City of DuPont.

With the issuance of this permit and other existing rights, the City of DuPont will hold an annual primary allocation of 3,360 acre-feet per year, with a supplemental allocation of 1,922 acre-feet per year. This supplemental allocation is non-additive and will allow the City flexibility in managing pumping of the Hoffman Hill wells to compensate for less productive or unusable wells.

Effect On Neighboring Water Users

The largest concentration of water rights in this area is situated over a mile to the northeast. From 1909 to 1976, the E.I. DuPont de Nemours Company operated an explosives manufacturing plant in the vicinity of the City of DuPont. Water use by the Company was authorized by three ground-water certificates totaling 2,320 gpm and 2,663 acre-feet per year. With the exception of fire-protection, and those uses related to the remediation project, these wells have not been used in over a decade. If Weyerhaeuser cannot demonstrate that the wells have been actively used within the last five years, the majority of the certificated quantities should be formally relinquished.

Directly southwest (approximately 1000 feet) of the Hoffman Hill site is the City of DuPont's El Rancho Madrona well, which is 311 feet deep and serves a residential subdivision of 33 homes as a stand-alone system. It is not anticipated that operations of the new DuPont wells will directly effect this well, and eventually, the El Rancho well may be tied into the rest of the system.

Conservation Planning

Under RCW 90.03.005 and 90.54.020(6), the Department of Ecology must emphasize conservation and water-use efficiency in management of the state's water resources and must reduce the waste of water, as far as practicable. The City of DuPont is committed to the responsible use of water and has developed a Conservation Plan as a component of its 1997 Water System Plan. The plan includes the implementation of a leak detection program. Issuance of this permit will require fulfillment of any conditions specified by DOH for approval of the plan and will require implementation of the approved program

FINDINGS AND CONCLUSIONS:

1. These wells are to be completed in a deep aquifer that discharges to marine waters or to the lowest reach of the Nisqually River. The use of these wells will not impair neighboring senior surface-water or ground-water rights.

2. This appropriation, as recommended, is a beneficial use and will not impair existing rights or be detrimental to public welfare.

RECOMMENDATION:

I recommend that this application be approved for 2,200 gpm and 774 acre-feet per year primary rights and 1,922 acre-feet per year to be supplemental to rights already held by the City of DuPont. The period of use is year-round, as needed.

This permit will be subject to the following provisions.

Provisions

The water appropriated under this application will be used for public water supply. The State Board of Health rules require public water supply owners to obtain written approval from the Office of Water Supply, Department of Health, Mail Stop 7822, Building 3, Olympia, Washington 98504-7822, prior to any new construction or alterations of a public water supply system.

Installation and maintenance of an access port as described in WAC 173-160-355 is required. An air line and gauge may be installed in addition to the access port.

"This well shall be constructed in accordance with the *Minimum Standards for Construction and Maintenance of Wells* as provided under RCW 18.104, Washington Water Well Construction Act of 1972, and Chapter 173-160 WAC. This includes a permanent surface seal, as described in Chapter 173-160-224, 255, 265 and 275 WAC."

All water wells constructed within the State shall meet the minimum standards for well construction and maintenance as provided under RCW 18.104, Washington Water Well Construction Act of 1972, and Chapter 173-160 WAC, Minimum Standards for Construction and Maintenance of Wells.

A completed well report of the well shall be submitted by the driller to the Department of Ecology within 30 days of completing this well. All pump test data for this well shall be submitted to the Department as it is obtained.

An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through -040. Meter readings shall be recorded at least monthly.

Issuance of this water right is subject to the implementation of the minimum requirements established in the Conservation Planning Requirements, Guideline and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the states water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

"Water-pumpage, well-monitoring, and static-water-level data, along with a summary and analysis of the data, shall be submitted annually, or more frequently upon request, to Ecology's Southwest Regional Office Water Resources Program. The data shall be submitted in digital format (ASCII) and shall include the following elements:

For Water Use Reporting:

1. Measurement method (totaling meter, acoustic meter, etc.) for each well
2. Total volume pumped from each well by month in thousands or millions of gallons
3. Unique Well ID number

For Water Level Reporting:

1. Unique Well ID Number
2. Measurement date and time
3. Measurement method (air line, electric tape, pressure transducer, etc.)
4. Well status (pumping, recently pumped, etc.)
5. Water level accuracy (to nearest foot, tenth of foot, etc.)
6. Description of the measuring point (top of casing, sounding tube, etc.)
7. Measuring point elevation above or below land surface to the nearest 0.1 foot

8. Land surface elevation at the well head to the nearest foot.

9. Static water level below measuring point to the nearest 0.1 foot.

Upon completion of construction, an aquifer test shall be conducted on these wells at the proposed rate of withdrawal, following the procedures outline in WRIS Information Bulletin No. 30. Results of this test shall be submitted to Department of Ecology prior to filing proof of appropriation. The instantaneous rate authorized under the resulting certificate may be reduced to reflect the production capacity of this well, or to protect existing rights.

"The applicant is advised that notice of Proof of Appropriation of water (under which the final certificate of water right is issued) should not be filed until the permanent distribution system has been constructed and that quantity of water allocated by the permit has been put to full beneficial use."

REPORTED BY: Jill E Walsh Date: August 20, 1997

The statutory permit fee for this application is $20.00.

FINDINGS OF FACT AND DECISION

Upon reviewing the above report, I find all facts, relevant and material to the subject application, have been thoroughly investigated. Furthermore, I find water is available for appropriation and the appropriation as recommended, is a beneficial use and will not be detrimental to existing rights or the public welfare.

Therefore, I **ORDER** a permit be issued under Ground Water Application Number G2-27663, subject to existing rights and indicated provisions, to allow appropriation of public ground water for the amount and uses specified in the foregoing report.

Signed at Olympia, Washington, this 20th day of August ,1997.

Gale Blomstrom

Gale Blomstrom
Shorelands & Water Resources Supervisor
Southwest Regional Office

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PERMIT
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
April 25, 1997	G2-29489	G2-29489	

NAME
City of DuPont

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
303 Barksdale Avenue	DuPont	Washington	98327

The applicant is pursuant to the Report of Examination which has been accepted by the applicant, hereby granted a permit to appropriate the following public waters of the State of Washington, subject to existing rights and to the limitations and provisions set hereln.

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Bell Hill 3

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE FEET PER YEAR
	1,000	1,210 (Supplemental)

QUANTITY, TYPE OF USE, PERIOD OF USE		
1210 Acre-feet per year	Municipal supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION--WITHDRAWAL
800 feet South and 400 feet West of the center of Section 25.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
NE¼ SW¼	25	19	1E	12	Pierce

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

City of DuPont water service area as defined by current approved water system comprehensive Plan and urban growth area as established by current adopted comprehensive plan.

DESCRIPTION OF PROPOSED WORKS

A well, 20-inch casing to 282.5 feet deep.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
	September 1, ~~1999~~ 2005 2001	September 1, 2019

PROVISIONS

Installation and maintenance of an access port as described in Chapter 173-160 is required. An air line and gauge may be installed in addition to the access port.

An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, 90.44.450 and WAC 508-64-020 through -040, and WAC 508-12-030. Meter readings shall be recorded at least monthly.

Issuance of this water right is subject to the implementation of the minimum requirements established in the Conservation Planning Requirements, Guideline and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the states water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

Water-pumpage, well-monitoring, and static-water-level data, along with a summary and analysis of the data, shall be submitted annually, or more frequently upon request, to Ecology's Southwest Regional Office Water Resources Program. The data shall be submitted in digital format (ASCII) and shall include the following elements:

For Water Use Reporting:

1. Measurement method (totaling meter, acoustic meter, etc.) for each well
2. Total volume pumped from each well by month in thousands or millions of gallons
3. Unique Well ID number

For Water Level Reporting:

1. Unique Well ID Number
2. Measurement date and time
3. Measurement method (air line, electric tape, pressure transducer, etc.)
4. Well status (pumping, recently pumped, etc.)
5. Water level accuracy (to nearest foot, tenth of foot, etc.)
6. Description of the measuring point (top of casing, sounding tube, etc.)
7. Measuring point elevation above or below land surface to the nearest 0.1 foot
8. Land surface elevation at the well head to the nearest foot.
9. Static water level below measuring point to the nearest 0.1 foot.

A proof inspection will be conducted prior to final certificate issuance. The certificate will reflect the extent of the project perfected within the limitations of the permit. Aspects will include as appropriate the source(s), system instantaneous capacity, beneficial use(s), annual quantity, home services designed, place of use, and satisfaction of provisions.

The permittee is advised that notice of Proof of Appropriation of water (under which the final certificate of water right is issued) should not be filed until the permanent distribution system has been constructed and that quantity of water allocated by the permit to the extent water is required, has been put to full beneficial use.

STATE OF WASHINGTON

APPLICATION FOR CHANGE/TRANSFER OF WATER RIGHT

RECEIVED
01 MAY -3 P2:33

For filing with Ecology or with County Conservancy Boards

A MINIMUM FEE OF $10.00 PAYABLE TO ECOLOGY MUST ACCOMPANY THIS APPLICATION

(Check all that apply.)
- ☐ Change purpose(s) of use
- ☐ Add purpose(s) of use
- ☒ Change point(s) of diversion/withdrawal
- ☐ Add point(s) of diversion/withdrawal
- ☒ Change/transfer place of use
- ☐ Other (i.e. consolidation, intertie, trust water)

Explain: _____

FOR OFFICE USE ONLY
CHANGE No. 170 WRIA 11
DATE ACCEPTED 5/3/01 BY SC
FEE $ 1000 REC'D 5/3/01
CHECK No. _____
SEPA: ☒ Exempt ☐ Not exempt

*****IF MORE SPACE IS NEEDED, ATTACH ADDITIONAL SHEETS (PLEASE PRINT OR TYPE CLEARLY)*****

1. Applicant Information:

APPLICANT/BUSINESS NAME	PHONE NO.	FAX NO.
Weyerhaeuser Company	(253) 964-1153	(253) 964-8050
ADDRESS: PO Box 100		
CITY: DuPont	STATE: WA	ZIP CODE: 98327

CONTACT NAME (IF DIFFERENT FROM ABOVE)	PHONE NO.	FAX NO.
Jim Odendahl	(253) 964-1153	(253) 964-8050
ADDRESS: PO Box 100		
CITY: DuPont	STATE: WA	ZIP CODE: 98327

2. Water Right Information:

WATER RIGHT OR CLAIM NUMBER	RECORDED NAME(S)
Groundwater Permit No. 170	Weyerhaeuser Company
DO YOU OWN THE RIGHT TO BE CHANGED? ☒ YES ☐ NO	
IF NO, PROVIDE OWNER(S) NAME:	
HAS THE WATER BEEN PUT TO BENEFICIAL USE IN THE LAST FIVE (5) YEARS? ☒ YES ☐ NO	

Please attach copies of any documentation that demonstrates consistent, historical use of water since the right was established. Also, if you have a water system plan or conservation plan, please include a copy with your application.

FOR OFFICE USE ONLY
APP. NO. _____ PERMIT NO. 765 CERT. NO. 170 CERT. OF CHANGE NO. 170

WRIA 11

3. Point(s) of Diversion/Withdrawal:

A. Existing

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #
Well/groundwater	1	NE	NW	27	19	1E	01-19-27-1-001	AEB509
Well/groundwater	2	NE	NW	27	19	1E	01-19-27-1-001	AEB510
Well/groundwater	3	NE	NW	27	19	1E	01-19-27-1-001	AEB511

B. Proposed

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #
Well/groundwater	4	SE	SE	27	19	1E	01-19-27-1-001	

DO YOU OWN THE EXISTING AND PROPOSED POINT(S) OF DIVERSION/WITHDRAWAL?

EXISTING: ☒ YES ☐ NO PROPOSED: ☒ YES ☐ NO – IF NO, PROVIDE OWNER(S) NAME:

Please include copies of all water well reports involved with this proposal. Also, if you know the distances from the nearest section corner to the above point(s) of diversion/withdrawal, please include that information in Item No. 6 (remarks) or as an attachment.

4. Purpose of Use:

A. Existing

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE
Irrigation & Site Remediation	1250	690.5	1948 to present
			(1948-1998 was used as
			industrial. On 2/98
			Weyerhaeuser relinquished

B. Proposed

2 Water Rights & had use changed to Irrigation/Remed.)

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE
Irrigation & Site Remediation	1250	690.5	Indefinitely

5. Place of Use:

A. Existing

LEGAL DESCRIPTION OF LANDS WHERE WATER IS PRESENTLY USED:

(See ATTACHED LEGAL DESCRIPTION)

¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES
NE	NW	27	19	1E	Pierce	01-19-27-1-001	636

DO YOU OWN ALL THE LANDS IN THE EXISTING PLACE OF USE? ☒ YES ☐ NO – IF NO, PROVIDE OWNER(S) NAME:

B. Proposed

LEGAL DESCRIPTION OF LANDS WHERE NEW USE IS PROPOSED:

(See ATTACHED LEGAL DESCRIPTION)

¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES
SE	SE	27	19	1E	Pierce	01-19-27-1-001	636

DO YOU OWN ALL THE LANDS IN THE PROPOSED PLACE OF USE? ☒ YES ☐ NO – IF NO, PROVIDE OWNER(S) NAME

Attach a detailed map of your proposed change/transfer. The map should show existing and proposed point(s) of diversion/withdrawal, place of use and any other features involved with this application. If platted property, please include a certified copy of the plat map.

Are there any ADDITIONAL WATER rights OR CLAIMS RELATED to the same property as the ONE PROPOSED FOR CHANGE/TRANSFER?
☐ YES ☒ NO – IF YES, PROVIDE THE WATER RIGHT/CLAIM NUMBER(S).

6. Remarks and Other Relevant Information:

This site is under a Consent Decree, with oversight from Department of Ecology; Mike Blum is the Manager. Contaminated soils will be capped under the fairways of a golf course. The well location needs to be changed to fit in with the design of the golf course and also to be used during remediation and screening of site soils. A Temporary Permit has been requested in order to keep work moving along.

IF FOR SEASONAL OR TEMPORARY, START DATE ___/___/___ END DATE ___/___/___ (Permanent)

7. Signatures:

I certify that the information above is true and accurate to the best of my knowledge. I understand that in order to process my application, I am hereby granting staff from the Department of Ecology or the County Conservancy Board access to the above site(s) for inspection and monitoring purposes. If assisted in the preparation of the above application, I understand that all responsibility for the accuracy of the information rests with me.

Jim Odendahl — *(Applicant)* — 5 / 2 / 01 *(Date)*

Weyerhaeuser Company — *(Water Right Holder)* — 5/2/01 *(Date)*

Weyerhaeuser Company — *(Land Owner(s) of Existing Place of Use)* — 5/2/01 *(Date)*

IMPORTANT! APPLICATION FILING INFORMATION IS PROVIDED ON THE NEXT PAGE.

WE ARE RETURNING YOUR APPLICATION FOR THE FOLLOWING REASON(S):

☐ APPLICATION FEE NOT ENCLOSED ☐ MAP NOT INCLUDED or INCOMPLETE

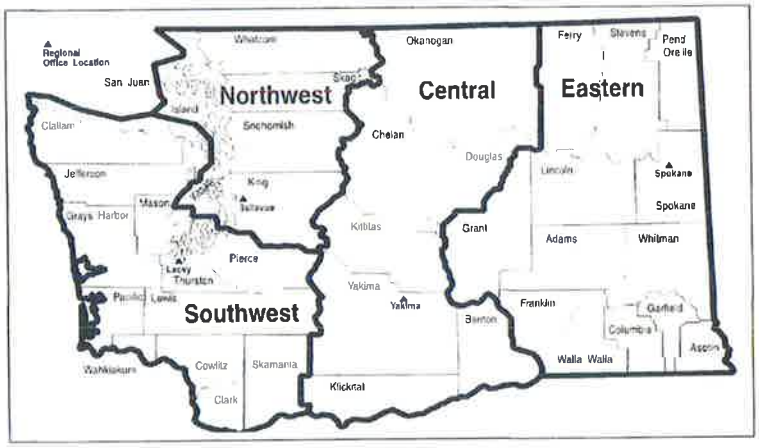
☐ ADDITIONAL SIGNATURES REQUIRED ☐ SECTION _____ IS INCOMPLETE

☐ OTHER/EXPLANATION: _____

STAFF: _____ ***DATE:*** ___/___/___

IMPORTANT!

Submit your application to Ecology at the regional office for the area of proposed or existing water use or at a Conservancy Board with jurisdiction. Below is a map of the State of Washington, with outlines of the four Ecology regional offices. If you have questions about your application or whether a County Conservancy Board with jurisdiction exists, contact the Water Resources program at the regional office in which your project is located.



Department of Ecology
Central Regional Office
15 W. Yakima Avenue, Suite 200
Yakima, WA 98902
Telephone: (509) 575-2490

Department of Ecology
Eastern Regional Office
N. 4601 Monroe, Suite 202
Spokane, WA 99205-1295
Telephone: (509) 456-2926

Department of Ecology
Northwest Regional Office
3190 – 160th Avenue SE
Bellevue, WA 98008-5452
Telephone: (425) 649-7000

Department of Ecology
Southwest Regional Office
PO Box 47775
Olympia, WA 98504-7775
Telephone: (360) 407-6300

Persons of disability needing assistance in the application process or those needing this application in an alternate format, may call (360) 407-6607 (voice) or (360) 407-6006 (TDD).

Ecology is an Equal Opportunity and Affirmative Action employer.

For Ecology Use

Fee Paid _____

Date _____

State of Washington
Application for a Water Right

Please follow the attached instructions to avoid unnecessary delays.

Section 1. APPLICANT - PERSON, ORGANIZATION, OR WATER SYSTEM

Name **City of DuPont** Home Tel: (____)____ - _____

Mailing Address **303 Barksdale Avenue** Work Tel: **(253) 912-5381**

City **DuPont** State **WA** Zip+4 **98327** + **9002** FAX: **(253) 964** - **1455**

Section 2. CONTACT - PERSON TO CALL ABOUT THE APPLICATION

☐ **Same as above**

Name **Ric Leir, Quadrant Corporation** Home Tel: (____)____ - _____

Mailing Address **1408 Palisade Boulevard** Work Tel: **(253) 964** - **4674**

City **DuPont** State **WA** Zip+4 **98327** + **9002** FAX: **(253) 964** - **2326**

Relationship to applicant: **Developer**

Section 3. STATEMENT OF INTENT

The applicant requests a permit to use not more than **3,150** (☒ gallons per minute or ☐ cubic feet per second) from a ☐ surface water source or ☒ ground water source (check only one) for the purpose(s) of **municipal supply**. **ATTACH A "LEGAL" DESCRIPTION OF THE PLACE OF USE.** (**See instructions.**) *NOTE: A tax parcel number or a plat number is not sufficient.* **City of DuPont water service area as defined by current approved water system comprehensive plan and urban growth area as established by current adopted comprehensive plan.**

Estimate a maximum annual quantity to be used in acre-feet per year: **3,811**

☐ Check if the water use is proposed for a short-term project. Indicate the period of time that the water will be needed:

From ___/___/___ to ___/___/___

Section 4. WATER SOURCE

If SURFACE WATER	If GROUNDWATER
Name the water source and indicate if stream, spring, lake, etc. If unnamed, write "unnamed spring," "unnamed stream," etc.: Number of diversions: _____	A permit is desired for **2** well(s). **Wells tentatively denoted Center Drive-1 and Center Drive-2.**
Source flows into (name of body of water):	Size & depth of well(s): **20-inch wells to depths of approximately 300 feet.**

LOCATION

Enter the north-south and east-west distances in feet from the point of diversion or withdrawal to the nearest section corner: **Center Drive-1 is 900 ft south and 2,670 ft west of the northeast corner of Section 35. Center Drive-2 is 940 ft north and 2,180 ft east of the southwest corner of Section 26. See Figure 1 (attached).**

¼ of	¼ of	Section	Township	Range(E/W)	County	If location of source is platted, complete below:		
						Lot	Block	Subdivision
NW	**NE**	**35**	**19 N**	**1 E**	**Pierce**	Tract C of City of DuPont short plat 98-3, Recording no. 9906175001.		
SE	**SW**	**26**	**19 N**	**1 E**	**Pierce**			Unplatted.

For Ecology Use Date Received: 12-15-04 Priority Date: 12-15-04

SEPA: Exempt/Not Exempt FERC License #_____ Dept. Of Health #_____

Date Accepted As Complete 12/20/04 By SC Date Returned_____ By_____ WRIA: ~~55~~ 12

ECY 040-1-14 Rev. 7/97 * * f **APPLICATION**

Appl. No.: G2-30221

Section 5. GENERAL WATER SYSTEM INFORMATION

A. Name of system, if named: **City of DuPont**

B. Briefly describe your proposed water system. **(See instructions.)**

Refer to City of DuPont Water System Comprehensive Plan submitted with this application.

C. Do you already have any water rights or claims associated with this property or system? ☒ YES ☐ NO
PROVIDE DOCUMENTATION. **G2-00799S; G2-00800; G2-27450; G2-27326C; G2-27663; G2-29489**

Section 6. DOMESTIC / PUBLIC WATER SUPPLY SYSTEM INFORMATION
(Completed for all domestic/public supply uses.)

A. Number of "connections" requested:_____ Type of connection _____
(Homes, Apartment, Recreational, etc.)

B. Are you within the area of an approved water system? ☒ YES ☐ NO
If yes, explain why you are unable to connect to the system. *Note: Regional water systems are identified by your County Health Department.* **Refer to City of DuPont Water System Comprehensive Plan submitted with this application.**

Complete C. and D. only if the proposed water system will have fifteen or more connections.

C. Do you have a current water system plan approved by the
Washington State Department of Health? ☒ YES ☐ NO
If yes, when was it approved? **2004** Please attach the current approved version of your plan.

D. Do you have an approved conservation plan? ☒ YES ☐ NO
If yes, when was it approved? **2004** Please attach the current approved version of your plan.

Section 7. IRRIGATION/AGRICULTURAL/FARM INFORMATION
(Complete for all irrigation and agriculture uses.)

A. Total number of acres to be irrigated: ___

B. List total number of acres for other specified agricultural uses:

Use_____Acres_____
Use_____Acres_____
Use_____Acres_____

C. Total number of acres to be covered by this application: _____

D. Family Farm Act (Initiative Measure Number 59, November 3, 1977, as amended by Chapter 237, Laws of 2001)
Add up the acreage in which you have a controlling interest, including only:
‡ Acreage irrigated under water rights acquired after December 8, 1977;
‡ Acreage proposed to be irrigated under this application;
‡ Acreage proposed to be irrigated under other pending application(s).

1. Is the combined acreage greater than 6000 acres? ☐ YES ☐ NO
2. Do you have a controlling interest in a Family Farm Development Permit? ☐ YES ☐ NO
If yes, enter permit no:_____

E. Farm uses:
Stockwater - Total # of animals _____ Animal type _____ (If dairy cattle, see below)
Dairy - # Milking _____ # Non-milking _____

Section 8. WATER STORAGE

Will you be using a dam, dike, or other structure to retain or store water? ☒ YES ☐ NO

Reservoirs as described in the City of DuPont Water System Comprehensive Plan submitted with this application.

NOTE: If you will be storing 10 acre-feet or more of water and/or if the water depth will be 10 feet or more at the deepest point, and some portion of the storage will be above grade, you must also apply for a reservoir permit. You can get a reservoir permit application from the Department of Ecology.

Section 9. DRIVING DIRECTIONS

Provide detailed driving instructions to the project site.

From Interstate 5, take exit 118 (Center Drive) at DuPont. Proceed north on Center Drive. The Center Drive-1 well is approximately 0.5 mile north of I-5 on the west side of Center Drive. Proceeding north from the Center Drive-1 well location approximately 0.4 mile, take a left onto Bob's Hollow Lane and proceed approximately 100 feet west. The Center Drive-2 well is on the south side of Bob's Hollow Lane. Refer to Figure 1 (attached).

Section 10. REQUIRED MAP

A. Attach a map of the project. **(See instructions.)**
Proposed well locations are depicted on Figure 1 (attached). The City of DuPont Water System Comprehensive Plan submitted with this application includes a map depicting the City's water service area.

Section 11. PROPERTY OWNERSHIP

A. Does the applicant own the land on which the water will be used? ☒ YES ☒ NO
If no, explain the applicant's interest in the place of use and provide the name(s) and address(es) of the owner(s):

The City of DuPont (applicant) and Quadrant Corporation (developer) both currently own some of the property within the City of DuPont water service area, which is the proposed place of use.

B. Does the applicant own the land on which the water source is located? ☐ YES ☒ NO
If no, submit a copy of agreement:
Following development of each well source, the land on which each well is located will be transferred by Quadrant Corporation to the City of DuPont (applicant).

I certify that the information above is true and accurate to the best of my knowledge. I understand that in order to process my application, I grant staff from the Department of Ecology access to the site for inspection and monitoring purposes. Even though I may have been assisted in the preparation of the above application by the employees of the Department of Ecology, all responsibility for the accuracy of the information rests with me.

Steven Fox — 12/7/04
Applicant (or authorized representative) — Date

Richard Walker — 11/23/04
Landowner for place of use (if same as applicant, write "same") — Date
FOR QUADRANT CORPORATION

WELL LOGS

Bell Hill Well 1

WATER WELL REPORT

STATE OF WASHINGTON

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

Start Card No. _____

Water Right Permit No. _____

(1) OWNER: Name Weyerhaeuser Real Estate Co Address Bell Hill

(2) LOCATION OF WELL: County Pierce SE ¼ SW ¼ Sec. 25 N. 19 N., R. 1E W.M.

(2a) STREET ADDDRESS OF WELL (or nearest address) _____

(3) PROPOSED USE: ☐ Domestic ☐ Irrigation ☐ DeWater ☐ Industrial ☐ Test Well ☒ Municipal ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) _____
Abandoned ☐ New well ☒ Deepened ☐ Reconditioned ☐ Method: Dug ☐ Cable ☐ Rotary ☒ Bored ☐ Driven ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 16" inches.
Drilled 560 feet. Depth of completed well 298 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 16" Diam. from 0 ft. to 250 ft.
Welded ☒ Liner installed ☐ Threaded ☐ _____" Diam. from _____ ft. to _____ ft.
Perforations: Yes ☐ No ☒
Type of perforator used _____
SIZE of perforations _____ in. by _____ in.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
Screens: Yes ☒ No ☐
Manufacturer's Name Johnson
Type 304 Model No. _____
Diam. 14" PS Slot size 60 from 248 ft. to 293 ft.
Diam. _____ Slot size _____ from _____ ft. to _____ ft.
Gravel packed: Yes ☐ No ☒ Size of gravel _____
Gravel placed from _____ ft. to _____ ft.
Surface seal: Yes ☒ No ☐ To what depth? 20 ft.
Material used in seal Bentonite + Cement
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

(7) PUMP: Manufacturer's Name _____
Type: _____ H.P. _____

(8) WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level 186 ft. below top of well Date _____
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☒ No ☐ If yes, by whom? Driller
Yield: 800 gal./min. with 28 ft. drawdown after 24 hrs.
" " " "
" " " "
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____
Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airtest _____ gal./min. with stem set at _____ ft. for _____ hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water _____ Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Brown sand + gravel, some silt Layered with water	0	165
Gray silty sand + gravel	165	176
Gray brown silt + organics	176	186
Gray + brown sand + gravel silt	186	251
Sand + gravel Clean	251	294
Silty sand + gravel cobbles	294	309
Clean sand + gravel	309	324
Sand + gravel cobbles silty	324	360
Gray silt + small gravel	360	381
Gray silty sand	381	397
Reddish black sand	397	424
Brown + green silt	424	432
Gray silt + sand	432	452
Green + black sand	452	457
Green black sand gravel cobbles	457	521
silty sand some gravel	521	524
Layered silt + silty sand	524	535
Clean black sand	535	539
Gray + green silt	539	556

RECEIVED '88 OCT 27 AM 8:52

Work started 5-23-88 19. Completed 8-16 88 19.

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Holt Drilling Inc (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address 10621 Todd Rd E

(Signed) _____ (WELL DRILLER) License No. 1099

Contractor's Registration No. HOLTDI 136016 Date 8-20 19 88

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20 (10/87) -1329-

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

Bell Hill Well 2

WATER WELL REPORT

STATE OF WASHINGTON

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

Start Card No. _____

Water Right Permit No. _____

(1) OWNER: Name DuPont, City of Address P.O. Box 455 DuPont, Wa. 98327

(2) LOCATION OF WELL: County Thurston NW ¼ SW ¼ Sec. 25 T. 19 N., R. 1E W.M.

(2a) STREET ADDDRESS OF WELL (or nearest address) _____

(3) PROPOSED USE: ☐ Domestic ☐ Irrigation ☐ DeWater ☐ Industrial ☐ Test Well ☒ Municipal ☐ Other

(4) TYPE OF WORK: Owner's number of well (if more than one) Bell Hill Well #2

Abandoned ☐ New well ☒ Deepened ☐ Reconditioned ☐ Method: Dug ☐ Cable ☒ Rotary ☐ Bored ☐ Driven ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 20 x 16 inches. Drilled 516 feet. Depth of completed well _____ ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 20" Diam. from 0 ft. to 362 ft.
Welded ☒ Liner installed ☐ Threaded ☐ 16" Diam. from 362 ft. to 508 ft.
_____" Diam. from _____ ft. to _____ ft.

Perforations: Yes ☐ No ☒
Type of perforator used _____
SIZE of perforations _____ in. by _____ in.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Johnson
Type Stainless Steel Model No. _____
Diam. _____ Slot size _____ from _____ ft. to _____ ft.
Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel packed: Yes ☐ No ☒ Size of gravel _____
Gravel placed from _____ ft. to _____ ft.

Surface seal: Yes ☒ No ☐ To what depth? 30 ft.
Material used in seal _____
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

(7) PUMP: Manufacturer's Name _____
Type: _____ H.P. _____

(8) WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level _____ ft. below top of well Date _____
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom? _____
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
" "See ATTACHED" "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____
Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airtest _____ gal./min. with stem set at _____ ft. for _____ hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water _____ Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Brn. To White Sandy, Gravelly Silt	0	15
Brn. Silty, Gravelly Sand w/cobbles	15	62
Brn. Silty, fine Sand	62	72
Brn. & gray gravelly Sand	72	85
Brn. Sandy Gravel w/Silt	85	127
Brn. To Med. Sand w/gravel	127	150
Brn. fine To Med. Sand	150	156
Black fine To Med. Sand w/Silt	156	173
Green Silt	173	178
Green Silt-bound gravel	178	195
Brn. to dark gray Sandy gravel & Silt	195	227
Black Med. To Coarse Sand	227	233
Brn. To Black Sandy To Very Sandy bld.	233	246
gray, gravelly Sandy Silt	246	267
Black Sandy Gravelly cobbles	267	283
Gray to black Sandy Silt Gravel	283	295
Brn. Sandy Gravel w/Silt	295	325
Brn. fine To Med. Sand	325	353
Brn. Silt w/Sand & gravel	353	372
Brn. Gray, Silty Sand w/Silt & Gravel	372	443
Green Silt	443	444
gray green Silt & gravelly Sand	444	449
Gray Silt w/gravel	449	454
Green gray Sandy Gravel	454	465
Gray-green Silt w/Sand & Gravel	465	471
Green to Black Sandy Gravel w/cobbles	471	484
" " " "	484	505
Gray Slightly Sandy Silt	505	516

Work started 7-10 19 90 completed 10-26 19 90

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Burt Well Drilling, Inc. (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address 19782 N.E. Lincoln Rd. Poulsbo, Wa. 983

(Signed) George Burt (WELL DRILLER) License No. 0048

Contractor's Registration No. BURTWI*227BW Date 12-14 19 90

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20 (10/87) -1329- 3

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

19N/01E-25 NE.S.W.

Bell Hill Well 3

APPENDIX A
WELL DRILLING AND CONSTRUCTION , City of Dupont

Well Drilling and Soil Sampling

Holt Drilling, of Puyallup, Washington, drilled Bell Hill No. 3 as a 20-inch-diameter boring to a total depth of 282.5 feet by the cable tool method using a Bucyrus Erie drill rig. The drillers installed a 24-inch-diameter cement/bentonite surface seal extending from ground surface to a depth of 50 feet. The deeper surface seal (beyond the required 18 feet) was completed in accordance with a variance received by Ecology for siting the well less than 100 feet from a sewer line. Drilling, well screen installation, development, and testing were performed between May 28 and June 26, 1998.

A Hart Crowser representative was on site to observe drilling and collect soil samples while drilling through potential aquifer materials, and periodically when drilling through non-aquifer materials. Additionally, the well driller maintained his own drilling log and collected soil samples at approximately 10-foot-depth intervals and whenever a change in subsurface conditions was encountered, when we were not on site. Soil samples consisted of drill cuttings collected from the driller's flap valve bailer. To obtain a representative sample, the cuttings were poured onto a sampling board and mixed prior to collection. Our interpretive geologic log is presented on Figure 2 in the body of this report. Figure A-1, presented at the end of this appendix, displays a key to the boring log.

Screen Design

Of the many soil samples collected within the prospective aquifer zone, eight were selected for grain size (sieve) analyses (depicted with GS on well log on Figure 2). The resulting grain size distributions from these analyses were used to determine the slot size and placement of the well screen. In addition to reviewing the full sample grain size distributions, we recalculated the distributions to exclude the plus 3/8-inch (larger gravel) fractions, to help assess the (more important) sand fraction in greater detail. The full-sample grain size distributions are shown on Figures C-2, C-3, and C-4 of Appendix C. Figure C-1 presents the Unified Soil Classification (USC) System used to classify the grain size results.

The 20-inch telescoping screen assembly (18-inch-outer-diameter that telescopes down through the 20-inch drill casing) is 78.5 feet long and is situated between depths of 187.5 and 266 feet below ground surface, as shown on Figure 2. The

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

screen assembly (20-inch telescoping, 18-inch-diameter) from top to bottom is as follows:

- 9.5 feet of steel riser pipe (187.5 to 197 feet) with Figure K packer;
- 13 feet of 100-slot stainless steel screen (197 to 210 feet);
- 12 feet of 25-slot stainless steel screen (210 to 222 feet);
- 15 feet of 70-slot stainless steel screen (222 to 237 feet);
- 18 feet of 30-slot stainless steel screen (237 to 255 feet);
- 6 feet of 120-slot stainless steel screen (255 to 261 feet); and
- 5 feet of steel tailpipe (261 to 266 feet).

Well Development

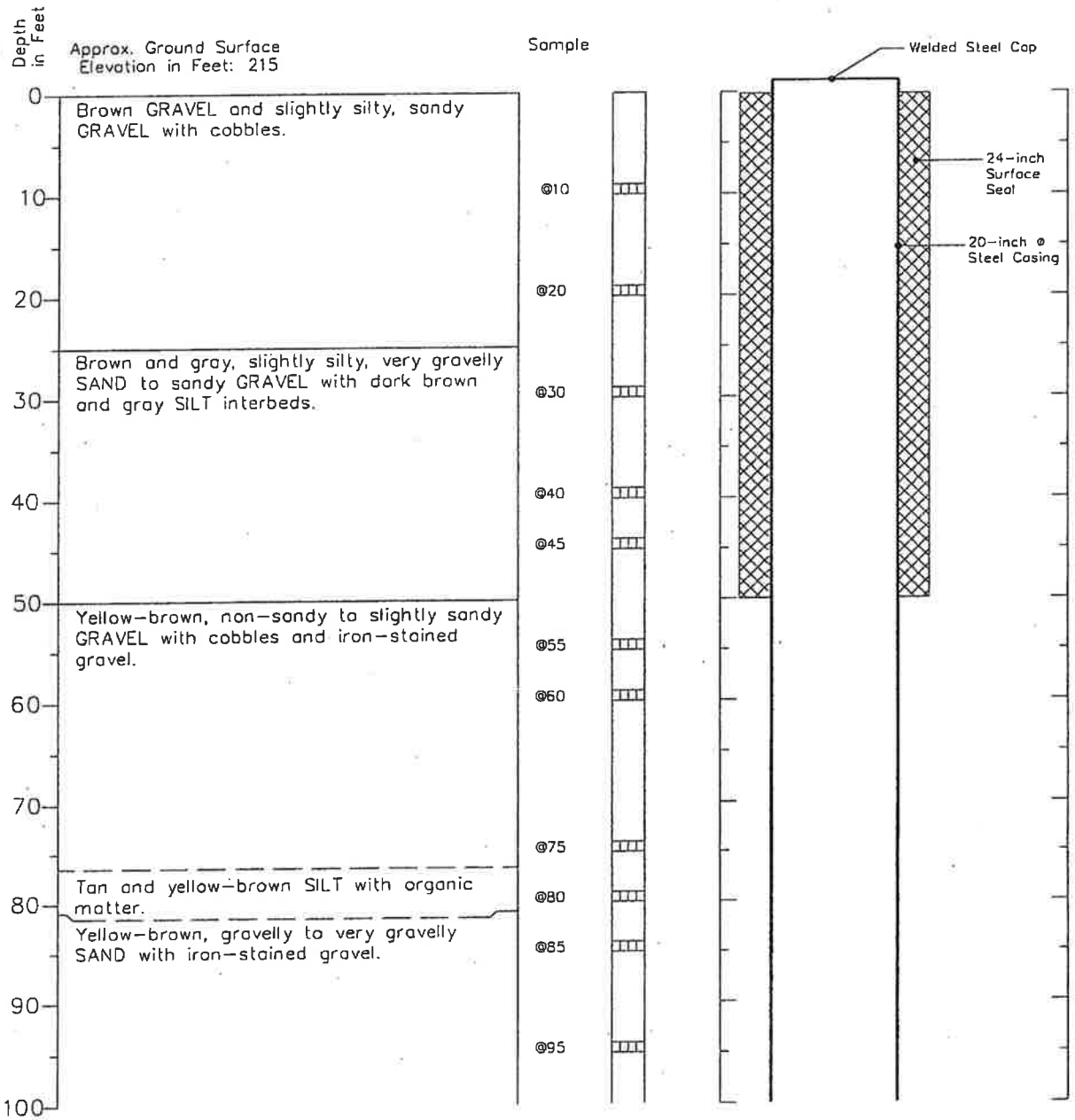
To create a natural filter pack, the well was developed for several days by surging and bailing. This method creates water flow in and out of the well screen—pulling the finer grained formation materials into the well and leaving behind the coarser grained materials which form a natural filter pack around the well screen. The finer grained material within the well screen is then removed using a flap-valve bailer. Approximately 25 feet of material was produced from development of the 64-foot well screen.

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

Boring Log and Construction Data for Bell Hill Well No. 3 Dupont

Geologic Log

Well Design



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

HARTCROWSER

J-4854 5/98

Figure 2 1/3

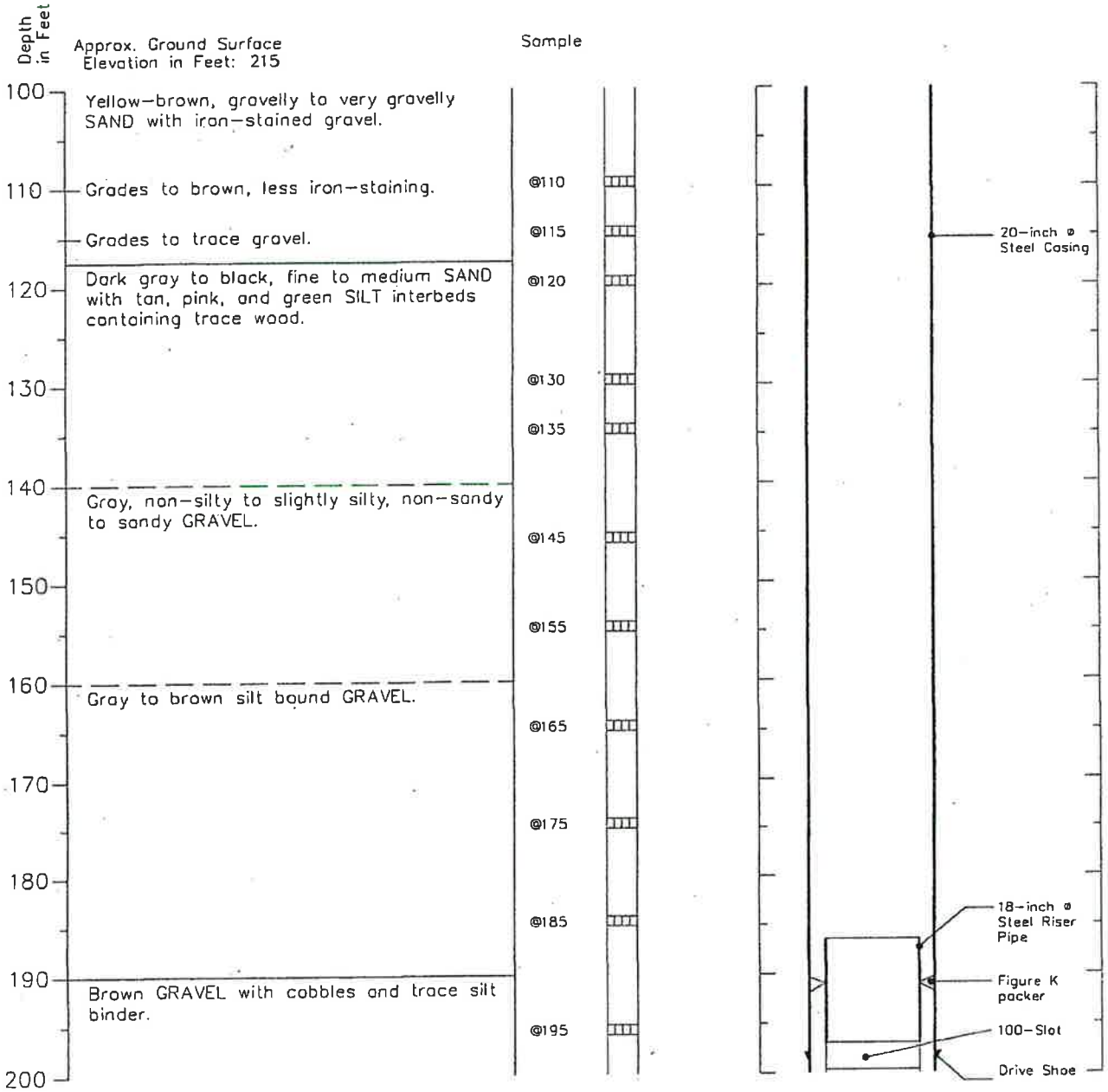
ACAD LOG

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

Boring Log and Construction Data for Bell Hill No. 3

Geologic Log

Well Design



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

HARTCROWSER

J-4854 5/98

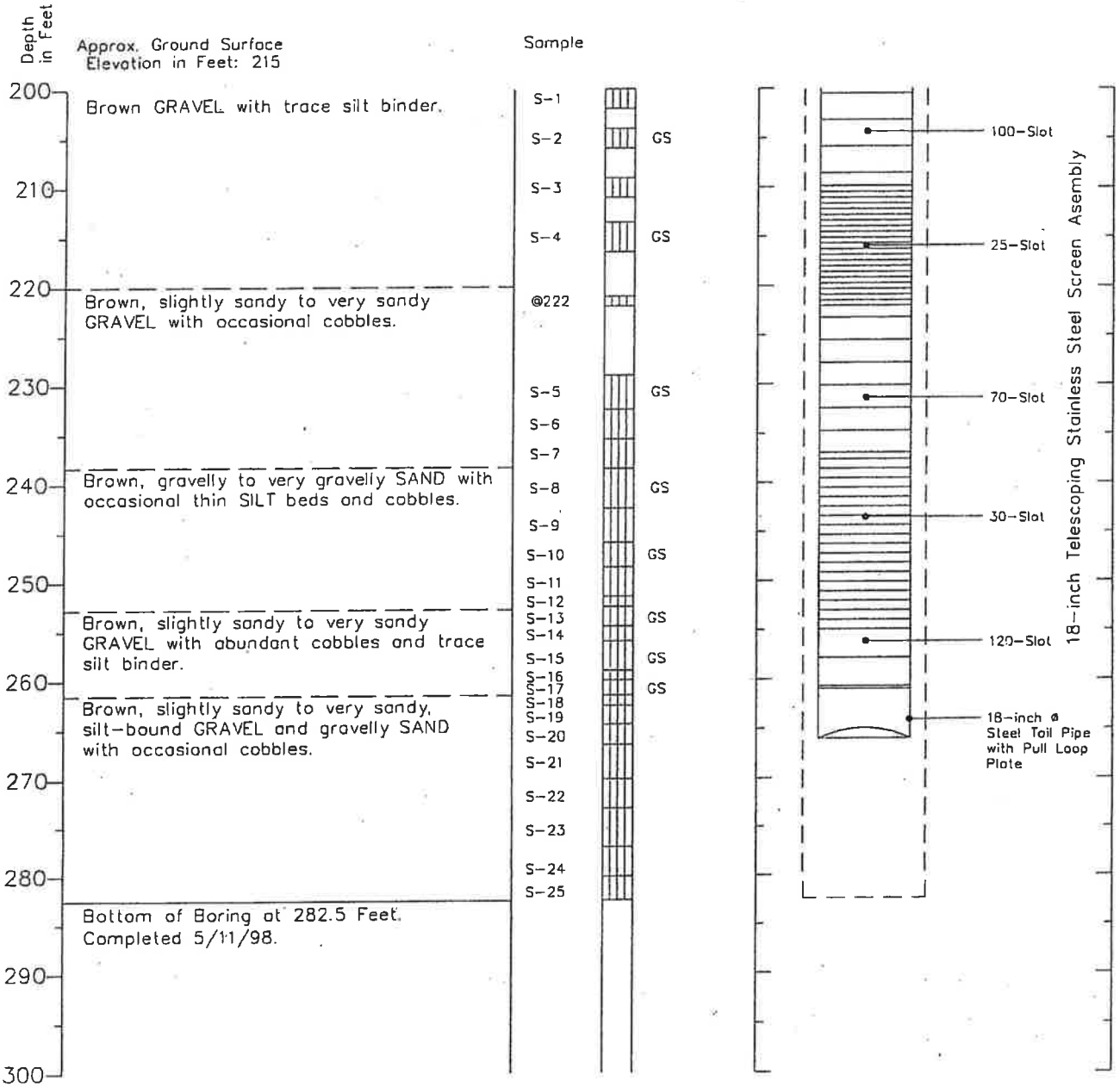
Figure 2 2/3

ACAD LOG

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

Boring Log and Construction Data for Bell Hill Well No. 3

Geologic Log



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

HARTCROWSER

J-4854 5/98

Figure 2 3/3

ACAD LOG

Hoffman Hill Well 1

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. W16342
UNIQUE WELL I.D. # ACS 966
Water Right Permit No. G2-27663

(1) OWNER: Name Weyerhaeuser Real Estate Address N/A

(2) LOCATION OF WELL: County Pierce SE 1/4 NE 1/4 Sec 33 T. 19 N., R. 1 E. W.M.

(2a) STREET ADDRESS OF WELL (or nearest address) Dupont Area Hoffman Hill #1

(3) PROPOSED USE: ☐ Domestic ☐ Industrial ☐ Municipal ☒ ☐ Irrigation ☐ Test Well ☐ Other ☐ ☐ DeWater

(4) TYPE OF WORK: Owner's number of well (If more than one) Hoffman Hills #1
Abandoned ☐ New well ☒ Method: Dug ☐ Bored ☐ Deepened ☐ Cable ☒ Driven ☐ Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 16" inches.
Drilled 502 feet. Depth of completed well 497 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 16" Diam. from +2 ft. to 417 ft.
Welded ☒ Liner installed ☐ Threaded ☐ " Diam. from ft. to ft.
" Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Johnson
Type 304 Stainless Model No.
Diam. 14" Slot size 50 from 415 ft. to 435 ft.
Diam. Slot size 25 from 435 ft. to 455 ft.
455 480

Gravel packed: Yes ☐ No ☐ Size of gravel
Gravel placed from 30 ft. to 480 - 490 ft.

Surface seal: Yes ☒ No ☐ To what depth? 20 ft.
Material used in seal Cement
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ft.
Static level 323 ft. below top of well Date
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☒ No ☐ If yes, by whom? Driller
Yield: 1080 gal./min. with 55 ft. drawdown after 24 hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test gal./min. with ft. drawdown after hrs.
Airtest gal./min. with stem set at ft. for hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☒ No ☐

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
sandy loam	0	4
silty sand + gravel	4	252
Brown + gray silts wood	252	263
Brown sand + gravel wb	263	286
Brown + gray silts	286	365
silt bound sand + gravel	365	385
Sand + gravel wb	385	496
Gray silt	496	502

Work Started 9-20-97 19. Completed 1-20-98 19

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Holt Drilling Inc (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address 10621 Todd Rd E
(Signed) (WELL DRILLER) License No. 1099
Contractor's Registration No. HOLTDI 1360G Date 7-27-98 19

(USE ADDITIONAL SHEETS IF NECESSARY)

Ecology is an Equal Opportunity and Affirmative Action employer. For special accommodation needs, contact the Water Resources Program at (206) 407-6600. The TDD number is (206) 407-6006.

ECY 050-1-20 (9/93)

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

Hoffman Hill Well 2

WATER WELL REPORT

RECEIVED JUL 14 2008

Original & 1st copy – Ecology, 2nd copy – owner, 3rd copy – driller

Construction/Decommission ("x" in circle)

☒ Construction

○ Decommission *ORIGINAL INSTALLATION Notice of Intent Number* W166594

DEPARTMENT OF ECOLOGY

300855

CURRENT

Notice of Intent No. W 166594

Unique Ecology Well ID Tag No. AHM 258

Water Right Permit No. 62-27663

Property Owner Name CITY OF DUPONT

Well Street Address 303 BARKSDALE ST

City DUPONT County PIERCE

Location NW 1/4-1/4 NW 1/4 Sec 34 Twn 19N R 1 (E/W/WWM) circle one

Lat/Long (s, t, r Still REQUIRED) Lat Deg _____ Lat Min/Sec _____ Long Deg _____ Long Min/Sec _____

Tax Parcel No. _____

PROPOSED USE: ☐ Domestic ☐ Industrial ☒ Municipal ☐ DeWater ☐ Irrigation ☐ Test Well ☐ Other _____

TYPE OF WORK: Owner's number of well (if more than one) _____

☒ New well ☐ Reconditioned ☐ Deepened — *Method:* ☐ Dug ☐ Bored ☐ Driven ☒ Cable ☐ Rotary ☐ Jetted

DIMENSIONS: Diameter of well 16 inches, drilled 388 ft. Depth of completed well 375 ft.

CONSTRUCTION DETAILS

Casing installed: ☐ Welded 16" Diam. from +1 ft. to 295 ft. ☐ Liner installed _____" Diam. from _____ ft. to _____ ft. ☐ Threaded _____" Diam. from _____ ft. to _____ ft.

Perforations: ☐ Yes ☒ No

Type of perforator used _____

SIZE of perfs _____ in. by _____ in. and no. of perfs _____ from _____ ft. to _____ ft.

Screens: ☒ Yes ☐ No ☒ K-Pac Location 290

Manufacturer's Name JOHNSON

Type V-WIRE Model No. STAINLESS

Diam. 14 Slot size .080 from 295 ft. to 330 ft.

Diam. 14 Slot size .100 from 330 ft. to 355 ft.

Gravel/Filter packed: ☐ Yes ☒ No ☐ Size of gravel/sand _____

Materials placed from _____ ft. to _____ ft.

Surface Seal: ☒ Yes ☐ No To what depth? 20 ft.

Material used in seal BENTONITE CHIP

Did any strata contain unusable water? ☐ Yes ☒ No

Type of water? _____ Depth of strata _____

Method of sealing strata off _____

PUMP: Manufacturer's Name _____

Type: _____ H.P. _____

WATER LEVELS: Land-surface elevation above mean sea level 283 ft.

Static level 221 ft. below top of well Date 10/8

Artesian pressure _____ lbs. per square inch Date _____

Artesian water is controlled by _____ (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? ☒ Yes ☐ No If yes, by whom? Holt

Yield: 1105 gal./min. with 30.8 ft. drawdown after 24 hrs.

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test Oct 8 & 9 2003

Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.

Airtest _____ gal./min. with stem set at _____ ft. for _____ hrs.

Artesian flow _____ g.p.m. Date _____

Temperature of water _____ Was a chemical analysis made? ☐ Yes ☐ No

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
FILL	0	2
BROWN SAND	2	15
SILTBOUND SANDS & GRAVELS	15	30
SILTY SAND SOME GRAVELS	30	42
TIGHT SAND & GRAVELS SILTY	42	50
TIGHT SAND & GRAVELS, COBBLES	50	58
LOOSER SAND W/SOME GRAVELS	58	75
TIGHT SILTBOUND SAND & GRAVEL	75	139
SILTY SANDS & GRAVEL	139	144
SAND & GRAVEL, SOME WATER	144	149
GREY PEAT SILT WOOD, SAND SEAMS	149	172
GREY-BROWN SILT W/GRAVEL, PEAT	172	203
GREY SILTY SAND / GRAVEL	203	206
GREY & BROWN SILT W/ PEAT	206	228
HARD GREY FINE SILTY SAND	208	239
SILTY SAND W/ GRAVELS	239	270
WTR BEARING GRAVELS, COBBLES SAND	270	283
SAND GRAVELS, COBBLES SILTBOUND	283	290
HARD TIGHT SAND GRAVELS COBBLES	290	294
WATER BEARING SAND, GRAVEL COBBLES	294	375
HARD TIGHT SAND GRAVEL BINDER	375	388

RECEIVED JUL 14 2008 DEPARTMENT OF ECOLOGY

Start Date 7-28-03 Completed Date 9-30-03

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☒ Driller ☐ Engineer ☐ Trainee Name (Print) WADE EVERSON

Driller/Engineer/Trainee Signature Wade Everson

Driller or trainee License No. 597

Drilling Company HOLT DRILLING INC

Address P.O. BOX 1890

City, State, Zip MILTON WA 98354

Contractor's Registration No. HOLTOI-13606 Date 10-20-06

IF TRAINEE,

Driller's Licensed No. _____

Driller's Signature _____

Ecology is an Equal Opportunity Employer.

 The Department of Ecology does NOT warranty the Data and/or Information on this Well Report.

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

WATER WELL REPORT

Original & 1st copy – Ecology, 2nd copy – owner, 3rd copy – driller

Construction/Decommission ("x" in circle)

☒ Construction

○ Decommission *ORIGINAL INSTALLATION Notice of Intent Number* 10166594

CURRENT
Notice of Intent No. SAME
Unique Ecology Well ID Tag No. AHM 258
Water Right Permit No. 62-27663
Property Owner Name CITY OF DUPONT
Well Street Address 303 BARKSDALE ST
City DUPONT **County** PIERCE
Location NW 1/4-1/4 NW 1/4 Sec 34 Twn 19N R 1 (EWM or WWM) circle one
Lat/Long (s, t, r Still REQUIRED) Lat Deg _____ Lat Min/Sec _____ Long Deg _____ Long Min/Sec _____
Tax Parcel No. _____

PROPOSED USE: ☐ Domestic ☐ Industrial ☐ Municipal ☐ DeWater ☐ Irrigation ☐ Test Well ☐ Other _____

TYPE OF WORK: Owner's number of well (if more than one) _____
☐ New well ☐ Reconditioned ☐ Deepened
Method: ☐ Dug ☐ Bored ☐ Driven ☐ Cable ☐ Rotary ☐ Jetted

DIMENSIONS: Diameter of well _____ inches, drilled _____ ft.
Depth of completed well _____ ft.

CONSTRUCTION DETAILS
Casing Installed: ☐ Welded _____" Diam. from _____ ft. to _____ ft.
☐ Liner installed _____" Diam. from _____ ft. to _____ ft.
☐ Threaded _____" Diam. from _____ ft. to _____ ft.

Perforations: ☐ Yes ☐ No
Type of perforator used _____
SIZE of perfs _____ in. by _____ in. and no. of perfs _____ from _____ ft. to _____ ft.

Screens: ☒ Yes ☐ No ☒ K-Pac Location 290
Manufacturer's Name JOHNSON
Type V-WIRE Model No. STAINLESS
Diam. 14 Slot size .020 from 355 ft. to 375 ft.
Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel/Filter packed: ☐ Yes ☐ No ☐ Size of gravel/sand _____
Materials placed from _____ ft. to _____ ft.

Surface Seal: ☐ Yes ☐ No To what depth? _____ ft.
Material used in seal _____
Did any strata contain unusable water? ☐ Yes ☐ No
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

PUMP: Manufacturer's Name _____
Type: _____ H.P. _____

WATER LEVELS: Land-surface elevation above mean sea level 283 ft.
Static level 221 ft. below top of well Date 10/8
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☒ Yes ☐ No If yes, by whom? Holt
Yield: 1105 gal./min. with 30.8 ft. drawdown after 24 hrs.
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test OCT 8 & 9 2003
Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airtest _____ gal./min. with stem set at _____ ft. for _____ hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water _____ Was a chemical analysis made? ☐ Yes ☐ No

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO

Start Date _____ Completed Date _____

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☐ Driller ☐ Engineer ☐ Trainee Name (Print) _____
Driller/Engineer/Trainee Signature _____
Driller or trainee License No. 0597

Drilling Company _____
Address _____
City, State, Zip _____
Contractor's Registration No. _____ Date _____

IF TRAINEE,
Driller's Licensed No. _____
Driller's Signature _____

Ecology is an Equal Opportunity Employer.

 The Department of Ecology does NOT warranty the Data and/or Information on this Well Report.

El Rancho Madrona Well

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Cert

Application No. G2-20970

Permit No. G2-20970P

(1) OWNER: Name Richardson Water Companies Address P. O. Box 44408, Tacoma, Wa. 98444

(2) LOCATION OF WELL: County Pierce — ¼ ¼ Sec 33 T 19 N., R 1E W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Multipule — Domestic ☒ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) 1

New well ☒ Method: Dug ☐ Bored ☐ Deepened ☐ Cable ☒ Driven ☐ Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 8 inches. Drilled 311 ft. Depth of completed well 303 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 8 " Diam. from 0 ft. to 293 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☒ No ☐
Manufacturer's Name UOP Johnson
Type Stainless Model No
Diam. 8 Slot size 50 from 293 ft. to 298 ft.
Diam. 8 Slot size 60 from 298 ft. to 303 ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 20 ft.
Material used in seal Concrete
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name Jacuzzi Bros., Inc.
Type: Submersible, 5S6A6 H.P. 5

(8) WATER LEVELS: Land-surface elevation above mean sea level ft.
Static level 227 ft. below top of well Date 10/15/73
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☒ No ☐ If yes, by whom? Driller
Yield: 80 gal./min. with 51 ft. drawdown after 4 hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test 10/15/73
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Yellow clay, sand & gravel	0	15
Yellow hardpan	15	27
Yellow clay, sand & gravel	27	53
Yellow hardpan	53	148
Brown clay & gravel	148	155
Fine & course sand & gravel	155	157
Brown clay & gravel	157	162
Yellow hardpan	162	180
Brown clay, sand, some gravel	180	248
Brown peaty colored clay & gravel,		
Bits of wood, silty in spots	248	271
Yellow hardpan	271	286
Fine & course sand, some water	286	288
Yellow hardpan	288	294
Fine & course sand & grave, water	294	305
Yellow hardpan with boulders	305	311

AUG 20 1975

SOUTH

Work started 9/12 19 73 Completed 10/17/ 19 73

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Richardson Well Drilling Company
(Person, firm, or corporation) (Type or print)

Address P. O. Box 44408, Tacoma, Wa. 98444

[Signed] (Well Driller)

License No. 223-02-6500 Date May 2, 19 74

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 1356—OS—(Rev. 4-71).

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

439182

El Rancho Madrona Well

WATER WELL REPORT

Original & 1st copy – Ecology, 2nd copy – owner, 3rd copy – driller

DEPARTMENT OF ECOLOGY State of Washington

Construction/Decommission *("x" in circle)*

☐ Construction

☒ Decommission *ORIGINAL INSTALLATION*

Notice of Intent Number _____

PROPOSED USE: ☐ Domestic ☐ Industrial ☒ Municipal ☐ DeWater ☐ Irrigation ☐ Test Well ☐ Other _____

TYPE OF WORK: Owner's number of well (if more than one) _____

☐ New well ☐ Reconditioned *Method:* ☐ Dug ☐ Bored ☐ Driven ☐ Deepened ☐ Cable ☒ Rotary ☐ Jetted

DIMENSIONS: Diameter of well 8 inches, drilled 311 ft. Depth of completed well 303 ft.

CONSTRUCTION DETAILS

Casing Installed: ☒ Welded 8" Diam. from 0 ft. to 293 ft.
☐ Liner installed _____" Diam. from _____ ft. to _____ ft.
☐ Threaded _____" Diam. From _____ ft. to _____ ft.

Perforations: ☐ Yes ☒ No

Type of perforator used _____

SIZE of perfs _____ in. by _____ in. and no. of perfs _____ from _____ ft. to _____ ft.

Screens: ☒ Yes ☐ No ☐ K-Pac Location _____

Manufacturer's Name ?

Type _____ Model No. _____

Diam. 8 Slot size 50 from 293 ft. to 298 ft.

Diam. 8 Slot size 60 from 298 ft. to 303 ft.

Gravel/Filter packed: ☐ Yes ☒ No Size of gravel/sand _____

Materials placed from _____ ft. to _____ ft.

Surface Seal: ☒ Yes ☐ No To what depth? 20 ft.

Material used in seal Concrete

Did any strata contain unusable water? ☐ Yes ☐ No

Type of water? _____ Depth of strata _____

Method of sealing strata off _____

PUMP: Manufacturer's Name _____

Type: _____ H.P. _____

WATER LEVELS: Land-surface elevation above mean sea level _____ ft.

Static level 220 ft. below top of well Date 11/21/11

Artesian pressure _____ lbs. per square inch Date _____

Artesian water is controlled by _____ (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☒ No If yes, by whom? _____

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____

Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.

Airtest _____ gal./min. with stem set at _____ ft. for _____ hrs.

Artesian flow _____ g.p.m. Date 11/21/11

Temperature of water _____ Was a chemical analysis made? ☐ Yes ☒ No

CURRENT

Notice of Intent No. AE 15482

Unique Ecology Well ID Tag No. AEF 218

Water Right Permit No. G2-20970P

Property Owner Name City of Dupont

Well Street Address XXX Lapsley Drive

City Dupont County Pierce

Location NW1/4-1/4 SE1/4 Sec 33 Twn 19 R 1 **(s, t, r Still REQUIRED)** EWM ☒ Or WWM ☐

Lat/Long Lat Deg ____ Lat Min/Sec ____ Long Deg ____ Long Min/Sec ____

Tax Parcel No. (Required) 3693000121

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
Well was decommissioned according to WAC 173-160-381-1a		
Casing was perforated with 5 rows using a star wheel perforator. Casing was then pressure grouted with bentonite grout from the bottom to the top.		

RECEIVED
NOV 29 2011
WA State Department of Ecology (SWRO)

Start Date 11/21/11 Completed Date 11/23/11

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☒ Driller ☐ Engineer ☐ Trainee Name (Print) Chris Jones

Driller/Engineer/Trainee Signature Chris Jones

Driller or trainee License No. 2253

IF TRAINEE: Driller's License No:

Driller's Signature:

Drilling Company Moerke & Sons Pump & Drilling, Inc.

Address 1162 NW State Avenue

City, State, Zip Chehalis , WA, 98532

Contractor's Registration No. MOERKSP072N5 Date 11/23/11

Historic Village Well 1

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
AND DEVELOPMENT

WELL LOG

No. Decla. #800
Cert. #636-D

Date Nov. 1 1925

Record by V. C. Decker

Source G. W. Decla. Claim

Location: State of WASHINGTON

County Pierce

Area

Map

NE ¼ NE ¼ sec. 35 T. 19 N., R. 1 E. W.

DIAGRAM OF SECTION

Drilling Co.

Address

Method of Drilling drilled Date Oct. 29 1925

Owner E. I. DuPont De Nemours & Co., Inc.

Address DuPont, Wash.

Land surface, datum ft. above / below

CORRELATION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
	(Transcribe driller's terminology literally but paraphrase as necessary, in parentheses. If material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings, perforations, screens, etc.)		
	Red sand-	30	30
	Cement gravel	35	65
	Dry gravel	65	130
	Pump Test:		
	Dim: 130' x 10"		
	SWL: 30'		
	Dd: 30'		
	Yield: 60 g.p.m.		
	Casing: 10" dia. entire depth		
	Perforations: Slot perfor. ½" x 12" four in the circumference, & spaced 6" apart for about 50'		
	Pump: 2" Krough, centrifugal		
	Motor: 10 hp, 1800 RPM		

Turn up

Sheet ____ of ____ sheets

Historic Village Well 2

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
AND DEVELOPMENT

WELL LOG

No. Decla. #799
Cert. 635-D

Date Nov. 1, 1925
Record by V. C. Darker
Source G. W. Decla. Claim

Location: State of WASHINGTON
County Pierce
Area
Map
NE ¼ NE ¼ sec. 35 T. 19 N., R. 1 E. W.

DIAGRAM OF SECTION

Drilling Co.
Address
Method of Drilling drilled Date Oct. 29 1925
Owner E. I. DuPont De Nemours & Co., Inc.
Address DuPont, Wash.
Land surface, datum ft. above / below

CORRELATION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
	Hard packed sand	12	12
	Clay & gravel	10	22
	Loose sand & dry gravel	55	77
	Sandy hardpan	45	122
	Coarse packed sand	48	170
	Cement gravel	35	205
	Dry gravel	45	250
Pump Test:			
	Dim: 250' x 12"		
	SWL: 30'		
	Dd: 30'		
	Yield: 150 g.p.m.		
	Casing: 12" dia. entire depth		
	Pump: 2⅛" American, centrifugal		
	Motor: 15 hp, 1800 RPM		
	Perforations: Slot, ⅛" x 12", four		

(Transcribe driller's terminology literally but paraphrase as necessary, in parentheses. If material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings, perforations, screens, etc.)

Turn up (Over) Sheet of sheets

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

WELL LOG.—Continued No. 1

CORRELATION	MATERIAL	THICKNESS (feet)	DEPTH (feet)
	Depth forward		
	in the circumference & space 6" apart from 0' to 150'		

S.F. 7449-46 REMINGTON INC-16 20 749-2

Historic Village Well 2

WATER WELL REPORT

Original & 1st copy – Ecology, 2nd copy – owner, 3rd copy – driller

DEPARTMENT OF ECOLOGY State of Washington

Construction/Decommission *("x" in circle)*

☐ Construction

☒ Decommission *ORIGINAL INSTALLATION*

Notice of Intent Number _____

PROPOSED USE: ☒ Domestic ☐ Industrial ☐ Municipal ☐ DeWater ☐ Irrigation ☐ Test Well ☐ Other _____

TYPE OF WORK: Owner's number of well (if more than one) _____

☐ New well ☐ Reconditioned *Method:* ☐ Dug ☐ Bored ☐ Driven ☐ Deepened ☐ Cable ☐ Rotary ☐ Jetted

DIMENSIONS: Diameter of well 12 inches, drilled 250 ft.
Depth of completed well 250 ft.

CONSTRUCTION DETAILS

Casing Installed: ☐ Welded _____" Diam. from _____ ft. to _____ ft.
☐ Liner installed _____" Diam. from _____ ft. to _____ ft.
☐ Threaded _____" Diam. From _____ ft. to _____ ft.

Perforations: ☐ Yes ☐ No
Type of perforator used _____
SIZE of perfs _____ in. by _____ in. and no. of perfs _____ from _____ ft. to _____ ft.

Screens: ☐ Yes ☐ No ☐ K-Pac Location _____
Manufacturer's Name _____
Type _____ Model No. _____
Diam. _____ Slot size _____ from _____ ft. to _____ ft.
Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel/Filter packed: ☐ Yes ☐ No Size of gravel/sand _____
Materials placed from _____ ft. to _____ ft.

Surface Seal: ☐ Yes ☐ No To what depth? _____ ft.
Material used in seal _____
Did any strata contain unusable water? ☐ Yes ☐ No
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

PUMP: Manufacturer's Name _____
Type: _____ H.P. _____

WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level _____ ft. below top of well Date _____
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☐ No If yes, by whom? _____
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____

Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.

Airtest _____ gal./min. with stem set at _____ ft. for _____ hrs.

Artesian flow _____ g.p.m. Date _____

Temperature of water _____ Was a chemical analysis made? ☐ Yes ☐ No

CURRENT

Notice of Intent No. AE45189

Unique Ecology Well ID Tag No. _____

Water Right Permit No. _____

Property Owner Name **Town of Dupont**

Well Street Address **709 Barksdale Ave.**

City Dupont County Pierce

Location NE1/4-1/4 NE1/4 Sec 35 Twn 19N R 1 **EWM** ☒ Or **WWM** ☐
(s, t, r Still REQUIRED)

Lat/Long
Lat Deg _____ Lat Min/Sec _____
Long Deg _____ Long Min/Sec _____

Tax parcel No. (Required) **3575001280**

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
Pressure grouted from the current sediment	**0**	**110'**
level in the well up to the surface and leave		
the rest of the well in place.		
Variance was submitted and approved.		

RECEIVED
FEB 07 2018
WA State Department of Ecology (SWRO)

Start Date **12-29-2017** Completed Date **1-3-2018**

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☒ Driller ☐ Engineer ☐ Trainee Name (Print) **Jeremey Carlson**
Driller/Engineer/Trainee Signature
Driller or trainee License No. **2989**
IF TRAINEE: Driller's License No:
Driller's Signature:

Drilling Company **Holocene Drilling, Inc.**
Address **11412 62nd Ave E**
City, State, Zip **Puyallup , WA, 98373**
Contractor's Registration No. **HOLOCDI044KH** Date **1-22-2018**

ECY 050-1-20 (Rev 02-2010) To request ADA accommodation including materials in a format for the visually impaired, call Ecology Water Resources Program at 360-407-6872. Persons with impaired hearing may call Washington Relay Service at 711. Persons with speech disability may call TTY at 877-833-6341.

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report

APPENDIX D

INTERTIE AGREEMENT

MEMORANDUM OF UNDERSTANDING FOR SALE OF UTILITIES SERVICES

For use of this form, see AR 420–41; the proponent agency is the Office of the Chief of Engineers

Contract No. DAKF57-89-S-9032
Estimated Annual
Cost to Purchaser $ 25.56

THIS AGREEMENT, entered into this 1st day of February 19 89 by and between the DEPARTMENT OF THE ARMY, an agency of the United States Government, (hereinafter called the Army), represented by the Utilities Sales Officer executing this agreement and

City of Dupont

(Hereinafter called the "Purchaser").

WITNESSETH THAT:

WHEREAS, the Army has established an installation near Tacoma, Washington known as Fort Lewis, Washington and owns, maintains and operates facilities for the furnishing of utilities service; and

WHEREAS, the Purchaser desires to obtain water service from the Army, as required for usage by the City Hall; and

WHEREAS, the Army is authorized to supply the service and the Purchaser is authorized to pay for the service pursuant to the terms of the Economy Act of 30 June 1932, 47 Stat. 417 as amended, (31 U.S.C. 686);

NOW, THEREFORE, in consideration of the premises and of the mutual agreements herein contained, to be performed by the parties hereto respectively, it is agree as follows:

GENERAL PROVISIONS

1. SERVICES TO BE RENDERED. From and after the effective date of this agreement, the Army will furnish on a reimbursable basis, and subject to the conditions hereinafter provided, utility service or services as described in Special Provisions C(S) attached hereto and made a part hereof.

2. PAYMENTS. The Purchaser shall reimburse the Army for the utility service or services described herein at the rates and under the terms and conditions set forth in the attached Special Provisions.

3. USE OF SERVICE. The Army, by reason of this agreement is not obligated to permanently supply the Purchaser with utility service. The service described herein is limited to such time as the service can be supplied by the Army as surplus to its own needs. Purchaser shall use the service provided herein in such a manner as to not in any way disrupt or interfere with the requirements of the Army or any other Purchaser that may be served by the Army.

4. CHANGE OF RATES. The rates to be charged the Purchaser shall at all time produce a revenue which is not less than the cost of supplying the service, including losses, but excluding capital and overhead charges. If during the life of this agreement there should be an appreciable change in the cost of supplying the service, the rates set forth herein will be adjusted as required to conform therewith and the Army agrees to furnish, subject to the conditions set forth herein, and the Purchaser agrees to take and pay for, such service at the adjusted rates from and after the date when such adjusted rates are made effective. The rates and charges applicable to the service or services contemplated herein will be reviewed annually, or more often if necessary, in compliance with the above requirements.

5. TERMINATION. Services under this agreement may be terminated by either party by written notice not less than thirty (30) days in advance of the effective date of termination. In the event of a national emergency proclaimed by the President having an effect on the Army's service requirements, the Army may at its discretion, terminate this agreement immediately without such advance notice.

6. FACILITIES TO BE PROVIDED. The Army shall not be obligated in any way for the cost of making connections for Purchaser's service. Purchaser shall, at Purchaser's expense, install, maintain and operate all new facilities required for obtaining service, including suitable metering and regulating equipment and service connections to Army's utility system. Plans for all such facilities shall be subject to the approval of the Utilities Sales Officer and the installation of such facilities shall be subject to his supervision.

7. LICENSE FOR FACILITIES. The Army hereby grants to the Purchaser a license to enter upon and use a site or sites to be agreed upon between the parties hereto upon which the Purchaser shall install, operate and maintain the Purchaser's new facilities to be located on Government property for obtaining service; and such license shall continue in effect until termination of this agreement. Facilities installed by the Purchaser on an Army installation will be removed promptly at the expense of the Purchaser upon termination of the service contemplated herein. Army land and facilities will be restored to their original condition at the expense of the Purchaser. If the Purchaser fails to so remove such facilities within ninety (90) days they will be deemed to be abandoned and become Army Property.

IN WITNESS WHEREOF, the parties hereto have executed this agreement as of the day and year first above written.

THE DEPARTMENT OF THE ARMY

By NEWELL G. FLOOD

Chief, Operations & Maintenance Division
(Official Title)

MARK S. JACKSON
(Purchaser)

Mayor, City of Dupont
(Title)

official gove... material

Attached to and made
a part of Contract No. DAKF57-89-S-9032

SPECIAL PROVISIONS C (S)
WATER SERVICE

For use of this form, see AR 420–41; the proponent agency is the Office of the Chief of Engineers

1. ESTIMATED REQUIREMENTS.
Estimated daily maximum demand Not Applicable
Estimated annual consumption 100 K/Gallons
(The parties hereto are not obligated to deliver or receive, nor are they restricted to, the above amounts.)

2. POINT OF DELIVERY. The point of delivery of water shall be the point of connection with the Government's water main, and located at the South West Corner of the 4300 block, Fort Lewis, Washington

3. QUALITY OF WATER. The Govemment will supply the same quality of potable water as supplied to Fort Lewis, Washington by means of its water system located at the said Fort Lewis, Washington

4. RATES. The rates to be charged the Purchaser by the Government for the water service described herein, are as follows: ".2556 per K/gallon for Fort Lewis, as per Rate "B", attached Summary of Rates. Any future changes in this rate will be effected by distribution of revised summaries of rates which within themselves will establish the effective date of the change.

5. METERING AND BILLING. Water will be measured by 6 inch meter(s) to be furnished, installed and maintained by the Purchaser. The meter(s) will be read by the Utilities Sales Officer, or his authorized representative, and bills will be rendered quarterly to the Purchaser by the Government. All such bills will be due and payable 15 days after receipt thereof by the Purchaser.

6. ALTERATIONS AND ADDITIONS.
Water shall be supplied provided only that the Purchaser shall furnish a locking device which shall securely lock the gate valve on the water line from the City of Dupont in closed position, with keys to said locking device kept in the possession of the Facility Engineer only.

official government material

DRAFT

INTER-GOVERNMENTAL AGREEMENT

BETWEEN

THE CITY OF DUPONT

AND

FORT LEWIS

FOR

EMERGENCY WATER SUPPLY INTERTIE

THIS AGREEMENT is made and entered into this __ day of _____, 1997, by and between the City of DuPont, a municipal corporation, hereinafter referred to as "City" and Fort Lewis, a United States Department of the Army military installation, hereinafter referred to as DOA.

WHEREAS the City provides water service to the City of DuPont, Pierce County, Washington, and the DOA provides water service to Fort Lewis, Pierce County, Washington; and

WHEREAS the City and the DOA desire to enter into an agreement to obtain supplemental water supply for emergency purposes; and

WHEREAS the City and the DOA have constructed an intertie between City and DOA water systems for such purposes subject to certain terms and conditions as set out below.

NOW, THEREFORE, THE CITY AND THE DOA AGREE AS FOLLOWS:

1. **SCOPE:** Subject to the terms and conditions of this Agreement, the City and the DOA agree to provide each other with an emergency source of water through an intertie connection between the City and DOA water systems at the location described and depicted on Exhibit "A" attached hereto. This connection shall be an emergency standby connection, and water shall only be drawn through this point when an emergency occurs. An emergency shall be considered an event that requires the City or DOA water supply to be augmented on a temporary emergent basis in the event of need for fire, failure of source and/or transmission or treatment facilities and such other emergency needs as may occur.

2. **TERM:** The term of this agreement shall run from the date of this agreement for a period of ____ years and shall be automatically extended for an additional ___

years unless written notice of termination is provided by either party at least one year prior to each ___ year termination date. Upon renewal all terms and conditions shall remain the same except that the parties may re-negotiate the water charge as described herein. Should the parties be unable to agree upon re-negotiation of the charge, the issue shall be referred to **arbitration/mediation ((?)See section 14)** as is set forth in this agreement.

3. **USAGE:** City or DOA shall notify the other party in writing at least three (3) working days in advance of the date either party desires to receive water through the intertie. In case of emergency need, the City or DOA shall provide water immediately upon oral notification of emergency. Follow-up written notice of such emergency request shall be made by City or DOA to the other party within five (5) days of the commencement of such use.

4. **OWNERSHIP:** The intertie is constructed and owned by the City up to the DOA boundary shown on Exhibit A. The DOA owns that portion of the intertie within the DOA boundaries.

5. **WATER QUALITY:** Water supplied by the City or DOA through the intertie shall be treated per current Washington State Department of Health standards for domestic water supply. If in the future, the water does not meet applicable government regulations for the transfer of water pursuant to this agreement, the supplying party shall take immediate and reasonable steps as may be feasible to correct these deficiencies.

6. **SUPPLY:** The City and DOA shall use reasonable efforts to provide an uninterrupted supply of water. Neither party shall be liable for any shortage or interruption in the delivery of water. In addition, neither party shall be liable for any failure, interruption, or shortage of water, or any loss or damage resulting therefrom occasioned by any cause beyond the control of either party. The City and DOA do not guarantee the availability of water through the intertie at all times because of each parties' respective needs and water demand. Further, during critical water shortage periods as determined by either party, the City or DOA may close the intertie until sufficient water supply exists to make such available for use by the other party. In the event City or DOA declares and/or imposes water usage restrictions within their boundaries, City and DOA agree to adopt and impose water usage restrictions no less restrictive than those adopted by the other party as a pre-condition to receiving water through the intertie.

7. **RESALE:** All water delivered under this agreement may only be resold to customers within the parties' respective water service boundary for use therein.

8. **METERING:** All water delivered pursuant to this agreement shall be metered and measured by the City by metering equipment owned by the City. City and DOA will monitor the water flow measurements.

9. **OPERATION:** City personnel shall operate intertie valves located inside the City limits. DOA personnel shall operate all valves within the DOA boundary. The City and DOA shall notify the respective parties when there is a need for emergency intertie water supply.

10. **MAINTENANCE:** The City will maintain the intertie up to the boundary with Fort Lewis as long as water is provided from the DOA to the City. If the City at any time provides water to the DOA, then from that date forward, maintenance costs shall be shared equally among the parties. These costs will include "time and materials" of City staff. Maintenance costs shall include calibration of the 6 inch meter every two years and exercising of valves and replacement of any appurtenances in the intertie vault. The DOA will maintain the intertie within the DOA boundary. The City and the DOA shall be responsible for the flushing of the intertie water lines as reasonably necessary to ensure water quality.

11. **CAPITAL COSTS:** The City funded the intertie vault at a cost of _____, in December 1997. DOA did not participate in the funding of the intertie since DOA does not anticipate using the intertie and receiving benefit. If DOA utilizes the intertie, it shall pay the City $0.00 as its capital contribution of the intertie facilities.

12. **WATER CHARGE:** In the event that City or DOA receive water through the intertie, the party receiving such water shall pay the other party shall be $_____ per hundred cubic feet. This rate shall be adjusted as required on an annual basis. The party delivering such water shall bill the party receiving such water monthly for the amount of water delivered. The party receiving such water shall pay the other party within sixty days (60) days of the date of such billing. Any billings not paid by the party within such sixty-day period, shall accrue interest at the rate of twelve percent (12%) per annum until paid.

13. **RECORDS:** Permanent books and records shall be kept by the City of respective volumes delivered and used and all expenses and costs incurred and paid for water service. The records required by this paragraph shall be available for examination at any reasonable time by DOA. Such records, or copies thereof, shall be maintained for at least five years and in complete compliance with State of Washington law.

14. **DISPUTES:** In the event that either party commences any legal action relating to the provisions of this Agreement, the prevailing party shall be entitled, in addition to all other amounts to which it is otherwise entitled in this Agreement, to all costs of litigation, including but not limited to, costs, expert witness and reasonable attorney's fees, including all such costs and fees incurred on appeal.

14. **ARBITRATION:** In the event of a dispute, the matter shall be subject to arbitration under the rule of the American Arbitration Association. Each party shall appoint one qualified arbitrator within thirty days of the written request for arbitration. The two arbitrators so appointed shall appoint a third arbitrator within an additional 30 days. The three arbitrators shall conduct a hearing within 90 days of appointment of the third arbitrator and shall produce a decision within 120 days of the appointment of the third arbitrator. The results of any arbitration shall be final and conclusive and may be revised or vacated only as presently allowed by RCW Chapter 7.04. Pre-hearing discovery shall be limited to document production and depositions only and the burden of proof shall be with the party requesting arbitration. The cost of arbitration shall be shared equally by the parties thereto and each party shall pay its own costs and attorney's fees unless the arbitration panel rules that the matter was brought frivolously in which case the party frivolously bringing the matter to arbitration shall pay all costs of arbitration and the attorney's fees and costs of the other party.

15. **HOLD HARMLESS:** City and DOA hold harmless and indemnify the other party and its employees and agents from any and all claims, damages, costs, and other liabilities caused by the parties' sole negligence or the parties' concurrent negligence, but only to the extent of the parties concurrent negligence, and arising by reason of participation in connection with, or relating to, the performance of this Agreement. The parties understand, and will advise their customers as necessary, that no legal relationship exists between them and that the party providing service is solely responsible for provision of water service to such customers and billing for same.

16. **NOTICE:** Whenever in this agreement notice is required to be given, the same shall be given by Registered Mail addressed to the respective parties at the following addresses:

Fort Lewis
Director of Public Works
Public Works
AFZH-DEP-E/MS 17b
Building 4301
P.O. Box 339500
Fort Lewis, WA 98433-9500

City of DuPont
Mayor
303 Barksdale Avenue
P.O. Box 455
DuPont, WA 98327

unless a different address shall be hereafter designated in writing by any of the parties. The date of giving such notice shall be deemed to be the date of mailing thereof. Billings for and payments of water costs may be made by regular mail.

17. **EXECUTION OF DOCUMENTS:** This agreement shall be executed in two counterparts, either of which shall be regarded for all purposes as one original. The parties agree that they will execute any and all deeds, instruments, documents and resolutions or ordinances necessary to give effect to the terms of this agreement.

18. **WAIVER:** No waiver by either party or any term or condition of this agreement shall be deemed or construed as a waiver of any other term or condition, nor shall a waiver of any breach be deemed to constitute a waiver of any subsequent breach whether of the same or a different provision of this Agreement.

19. **INTEGRATION:** This agreement merges and supersedes all prior negotiations, representations and agreements between the parties hereto relating to the subject matter hereof and constitutes the entire contract between the parties.

Dated: _____	Dated: _____
City of Dupont	**Fort Lewis**
_____ _____	_____ _____
Authorized Signature Title	Authorized Signature Title

DRAFT

STATE OF WASHINGTON)
) ss.
COUNTY OF PIERCE)

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledged that he signed this instrument, on oath stated that he was authorized to execute the instrument and acknowledged it as _____ for Fort Lewis, a United States Department of the Army military installation, to be the free and voluntary act of such installation for the uses and purposes mentioned in the instrument.

Dated_____

Name_____

Notary Public in and for the State of Washington, residing at _____
My Appointment Expires_____

STATE OF WASHINGTON)
) ss.
COUNTY OF PIERCE)

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledged that he signed this instrument, on oath stated that he was authorized to execute the instrument and acknowledged it as the _____ of the City of DuPont, a municipal corporation, to be the free and voluntary act of such municipal corporation for the uses and purposes mentioned in the instrument.

Dated_____

Name_____

Notary Public in and for the State of Washington, residing at _____
My Appointment Expires_____

APPENDIX E

CITY CODE AND POLICIES

TITLE 21

WATER AND SEWER UTILITIES

Chapters:

21.01 Water Supply System
21.02 Sanitary Sewer System
21.03 Prevention of Contamination of Public Water
21.04 Fire Hydrant Use
21.05 Water System Rates and Charges
21.06 Sewage Lift Station Charges

Chapter 21.01

Water Supply System

Sections:

21.01.010 Definitions.
21.01.020 Purpose.
21.01.030 Applicability.
21.01.040 Inspections.
21.01.050 Unlawful acts defined.
21.01.060 Hydrant--Authorized use.
21.01.070 Emergency interruption of service.
21.01.080 Cross connections prohibited.
21.01.090 City not liable for damages.
21.01.100 Discontinuance of service.
21.01.110 Administration.
21.01.120 Violations--Penalty.
21.01.130 Application for service.
21.01.140 Conditions applicable to all water service connections.
21.01.150 Conditions applicable to all connections.
21.01.160 New residential service connection fee.
21.01.170 New commercial or industrial service connection fee.
21.01.180 Ownership of permanent facilities.
21.01.190 Non-standard water service extension.
21.01.200 Owner's service piping specifications.
21.01.210 Plumbing specifications.
21.01.220 Lawn sprinkler specifications.
21.01.230 Fire protection service.
21.01.240 Turn on--New installation.
21.01.250 Turn off--No charge.
21.01.260 Turn on charge.
21.01.270 Turn on--Unauthorized.
21.01.280 Turn off, turn on--Liability disclaimer.
21.01.290 Disconnection of service--Condemned buildings.
21.01.300 Meters--Ownership and installation.
21.01.310 Meters--Exchange and reinstallation.
21.01.320 Meters--Maintenance and repair.
21.01.330 Meters--Tests and adjustment of bill.
21.01.340 Monthly water service rates.
21.01.350 Service rates.
21.01.360 Service trip charge.
21.01.370 Main extensions--When required.
21.01.380 Main extensions--Application.
21.01.390 Main extensions--Preparation of plans and specifications.
21.01.400 Main extensions--Plan review, inspection fee--Deposits.
21.01.410 Main extensions--Construction.
21.01.420 Main extensions--Acceptance.
21.01.430 Main extensions--Construction drawings.
21.01.440 Main extensions--Deeded to City.
21.01.450 Temporary mains.
21.01.460 Violation--Penalty.

21.01.010 Definitions.

(a) Interpretation of Definitions. For the purpose of this chapter the following words or phrases have the meaning set forth herein, unless the context indicates otherwise.

(b) “City” means the City of DuPont.

(c) “Mayor” means the Mayor of the City of DuPont or Mayor’s authorized representative.

(d) “Commercial services” means water services to multiple dwelling units or businesses engaged in the manufacture and/or sale of a commodity or commodities, or the rendering of a service, such as hotels, motels and hospitals.

(e) “Council” means the City Council of the City of DuPont.

(f) “Cross connection” means any connection between any part of the water system used or intended to supply water for drinking purposes and any source or system containing water or substance that is not or cannot be approved as safe, wholesome, and potable for human consumption.

(g) “Customer” means all persons obtaining water service from the water supply system of the City of DuPont.

(h) “G.I.S.” means the City of DuPont’s computer based Geographic Information System which will be used for tracking and maintaining current information on all of the utility systems and roadways within the City.

(i) “Industrial services” means water service connections to a business enterprise engaged in the manufacture of products, materials, equipment, machinery and supplies on a substantial or major scale.

(j) “Main” means a water line designed or used to serve more than one premises.

(k) “Multiple dwelling units” means duplexes, apartment buildings, condominiums, mobile home parks, trailer courts, etc.

(l) “Person” means natural persons of either sex, and associations, copartnerships and corporations, whether acting by themselves or by a servant, agent or employee.

(m) “Premises” means a private home, building, apartment house, condominium, trailer court, mobile home park, a group of adjacent buildings or property utilized under one ownership and under a single control with respect to use of water and responsibility for payment therefor.

(n) “Residential services” means a water service connection to a single-family dwelling unit.

(o) “Service installation, service connection, or connection” means all pipings and fittings from the main to the property owner’s side of the water meter assembly.

(p) “System” means all water source and supply facilities, transmission pipelines, and storage facilities, pumping plants, distribution mains and appurtenances, vehicles, and materials storage facilities.

(q) “Temporary main” means mains which do not conform to City standards with respect to size, location, type of material and/or method of installation.

(r) “Treasurer” means the City Treasurer of the City of DuPont.

(s) “Water service area” means that area consisting of the corporate limits of the City of DuPont and those areas that have been or may be designated for water service by the City Council.

(t) “Water standards” means the City’s latest revision of “Conditions and Standards for Construction of Developer Extensions to the Water System.” (Ord. 488 Ch. 1, Nov. 9th, 1993).

21.01.020 Purpose.
The purpose of this chapter is to establish general rules and regulations for the service and extension of service from the water system of the City of DuPont; and to promote the public health, safety, and general welfare of the users of the water system, in accordance with standards established by the City, County, State and Federal governments. (Ord. 488 Ch. 2 § 1, Nov. 9th, 1993).

21.01.030 Applicability.
The provisions of this chapter shall apply to all water services provided by, and to all work performed by the City. (Ord. 488 Ch. 2 § 2, Nov. 9th, 1993).

21.01.040 Inspections.
(a) Authorized employees of the City, properly identified, shall have access, at reasonable hours of the day, to all parts of a premises or buildings to which water is supplied by the City, for the purpose of assuring conformity to these regulations, as required by the Department of Health.

(b) Whenever the owner or the occupant of any premises provided service by the City restrains authorized City employees from making such necessary inspections, water service may be refused or discontinued. (Ord. 488 Ch. 2 § 3, Nov. 9th, 1993).

21.01.050 Unlawful acts defined.
(a) Any person causing damage to any property belonging to the City shall be liable to the City for any and all damages resulting either directly or indirectly therefrom.

(b) It shall be unlawful for any person to willfully disturb, break, deface, damage or trespass upon any property belonging to or connected with the water system of the City of DuPont, in any manner whatsoever.

(c) It shall be unlawful for any person to store, maintain or keep any goods, merchandise, materials or rubbish within a distance of five (5) feet of, or to interfere with, the access or operation of any water meter, gate valve, fire hydrant, or other appurtenance in use on any water service, connection, water main, or fire protection service. (Ord. 488 Ch. 2 § 4, Nov. 9th, 1993).

21.01.060 Hydrant--Authorized use.
It shall be unlawful for any person, other than authorized employees of the City, to operate fire hydrants, valves and hose outlets, unless proper arrangements have been made for payment therefor and permission has been granted by the City. (Ord. 488 Ch. 2 § 5, Nov. 9th, 1993).

21.01.070 Emergency interruption of service.
(a) In case of emergency, or whenever the public health, safety, or the equitable distribution of water so demands, the City may change, reduce or limit the time for, or temporarily discontinue the use of water. Water service may be temporarily interrupted for the purposes of making repairs, extension or doing other necessary work.

(b) Before so changing, reducing, limiting or interrupting the use of water, the City shall notify, insofar as practicable, all water consumers affected.

(c) The City shall not be responsible for any damage resulting from interruption, change or failure of the water supply system. (Ord. 488 Ch. 2 § 6, Nov. 9th, 1993).

21.01.080 Cross connections prohibited.
(a) The installation or maintenance of a cross connection is prohibited.

(b) Any such cross connection now existing or hereafter installed is hereby declared a nuisance and shall be abated immediately. The control or elimination of cross connections shall be in accordance with the State of Washington Administrative Board of Health Code (WAC 246-290-490) as now enacted or hereafter amended, together with any future manuals of standard practice pertaining to cross connection control approved by the Director of the State of Washington Department of Social and Health Services.

(c) Water service will be discontinued to any premises upon failure to comply with the provisions of this section.

(d) For protecting the City's water supply from backflow, furnishing of water service shall be contingent upon the customer providing cross connection control approved by the appropriate Health Authority and the City. (Ord. 488 Ch. 2 § 7, Nov. 9th, 1993).

21.01.090 City not liable for damages.
The City shall not be liable for damages in case the operation of the City's source of water supply or means of distribution fails or is curtailed, suspended, interrupted or interfered with, or for any cause reasonably beyond its control. Such failure, curtailment, suspension, interruption or interference shall not be held to constitute a breach of contract on the part of the City, or in any way affect any liability for payment for water made available or for money due on or before the date of such occurrence. (Ord. 488 Ch. 2 § 8, Nov. 9th, 1993).

21.01.100 Discontinuance of service.
(a) The City may discontinue service by reason of a failure to pay a bill for service or the failure to comply with the terms of this chapter, in accordance with the procedures established by State law, this chapter, and other City ordinances.

(b) Service to any premises upon which a private water supply system is used or operated contrary to the provisions of this chapter may be discontinued or refused. (Ord. 488 Ch. 2 § 9, Nov. 9th, 1993).

21.01.110 Administration.
(a) The Mayor may make such administrative determinations for the proper operation of this chapter that are not inconsistent with its provisions.

(b) The Mayor shall promulgate and enforce such customer service policies and related additional rules as may be deemed necessary from time to time to encourage and facilitate the use of water, pursuant to City Council resolution approving the same. (Ord. 488 Ch. 2 § 10, Nov. 9th, 1993).

21.01.120 Violations--Penalty.
Any person willfully violating any of the provisions of this chapter shall be guilty of a misdemeanor, and shall be punished as set forth in the City of DuPont Municipal Code. (Ord. 488 Ch. 2 § 11, Nov. 9th, 1993).

21.01.130 Application for service.
(a) An application shall be made for all service connections, for the use of fire hydrants, and for work to be performed by the City. Such application shall be on forms provided by the City.

(b) An application shall be accompanied by all fees or deposits required by this chapter.

(c) An application shall provide all information required by this chapter, as well as all other information determined by the Mayor to be necessary for consideration and action upon the application.

(d) The application, when approved by the Mayor, shall constitute an agreement whereby the applicant agrees to conform to the provisions of this chapter, as now enacted or hereafter amended.

(e) A change of use of the served premises will require that a new application for service be made. (Ord. 488 Ch. 3 § 1, Nov. 9th, 1993).

21.01.140 Conditions applicable to all water service connections.
(a) All service connections shall be metered.

(b) Each served premises must have a separate connection to a main, unless otherwise approved by the Mayor when impossible or impractical.

(c) Water will not be provided to more than one customer or dwelling through a single service connection, and separate service applications are required for each dwelling. When two customers are being served by a single service connection on the effective date of the ordinance codified in this chapter, the Mayor may require the installation of a new service, when necessary, for efficient operation of the system, at the cost of the customer.

(d) When the premises for which service is sought does not abut a main with sufficient pressure and capacity to provide the required flow at the property line, the application for service shall be rejected.

(e) No application for water service shall be accepted or approved for locations outside of the City water service area.

(f) The furnishing of water by a customer to premises other than that served by the customer's service is prohibited, except as may be approved by the Mayor, and except during emergencies; provided, that emergency service cannot continue for more than 30 days and an application for emergency service shall be made to the City within 48 hours of the onset of the emergency.

(g) A request for a change in the size of service connection shall be treated as a request for a new service installation.

(h) A change of use of the served premises will require a new service connection, unless the existing service is adequate for the changed use, as determined by the Mayor. (Ord. 488 Ch. 3 § 2, Nov. 9th, 1993).

21.01.150 Conditions applicable to all connections.
(a) All water service connections shall be made by the City unless approved otherwise by the Mayor. Water service connections may be installed by a City approved contractor during construction of water main extensions.

(b) The cost of such connections shall be paid by the customer at the time of application.

(c) When buildings are replaced by new buildings, the existing water service connection shall not be used, when the Mayor determines that such connection is not acceptable. In such an instance, the customer shall be required to install a new water service connection, in accordance with the terms of this chapter. (Ord. 488 Ch. 3 § 3, Nov. 9th, 1993).

21.01.160 New residential service connection fee.
(a) The fee for new residential water service connections and inspections, up to and including the meter, shall be set by the City Council by ordinance, as may be necessary.

(b) This fee shall cover the cost of tapping the City's water main for the necessary size of service, providing and installing pipe saddle, installing the copper tubing, type "K" necessary to reach the meter box to be installed within the right-of-way, and providing and installing a yoke, shut-off, meter and meter box. (Ord. 488 Ch. 3 § 4, Nov. 9th, 1993).

21.01.170 New commercial or industrial service connection fee.
(a) For all commercial and/or industrial services, and for all residential services larger than 2 (two) inch diameter irrespective of meter size, the owner or applicant shall pay a deposit in an amount of the City estimate of cost for the construction work and the work shall be thereafter billed on the basis of actual cost of installation plus administrative overhead (15%). The applicant shall be refunded any underrun or billed any overrun of the actual cost difference in the estimated cost including administrative overhead.

(b) In no event shall the charge be less than the charge for a 3/4-inch diameter residential service with a 3/4-inch meter. (Ord. 488 Ch. 3 § 5, Nov. 9th, 1993).

21.01.180 Ownership of permanent facilities.
(a) The ownership of all water mains, easements, and the water services from the main to the meter box in public rights-of-way shall be solely vested in the City, except for those mains which are designated as private mains.

(b) The ownership and responsibility for the maintenance of individual services from the meter to the premises served shall be that of the owner of the premises served and the City shall not be liable for any part thereof. (Ord. 488 Ch. 3 § 6, Nov. 9th, 1993).

21.01.190 Non-standard water service extension.
(a) Where the premises of one customer only is located near or abuts upon a street in which there is no water main, a nonstandard water service extension no greater than 150 feet in length may be installed and connected, as approved by the Mayor to the nearest avail-able water main.

(b) The City will maintain the nonstandard water service extension beneath and along the public street, from the main to the water meter. Whenever any improvement within the public right-of-way within which any nonstandard water service extension is located requires the removal or readjustment of such pipe, the cost and responsibility

therefor shall be that of the owner of the premises served and the City shall not be liable for any operation of the cost thereof.

(c) Upon acceptance of a new permanent main where the customer is being served by a nonstandard water service, the customer shall discontinue the use of said service and the City shall connect the service line to the permanent main at its own expense. (Ord. 488 Ch. 3 § 7, Nov. 9th, 1993).

21.01.200 Owner's service piping specifications.
(a) Water mains, service lines and appurtenances shall be installed per the City's Water Standards.

(b) Service connections and extension pipes laid underground shall be sized in conformance with the applicable provisions of the Uniform Building Code as adopted by the City.

(c) The City may require any customer to install a pressure reducing valve, backflow preventive device, pressure relief valve or similar device at any location where the City determines a need, to protect the water system. (Ord. 488 Ch. 3 § 8, Nov. 9th, 1993).

21.01.210 Plumbing specifications.
(a) All persons installing fixtures or appliances to be supplied with water from the City water mains shall be subject to the requirements of the applicable Plumbing Code of the City. Persons installing plumbing in new buildings shall leave the valve at the meter in the "Off" position upon completion of their work.

(b) Persons making additions or repairs to existing plumbing systems shall leave the valve at the meter in the position in which it was found on beginning their work.

(c) The Mayor shall have the right to refuse water service or discontinue water service in any situation where it is discovered that applicable City standards and codes have not been complied with in making the installation. (Ord. 488 Ch. 3 § 9, Nov. 9th, 1993).

21.01.220 Lawn sprinkler specifications.
(a) A lawn sprinkler system connected to a domestic, or commercial connection shall be equipped with an approved backflow prevention device placed between the sprinkler stop and waste valve and the first sprinkler outlet. The approved backflow prevention device shall be placed at a height as provided in the applicable City Plumbing Code. The stop and waste valve and approved backflow prevention device shall be in the sprinkler line after it branches from the water service pipe or the building plumbing.

(b) The stop and waste valve for a lawn sprinkler system shall be at the same depth as the water service pipe, however, the lawn sprinkler system proper may be laid to a lesser depth at the option of the owner.

(c) Such additional stop and waste valves, as are required to properly drain the sprinkler piping, shall also be installed.

(d) All backflow prevention devices shall be inspected by an authorized City employee prior to utilization of the system.

(e) Water service may be refused on existing lawn sprinkler systems which are not equipped with a stop and waste valve and an approved backflow prevention device. (Ord. 488 Ch. 3 § 10, Nov. 9th, 1993).

21.01.230 Fire protection service.
(a) A water main to be used solely for fire protection purposes may be installed, servicing any premises, subject to the provisions of this section.

(b) Fire protection systems shall be provided in accordance with Insurance Services Office (I.S.O.) Guidelines.

(c) A plan of the proposed required fire protection system showing the general installation detail shall be required and shall be approved by the Mayor and the Fire Marshal prior to construction.

(d) Service of more than one premises by a fire service shall not be permitted.

(e) Fire protection systems shall be installed and maintained by the customer in a manner approved by the City and the system shall contain an approved, tested backflow prevention device.

(f) Fire protection systems shall be installed with, at a minimum, a detection check meter of a size and type approved by the Engineer.

(g) Indication of unauthorized use of water through a detector check meter or other backflow prevention device more than once per calendar year shall be cause for installation of a fire line meter at the expense of the customer.

(h) Delinquency in payment of expense for fire protection service or failure of the customer to make changes in meter installation as herein provided, after notice from the City, shall be sufficient cause for filing a lien on the property and/or discontinuance of the service. (Ord. 488 Ch. 3 § 11, Nov. 9th, 1993).

21.01.240 Turn on--New installation.
When new water service connections are installed by the City for any premises, the valve at the meter shall be turned to the "Off" position and remain off until a "turn on" is applied for and an order shall be issued by the City upon written application therefor by the owner of the premises to be supplied after inspection and approval by the City, and after the Plumbing Inspector has issued a certificate that all provisions of the applicable Plumbing Code have been complied with. (Ord. 488 Ch. 4 § 1, Nov. 9th, 1993).

21.01.250 Turn off--No charge.
After written application or verbal request, any water service will be turned off without charge where such "turn off" can be accomplished at a time convenient to the Department. The City's monthly base service rate will remain in effect during the turn off period. (Ord. 488 Ch. 4 § 2, Nov. 9th, 1993).

21.01.260 Turn on charge.
(a) "Turn on" charges are for expenses incurred to take meter readings, administrative, accounting, data processing, and overhead charges incurred in transferring or establishing a new or existing account. The "turn on" fee shall be deemed fully earned if all or any part of the above activities are accomplished.

(b) "Turn on" charges shall not be prorated for services started during a billing period. These charges shall be as outlined in the latest revision of the City's Water System Charges and Fee Ordinance.

(c) All unpaid water service charges and penalties against the premises shall be required to be paid by the Owner at the time of application for turn on, or an arrangement for payment satisfactory to the City shall be made before water is supplied to the premises. (Ord. 488 Ch. 4 § 3, Nov. 9th, 1993).

21.01.270 Turn on--Unauthorized.
(a) It shall be unlawful for any person, except duly authorized employees of the City, to "turn on" the water supply to the premises after a "turn off" is made at the meter by the City.

(b) A water service to any premises turned on by an unauthorized person, after said water supply had been turned off by the City, may, upon discovery, be disconnected by the City from the water main in the street, and shall not be connected again until all fees due as a result of the disconnecting and reconnecting of such service are paid. (Ord. 488 Ch. 4 § 5, Nov. 9th, 1993).

21.01.280 Turn off, turn on--Liability disclaimer.
The City shall not be liable for any damage to persons or property resulting from a properly performed and authorized "turn off" or "turn on" of the water service including, but not limited to, situations where water service is left on between a change of customers occupying the premises, at the request of one of the customers, or the services disconnected for "nonpayment" or "no contract." (Ord. 488 Ch. 4 § 6, Nov. 9th, 1993).

21.01.290 Disconnection of service--Condemned buildings.
Whenever a premises supplied with water has been found by the proper authorities to be dangerous to human life and unfit for human habitation, and notice of such finding has been received by the City from said authorities, the Mayor shall cause the water service to such premise to be turned off. Water service to such premises shall not be

restored until the owner and/or his agent has secured a release or clearance from the proper authorities. (Ord. 488 Ch. 4 § 7, Nov. 9th, 1993).

21.01.300 Meters--Ownership and installation.
All meters installed on water service connections shall be and remain the property of the City and shall be removed only by the City. (Ord. 488 Ch. 5 § 1, Nov. 9th, 1993).

21.01.310 Meters--Exchange and reinstallation.
(a) Whenever the owner of any premises desires to change the size of a meter, an application shall be made to the City, and, upon approval, the exchange will be made at the expense of the owner, less credit for the usable value of the meter removed.

(b) Overload Meters. Whenever demand periodically exceeds the rated capacity of a meter to the extent that the meter may be damaged, the City shall notify the owner of this fact. After evaluating the owner's requirements, the City shall advise what size meter is necessary to give proper service without damage to the meter. The estimate of cost covering such change shall be furnished by the City, upon request by the owner, without charge. If the owner does not make the required deposit for the installation of the larger meter within thirty days after the date of the notice, then the City shall install the proper size meter, charging the total cost to the owner, or the City may discontinue service. (Ord. 488 Ch. 5 § 2, Nov. 9th, 1993).

21.01.320 Meters--Maintenance and repair.
(a) The City shall maintain and repair all domestic, commercial and industrial service meters and shall replace meters periodically, when necessary, if rendered unserviceable by ordinary use.

(b) When replacement or repairs to any meter are made necessary by the willful act, neglect or carelessness of the owner or occupant of the premises serviced, all expenses of such replacement shall be borne by the owner or occupant of the premises. (Ord. 488 Ch. 5 § 3, Nov. 9th, 1993).

21.01.330 Meters--Tests and adjustment of bill.
(a) Upon request from a customer, based upon a complaint that the water bill for any period has been excessive, the City shall have the meter reread.

(b) Should the customer then request that the meter be tested for accuracy, he shall make a deposit, as prescribed per City ordinance, with the City Clerk. In case the test discloses an error of more than three percent in favor of the City, the deposit shall be refunded to the customer, a correct registering meter shall be installed and the customer's account shall be credited with the excess consumption over the average consumption for the last previous reading, unless otherwise approved by the Mayor. When the test discloses either no error or an error of three percent or less, the amount deposited will be retained by the City to cover a part of the cost of such test. (Ord. 488 Ch. 5 § 4, Nov. 9th, 1993).

21.01.340 Monthly water service rates.
Monthly water service rates shall be charged to all users of public water facilities operated and maintained by the City. (Ord. 488 Ch. 6 § 1, Nov. 9th, 1993).

21.01.350 Service rates.
(a) The monthly rates set forth in the most current City of DuPont "Water System Rates and Charges" Ordinance for properties or buildings to which water service is available shall commence (60) days after such water service becomes available and formal notice of such availability is given to the owner of record, or upon connection to such water facilities, whichever occurs first.

(b) Service rates once imposed on any property or building shall continue until the serviced building is demolished, torn down, removed or no longer in existence for any reason, or unless it can be shown by affidavit that the building could not be serviced because of lack of water. Water service rates for any structure disconnected or to be disconnected shall continue until such disconnection is approved by the City.

(c) The City shall cause to be made and delivered to each consumer of water a statement of the rates every two months. All billings shall be made in accordance with the City of DuPont's Water System Rates and Charges and

Uniform Utility Billing and Collection Procedure Ordinances applicable to the type of facility and location of water system serving the user.

(d) After water services have been shut off because of a delinquency in paying utility charges, service shall not be resumed until all charges, penalties and service fees have been paid. Service fees shall include a fee for each service trip which has been made to the premises relative to the delinquent charges at rate established by resolution of the City Council.

(e) If a trip is made by service personnel to the premises of a customer for the purpose of shutting off services due to delinquency, and the customer wishes to pay the delinquent bill and delinquency penalty at that time, a service fee for said trip at rates established by resolution of the City Council shall be assessed. If the delinquent charges, penalty and such service fee are paid at the time, the water service shall not be discontinued. (Ord. 488 Ch. 6 § 2, Nov. 9th, 1993).

21.01.360 Service trip charge.
Whenever the City responds to a request outside of regular working hours for assistance to investigate a deficiency in water service to any premises and it is determined that the deficiency is the result of improper operation or maintenance of the customer's plumbing, a charge per the City's "Water System Charges and Fees" ordinance will be made to defray a portion of the cost of responding to the request. (Ord. 488 Ch. 6 § 3, Nov. 9th, 1993).

21.01.370 Main extensions--When required.
A main extension shall be required whenever more than one (1) residence or customer is provided service, and the property to be served does not abut a water main, or the existing water main is not adequate to provide the necessary water pressure or flow characteristics. (Ord. 488 Ch. 7 § 1, Nov. 9th, 1993).

21.01.380 Main extensions--Application.
(a) The person desiring a main extension shall apply to the Mayor requesting permission to extend the City's water system.

(b) The Mayor shall review the application, and if the requested extension is determined to be a proper extension of the water system, shall provide the petitioner with the design requirements for the extension.

(c) If the requested main extension is determined to be an improper extension of the water system, the application shall be denied. (Ord. 488 Ch. 7 § 2, Nov. 9th, 1993).

21.01.390 Main extensions--Preparation of plans and specifications.
Upon receipt of the design requirements from the City, the petitioner shall cause plans and specifications for the extension to be prepared. All design and construction plans and specifications shall be in accordance with the City of DuPont's Water Standards. The completed plans and specifications, having a valid professional engineer's seal and endorsement, shall be submitted to the City for review and approval. (Ord. 488 Ch. 7 § 3, Nov. 9th, 1993).

21.01.400 Main extensions--Plan review, inspection fee--Deposits.
(a) Along with a water line extension plan submittal to the City, the owner shall pay to the City a nonrefundable deposit of five hundred (500) dollars. The plan review fee provides for the costs of service performed by the City included but not limited to planning, engineering review of plans, legal services, inspection of construction, and all other technical and administrative services provided relative to extensions to the existing City water system. The owner will be charged on a time and material basis for plan review. Should the cost exceed $500, the Owner will be charged the additional fees.

(b) After approval of the plans and specifications, the City shall provide the petitioner with an estimate of the construction inspection fee. A permit for construction will be issued after review fees and the estimated inspection fees have been deposited with the City Treasurer. At such time as the Mayor determines the remaining funds are not adequate to provide necessary inspection for project completion, the petitioner shall be notified of such and an estimate of additional inspection fee required will be provided. The additional fees shall be deposited with the City Treasurer prior to depletion of the funds on deposit. Any monies unexpended from the inspection deposit upon completion of the project shall be returned to the petitioner. (Ord. 488 Ch. 7 § 4, Nov. 9th, 1993).

21.01.410 Main extensions--Construction.
(a) All work in the City right-of-way shall be subject to the approval of the City Engineer.

(b) Main extensions may be made by private contract or by City forces.

(c) Any main extension done by other than the City's forces shall be done by a licensed and bonded contractor of the State of Washington.

(d) Extension by the City's forces shall be at the expense of the person requesting construction of the main.

(e) All main extensions must be on the City's frontage of the applicant's property and other public rights-of-way and easements. (Ord. 488 Ch. 7 § 5, Nov. 9th, 1993).

21.01.420 Main extensions--Acceptance.
(a) The City reserves the right to reject any installation not inspected and approved by the City.

(b) Upon satisfactory completion of all required tests and acceptance of the main extension, the Contractor may, upon the City's approval, cause the extension to be connected to the City system. All costs incurred in such connection(s) including overhead and administrative charges, shall be the responsibility of the petitioner. Any adjustment on the actual cost of installation because of variance between the estimate and the actual cost shall be adjusted by refund upon completion of the job by the petitioner, or by payment by the petitioner to the City of any additional expense above the estimate.

(c) No main extension shall be energized other than for test purposes by duly authorized personnel until the main extension has been accepted by the City and all fees and charges have been paid. If energizing a main is necessary to restore service to existing customers, fire hydrants will not be activated until acceptance of the main extension. (Ord. 488 Ch. 7 § 7, Nov. 9th, 1993).

21.01.430 Main extensions--Construction drawings.
(a) Upon completion of a main extension, the petitioner shall provide the City reproducible mylar drawings that accurately indicate the main extension and appurtenances as actually installed in plan and profile. The petitioner shall also provide the City with a G.I.S. file, per the City requirements, indicating the main extension and appurtenances as actually installed in plan. If the G.I.S. files are not submitted per the City requirements, the City will create the files and charge the Developer on a time and materials basis.

(b) No main extension will be accepted until satisfactory "as built" drawings and G.I.S. files are provided, or the City is reimbursed for their creation. (Ord. 488 Ch. 7 § 8, Nov. 9th, 1993).

21.01.440 Main extensions--Deeded to City.
(a) The permit holder shall provide the City with a deed of conveyance for all main extensions as a condition of acceptance of the main extension by the City.

(b) The transfer of any main to the City shall be on the condition that the owner, district, company, contractor, or contributor shall transfer or provide for any necessary and proper franchise. (Ord. 488 Ch. 7 § 9, Nov. 9th, 1993).

21.01.450 Temporary mains.
(a) No temporary main shall be permitted to be installed as a part of the City's water system.

(b) Temporary mains and main extensions, however, may be acquired, maintained and operated by the City where provisions have been made by the owners of such mains to standardize such installations, in compliance with the standards for permanent mains, under terms of an agreement entered into with the Council. Where necessary, said agreement may provide for a surcharge rate or charge to be levied by the City for a specified period of time to provide sufficient revenues to assure compliance with City standards. The Mayor shall, before recommending the acceptance, delineate the temporary mains included in such installations, which are to be brought up to the City standards, on a map to be included as an exhibit under the aforementioned agreement. (Ord. 488 Ch. 7 § 10, Nov. 9th, 1993).

21.01.460 Violation--Penalty.

Violation of any portion of this chapter is a misdemeanor and is subject to a penalty of not more than $500.00 and for any costs incurred by the City relative to any violation or as otherwise provided in this chapter. (Ord. 488 Ch. 8 § 2, Nov. 9th, 1993).

Chapter 21.02

Sanitary Sewer System

Sections:
21.02.010 Definitions of terms.
21.02.020 Administration.
21.02.030 Required use of public sanitary sewerage systems.
21.02.040 Unlawful use of public and private sanitary sewer systems.
21.02.050 Types and methods of providing sanitary sewerage service.
21.02.060 Construction of sanitary sewer systems.
21.02.070 Sewer service charge and connection charges.
21.02.080 Violations of title.
21.02.090 Fees.

21.02.010 Definitions of terms.

(1) Words or phrases used in this chapter shall have the following meanings unless the context specifically indicates otherwise. Terms not specifically defined herein shall be as defined in the latest revised publication, "Glossary Water and Wastewater Control Engineering," published jointly by the American Public Health Association, American Society of Civil Engineers, American Water Works Association and Water Pollution Control Federation.

(2) "Approved" means approved by the "Director" unless otherwise specified.

(3) "ASTM" means American Society for Testing Materials.

(4) "Benefited property" means property receiving or having the potential of receiving sanitary sewer service from "public sewer facilities" built either by the "City" or for the "City" to provide service to a defined area.

(5) "BOD" means either the abbreviation for biochemical oxygen demand, the quantity of oxygen used in the biochemical oxidation of organic matter in a specified time, at a specified temperature, and under specified conditions; or a standard test used in assessing "wastewater" strength.

(6) "Building sewer" means that portion of the "sanitary sewer" connecting one or more structure(s) from the "plumbing outlet" to the "public sewer facilities." The "building sewer," including that portion called the "side sewer stub," is constructed in accordance with "City" approved standards and is not part of the "City" "public sewer facilities." "Building sewers" shall be maintained by the property owner.

(7) "Certified" means to present written, formal communication attesting as being true as represented or as meeting a standard and guaranteed by signature.

(8) "Cesspool" means a lined or partially lined underground pit into which "wastewater" is discharged and from which the liquid seeps into the surrounding soil, sometimes called leaching cesspool.

(9) "City" means the City of DuPont, Washington.

(10) "City sanitary sewerage system" means the system of "public sewer facilities" owned by the City and used for the purpose of conveying from their source, treating in any manner, and conveying to final points of disposal, all wastes of any nature permitted by this chapter to enter said system.

(11) "Collection system" means a system of "sanitary sewer(s)" consisting of eight-inch or larger diameter pipes and their associated manholes, cleanouts, and appurtenances, whose primary function is to collect "wastewater" from individual "side sewer(s)" and transport this "wastewater" to trunk and/or interceptor sewers.

(12) "Council" means those duly elected individuals serving as the Legislative Body of the City of DuPont.

(13) “Commercial facilities or units” means all facilities generating “wastewater” not herein defined as “residential facilities.”

(14) “Connection charges” means charges assessed by the “City” against a property owner prior to plan approval for connection to “public sewer facilities” owned by the “City.” These charges include all of the costs to the “City” associated with providing permanent sewer service to an owner/parcel including area, stub, treatment plant capacity charge, front footage, and any other costs or charges excluding permit fees.

(15) “County” means Pierce County, Washington.

(16) “Department” means the City’s Public Works Department, or in the future that department of the City responsible for the administration of the sanitary sewer utilities owned by the City.

(17) “Developer” means any person, or the heirs, successors, or assigns of such person, who owns and/or proposes or intends to develop any parcel of real property wherein there is located or is to be located any building or structure.

(18) “Director” means the Director of the City’s Public Works Department or his/her authorized deputy, agent or representative.

(19) “Domestic wastewater facilities” means all facilities generating “wastewater” principally from “residential facilities or units.”

(20) “Duplex” means a two-family dwelling, consisting of a detached building containing two complete living units sharing a common wall or floor with not more than two kitchens, designated and/or used to house not more than two families living independently of each other and including all necessary household functions of each such family. A “duplex” shall be considered a “multifamily dwelling.”

(21) “Easement” means a legally binding agreement entitling the “City” to construct, repair and/or connect sewer facilities located on private property; or, an agreement between two separate owners, for the purpose of mutual “wastewater” discharge, to construct sewer facilities on property owned by one “owner” or the other or both.

(22) “Effluent” means “wastewater” that has been treated to remove wastes and is discharged from treatment facilities.

(23) “Garbage” means animal, vegetable, and other waste resulting from the handling, preparation, cooking and serving of foods. It is composed largely of putrescent organic matter and its natural moisture content.

(24) “Governmental entity” means the organization or agency through which a separate and independent political body exercises authority including, but not limited to, cities, towns, Pierce County water and sewer districts, and other municipal corporations.

(25) “Industrial wastes” means wastes from industrial processes, as distinct from domestic or sanitary wastes.

(26) “Mayor” means the duly elected individual serving as the Mayor of the City of DuPont.

(27) “Multifamily dwelling” means a building designed and/or used to house three or more families living independently of each other in separate living quarters that share common walls, floors and/or ceilings and including all necessary household functions of each such family.

(28) “Mutual maintenance agreement and easement” means a legally binding agreement between two or more “owners” for the purpose of connecting two or more structures to a single “building sewer” located on private property and specifying for the mutual maintenance of the single “building sewer” by said property owners.

(29) “Natural outlet” means any outlet into a “watercourse,” pond, ditch, lake or other body of surface or ground water.

(30) “Natural watercourse” means a surface or underground “watercourse” created by natural agencies and conditions.

(31) “Off-site general facilities” means the same as “public sewer facilities.”

(32) “On-site general facilities” means the same as “private sewer facilities.”

(33) “Owner” means the lawful and legal owner of a lot or parcel of land (delineated by parcel number) under single ownership also noted on County Assessor/Treasurer property rolls as the taxpayer.

(34) “Permit” means written authorization from the “Director” granting the “owner” or his/her duly authorized representative permission to make the required “building sewer” connections to the “side sewer stub” or to make repairs, alterations, disconnections, caps, or any other sewer construction or repair stipulated in this chapter.

(35) “Person” means any agency, agent, authority, board, church, club, committee, commune, cooperative, department, district, government, group, guardian, league, office, order, party, school, task force, trustee individual, family, partnership, firm, company, association, society, corporation, or other entity.

(36) “pH” means the reciprocal of the logarithm of the hydrogen ion concentration. The concentration is the weight of hydrogen ions, in grams, per liter of solution. Neutral water, for example, has a “pH” value of 7 and a hydrogen ion concentration of 10^{-7}.

(37) “Plumbing outlet” means the part of the lowest horizontal piping of a drainage system of a structure that receives waste from other drainage pipes inside the walls of a structure and conveys it to a “building sewer.” The “building sewer” begins 24 inches from the outer face of the outside building wall.

(38) “Premises” means a continuous tract of land, building or group of adjacent buildings under a single ownership.

(39) “Private sewer facilities” means any sanitary sewer facility including “building sewers” and “side sewer stubs,” constructed within the limits of privately owned property, including, but not limited to collection lines, trunk sewers, lateral sewers, pump stations, force mains and appurtenances. “Side sewer stubs,” as defined herein and located within a public right-of-way or perpetual “easement” owned by the City, shall be operated and maintained by the private property owner.

(40) “Privy” means a building, either portable or fixed directly to a pit or vault, equipped with seating and used for excretion of bodily wastes.

(41) “Privy vault” means a concrete or masonry vault that is provided with a cleanout opening and over which is placed a privy building containing seats.

(42) “Properly shredded garbage” means garbage which has been shredded to such a degree that all particles shall be carried freely under the flow conditions normally prevailing in “public sewer facilities,” with no particle greater than one-quarter inch in any dimension.

(43) “Public sewer facilities” means any “sanitary sewer” constructed within a public right-of-way, perpetual “easement” dedicated to the “City,” or on property owned by the “City,” including but not limited to, structures, collection lines, interceptor sewers, lateral sewers, side sewer tees, pump stations, force mains, and appurtenances. “Public sewer facilities” are operated and maintained by the “City.” “Building sewers” and “side sewer stubs” as defined herein are not “public sewer facilities” and are operated and maintained by the “owner.”

(44) “Purchaser” means any person, or the heirs, successors or assigns of such person, who purchases and/or leases any house, building, or structure, or one or more units in a subdivision or multiple housing projects, from a developer as herein defined.

(45) “Registered building sewer contractor” means any contractor who is duly registered pursuant to the requirements of this chapter to construct, install, repair, reconstruct, excavate, or connect any “building sewer” and “side sewer stub” to the “public sewer facilities” of the “City.”

(46) “Registered professional engineer” means an individual or corporation holding a currently valid license to practice engineering in the State of Washington.

(47) “Residential equivalent unit (RE)” means that service unit which, for purposes of sewerage service measurement, is 220 gallons per day (GPD), having a waste strength of not greater than 225 milligrams per liter of “BOD” and not greater than 225 milligrams per liter of “suspended solids.”

(48) “Residential facilities or units” means a structure or portion of a structure capable of human habitation, including, but not limited to: private houses; each unit of a duplex, triplex, fourplex, apartment building, condominium, or townhouse; or a mobile home.

(49) “Sanitary sewage” means the same as “wastewater.”

(50) “Sanitary sewer” means a collection of facilities which carries “sanitary sewage.”

(51) “Septic tank” means a settling tank in which settled sludge is in immediate contact with the “wastewater” flowing through the tank and in which the organic solids are decomposed by anaerobic bacterial action.

(52) “Service area” means that area eligible for the extension of sewer service under a “ULID,” “sewer line extension,” or “City” extension as defined by a comprehensive plan for the area or natural topography.

(53) “Sewage” means the term now being replaced in technical usage by the preferable term of “wastewater,” and for purposes of this chapter shall be considered synonymous.

(54) “Sewer facility plans” means a plan that identifies the system of sewerage facilities required to convey and treat “sanitary sewage” in the “City.” The “sewer facility plan” shall include location and description of disposal facilities, trunk and interceptor sewers, pumping and monitoring stations, and control and treatment facilities, if appropriate. It shall also include preliminary engineering to ensure the feasibility of any future proposed structures which are proposed as part of the plan. The preliminary engineering for the “sewer facility plan” shall include all criteria necessary to establish sizing of the sewerage facilities identified in the plan.

(55) “Sewer line extension” means the following:

(a) The construction, upgrading, and/or extension of existing sewer facilities located in public rights-of-way or “easements” conveyed to the “County,” or

(b) The construction, upgrading, and/or extension of existing sewer facilities located on private property serving two or more structures or exceeding a length of 400 feet, or

(c) Those “wastewater” systems of sufficient complexity to require an engineered sewer plan by a “registered professional engineer” as determined by the “Director.” “Sewer line extensions” located on private property shall be operated and maintained by the “owner” including the “side sewer stub” as defined herein. Gravity “building sewer” lines over 400 feet in length serving one “single-family dwelling” are exempt from this definition unless, in the opinion of the “Director,” they meet the criteria in this subsection.

(56) “Side sewer stub” means a “sanitary sewer” constructed from a lateral or trunk sewer to a property line, or edge of a perpetual “easement” of a property being served. The “side sewer stub” shall be considered part of the “building sewer” and shall be maintained by the “owner.”

(57) “Side sewer tee” means the point at which the “side sewer stub” joins the “public sewer facilities.”

(58) “Single-family dwelling” means a building designed and/or used to house a single family and shall include mobile homes on individual lots whether owned collectively or individually in mobile home courts, condominiums, or townhouses.

(59) “Standard biochemical oxygen demand” means the results of a statistical test for oxygen demand as determined under standard laboratory procedure for five days at 20 degrees centigrade.

(60) “Storm drain” means those drainage pipes which are designated to carry surface water runoff and other such stormwaters as are not permitted to be disposed of through the “sanitary sewer system” in accordance with the provisions of this chapter.

(61) "Structure" means anything constructed, erected, or placed, the use of which requires location or attachment to something having location on the ground, and shall in addition, include but not be limited to, trailers, mobile homes and house trailers, but shall not include fences and retaining walls.

(62) "Suspended solids" means solids that either float on the surface of, or are in suspension in, water, "wastewater," or other liquids, and which are largely removable by laboratory filtering.

(63) "Wastewater" means water-carried wastes from domestic, commercial, and industrial facilities together with other waters which may inadvertently enter the system.

(64) "Wastewater facilities" means the structures, equipment, and processes required to collect, transport, and treat domestic, commercial, and industrial wastes, and to dispose of the "effluent" and waste by-products, including "public sewer facilities" and "private sewer facilities."

(65) "Wastewater treatment plant" means the arrangement of devices and structures used for treating the "wastewater" collected by the "City."

(66) "Watercourse" means: (a) a natural or artificial channel for passage of water; (b) a running stream of water; (c) a natural stream fed from permanent or natural sources, including rivers, creeks, runs, and rivulets. There must be a stream, usually flowing in a particular direction (though it need not flow continuously) in a definite channel, having a bed or banks and usually discharging into some other stream or body of water. (Ord. 04-760 § 2, 2004).

21.02.020 Administration.

(a) Public Works Department. This Department is under the management of the Director of Public Works. This Department has the responsibility for the construction, maintenance and operation of sewer utility facilities owned by the City.

(b) Director--Responsibilities and Limitations. The Director shall be the administrator of the Sewer Utility. Overall authority for the execution, administration, and interpretation of these rates and regulations resides with the Director. Such authority shall include the power: to determine questions of applicability or interpretation of rates or regulations; to adopt or modify implementing regulations; and to grant exemptions therefrom or order specific actions, forbearance, or impose other additional requirements. These decisions shall be made when deemed reasonably necessary in the interest of the public health and safety. The Director shall have the authority to delegate, as necessary, specific authority to carry out the execution, administration, and interpretation of these rates and regulations.

(c) Contracts--General. The City may enter into contracts with entities such as a municipal corporation, other government agency, political subdivision, person, or commercial entity for the discharge of wastewater into an existing sanitary sewer system of said entity(ies), or for the establishment, maintenance and/or operation of all or part of a new or existing system of sewer facilities. The Director shall not be authorized to obligate the City to any such contract, but shall perform all preparatory work necessary prior to presentation of such proposed contracts to the City Council for execution.

Such contracts include but are not limited to the following types:

(1) Contracts with such entities where such other person or entity agrees to establish, maintain, or operate all or a portion of a system or systems of sewerage for the City;

(2) Contracts with such entities whereby the City may utilize for any lawful purpose all or any portion of a system of sewerage owned and/or operated by such other entity or person;

(3) Contracts with such entities wherein such other entity or person may utilize all or a portion of the City's system of sewerage for any lawful purpose; and

(4) Contracts with owners of real estate, wherein such owners agree to construct off-site sewerage and/or water facilities, or any portion thereof, or appurtenances thereto.

(d) Contract Requirements. All contracts entered into between the City and other entities shall contain the minimum following information:

(1) Complete description of all the duties, obligations, and commitments of both parties;

(2) Description of all construction, maintenance, and operation requirements;

(3) Legal description;

(4) Type of development, units to be served, and capacity to be required;

(5) Responsibility of inspection: documentation, record drawings;

(6) Temporary and/or perpetual easements;

(7) Required payments, connection charges, fees, deposits and assessments;

(8) Other information and/or items deemed necessary by the Director; and

(9) Requirements of other agencies of the County and the State of Washington and/or United States Government for the type of service being provided in said contracts.

(e) Review, Inspection, and Construction of Sewer Facilities Built by a Property Owner or Developer. Prior to the construction, installation, and operation of any public or private sewer facility governed by the provisions of this chapter, the Department shall require owners, developers or other entities as defined and/or required by this chapter to submit Sewer Facility Plans to the Director for action/approval, and/or obtain a building sewer permit and pay all required fees and charges. Sewer Facility Plans required by this chapter shall conform to Pierce County Department of Utilities Standard Sanitary Sewer Specifications and Standard Plans and include information of sufficient scope and detail so as to allow the Director to make a determination that the plans and specifications meet the minimum requirements of the City.

The Department shall also conduct reviews of Sewer Facility Plans prior to commencement of construction and conduct inspections of said sewer facility installation prior to operation to ascertain whether said installation complies with the approved Sewer Facility Plan and all other requirements, standards and/or provisions of this chapter. The City will conduct a television inspection of all lines installed by the owner. If defects are discovered by the City, the owner shall be responsible for reimbursing the City all costs incurred to re-televise the lines after the defects have been resolved.

(f) Design Criteria and Construction Standards. The Department shall ensure that sewer facilities design and construction standards shall be those as prescribed in the most current Pierce County Department of Utilities Standard Sanitary Sewer Specifications and Standard Plans, as amended from time to time by the Department, or as prescribed and interpreted by the Director.

(g) Utility Fund. Pursuant to DMC 17.02.010(a), the City has created an account for any and all revenues received for the use of sewers. (Ord. 04-760 § 2, 2004).

21.02.030 Required use of public sanitary sewerage systems.

(a) General. It is the clear intent of this section and the stipulations, conditions, and/or requirements contained herein that all matters pertaining to the collection, treatment and disposal of sewage, wastewater, and/or industrial wastes, in areas under the jurisdiction of the City, shall be subject to this chapter.

(b) Treatment of Wastewater Required. It shall be unlawful to discharge into any natural outlet within the City, or into any area under the jurisdiction of the City, any sewage, wastewater, industrial wastes, or other polluted waters, except where suitable treatment has been provided in accordance with City regulations and the provisions of this chapter.

(c) Property Required to Connect to Public Sewer. In any area under the jurisdiction of the City, the owner of each lot or parcel of real property within a Utility Local Improvement District, or any portion of a lot or parcel located

within a horizontal plane of 300 feet of any permanent wastewater facilities, is hereby required, at his/her expense, to connect all applicable plumbing outlets from such building(s) or structure(s) directly to the public sewer, in accordance with the provisions of this chapter. The owners of all such properties located outside the boundary of a Utility Local Improvement District (ULID) shall be required to submit to the Department any required Sewer Facilities Plan(s), obtain a building sewer permit, pay all applicable charges and fees, and take any other action required by the provisions of this chapter. Exceptions to this section are provided for in subsections (d) and (e) of this section.

(d) Required Use Exemptions. Except as indicated below, when the Department or a developer extends permanent sewer service into an area not included within the boundaries of a Utility Local Improvement District (ULID), existing structures in a single drainage area are not required by the Department to connect to the public system unless the owners of such structures voluntarily elect to connect to the public system and pay all fees/capital charges to the Utility. However, if septic tank systems serving existing structures fail, or if a property owner expands the use of the structure through the City building permit process, then the owners of such existing structures shall be required to connect to the public sewer system immediately and at their own expense and pay all fees/capital charges to the City.

Additional exemptions inside or outside the boundaries of a ULID may be granted at the discretion of the Director. Such requests shall be in written form to the Director and include but not be limited to the following:

(1) Applicant's name and address;

(2) Reason for the request;

(3) Map of applicant's property including location of nearest existing sanitary sewer system;

(4) Legal description of properly including parcel number; and

(5) Cost documentation excluding sewer connection charges.

Decisions by the Director are final and, to the extent that a remedy exists, shall be appealed to the Pierce County Superior Court.

(e) Financial Conditions. Any owner and/or developer requesting increased usage or other benefits over and above what the property was previously assessed or charged, or any owner and/or developer requesting a first time connection to any public wastewater facility, shall be required to pay all connection charges, including any latecomer charges, in cash at the time permits are issued. (Ord. 04-760 § 2, 2004).

21.02.040 Unlawful use of public and private sanitary sewer systems.

(a) Unlawful Wastewater Disposal Facilities. Except as hereinafter provided, it shall be unlawful to construct or maintain any privy, privy vault, septic tank, cesspool or other sewage holding facility intended or used for the disposal of wastewater within the boundaries of a ULID or other service area where sewers are available. This does not include portable privies or other temporary wastewater disposal systems, such as those used at construction sites.

(b) Unlawful Deposit of Waste. It shall be unlawful for any person to place, deposit or permit to be deposited in an unapproved and unacceptable manner into the City sanitary sewer system any human excrement, garbage, and/or other unlawful wastes. Penalty for such violations shall be as set forth in DMC 21.02.080.

(c) Unlawful Discharge of Storm and Other Waters Into Sewers. No person shall discharge or cause to be discharged any storm drainage water, surface water, roof runoff, or subsurface drainage into the sanitary sewer system. Persons discharging swimming pool water, unpolluted cooling water, or unpolluted industrial cooling or process water into the sanitary sewer system shall be charged commercial sewer service rates based on flow, BOD and suspended solids.

(d) Unlawful Wastes. Any sewage, waste, or other matter having the characteristics described in the most current Pierce County Department of Utilities "Pierce County Sewer Utility Prohibited Discharge and Industrial Pretreatment Regulations" shall, under no conditions, be discharged into or be placed where they might find their way into, or be allowed to run, leak, leach or escape into, any part of the sanitary sewer system.

(e) Limitations on Discharge Locations. No person or entity shall discharge any unlawful substance directly into a manhole or other opening in the public sewer system other than through an approved building sewer without the written authorization of the Director in compliance with this chapter.

(f) Unlawful Damage to Sewer Facilities. It shall be unlawful for any unauthorized person to maliciously or willfully break, damage, destroy, uncover, deface or tamper with any structure, appurtenance, or piece of equipment which is part of the City sanitary sewer system by throwing, dumping, discharging, or otherwise introducing any dirt, rocks, sticks, debris, or any other foreign or other matter prohibited by this chapter into the City sanitary sewer system. Any person or entity that violates this section shall be subject to the civil and/or criminal liability and penalties prescribed in DMC 21.02.080.

(g) Pretreatment of Sewage. When, at any time, it becomes necessary or desirable to discharge into the City sewer system any matter from any existing or proposed facility which does not conform to the standards as prescribed in the most current Department of Utilities "Pierce County Sewer Utility Prohibited Discharges and Industrial Pretreatment Regulations," the owner(s) of such facilities shall hereby be required to pretreat such matter at the owner(s) expense to a degree that will produce an effluent which will conform to the standards set forth therein and as amended from time to time or as prescribed and interpreted by the Director. Such pretreatment shall be understood to include grease interceptors, oil/water separators, chemical or biochemical plants, sedimentation chambers and any devices which effect a change of any nature in the characteristics of the matter being treated. Any and all such devices and equipment shall be subject to the approval of the Director and the Washington State Department of Ecology and shall not be put into operation nor revised in any manner without written permit or approval issued by the Director, the Washington State Department of Ecology, and other approving governmental agencies. (Any such device other than a grease interceptor requires approval from other governmental entities.) Said devices and equipment shall be provided with all necessary features of construction permit inspection of operations and testing of material passing through them and shall be open to the inspection of the Director at any time. Written approval from the Director and other governmental agencies for such pretreatment facilities shall not guarantee that the pretreatment facility will operate as designed; the owner and/or the owner's engineer will assume this liability.

New plans and specifications and other pertinent information relating to proposed preliminary treatment facilities shall be prepared by a licensed professional engineer and shall be submitted for the approval of the Director, the Washington State Department of Ecology, and Department of Health when required by law. No construction of preliminary treatment facilities shall be commenced until such approvals are obtained in writing. Any expenses incurred by the City in reviewing such plans, specifications, and information shall be paid by the property owner or owner's representative before the City's approval shall be granted. All approval procedures, planning and design specifications, charges, fees and other requirements relating to pretreatment facilities shall conform to the provisions set forth in the most current Department of Utilities "Pierce County Sewer Utility Prohibited Discharge and Industrial Pretreatment Regulations."

(h) Pretreatment Facilities--Operation and Maintenance. When pretreatment facilities are provided for any waters or wastes, they shall be maintained continuously in satisfactory and effective operation by the owner at the owner's expense. The owner shall, at the Department's discretion, submit to the Director certified monthly operational records and tests to monitor the performance of the pretreatment facilities. The form of such operational records and tests shall be prescribed by the Director.

(i) Determination of Character of Waste Matter. Before matter of any nature whose discharge might reasonably be considered a violation of this chapter may be discharged into the sanitary sewer system, the controlling characteristic of such matter shall be determined to the satisfaction of the Director. The responsibility of initiating such determinations and the costs involved with submitting the results of said determinations to the Director for approval shall lie solely with the party or parties desiring to discharge the matter into the sanitary sewer system. Verification of these results and the decision as to whether the matter may be discharged to the sanitary sewer system shall be the responsibility of the Director. The fact that any matter has been discharged into the sanitary sewer system prior to the passage of this chapter or subsequent thereto, but without any objection from the Director, does not constitute a valid right to discharge such matter. If at any time, upon discovery by the Director, that any matter being discharged into the sewer does not conform to the requirements of this chapter, the Director may immediately order the stoppage of the discharge of such matter into the sanitary sewer system and/or termination of sanitary sewer service to the discharging property.

(j) Tests of Wastes and Location of Sampling. All measurements, tests and analyses of the characteristics of waters and wastes to which reference is made in subsections (d), (g), (h), and (i) of this section shall be determined by analysis of the samples obtained at a control manhole or other location as approved by the Director. Such tests and analyses shall be performed by an appropriately certified, independent testing laboratory and shall be conducted at the sole expense of the owner.

(k) Commercial Wastes--Control Manhole. When required by the Director, the owner of any property served by a building sewer carrying commercial or industrial wastes shall install a suitable control manhole in the building sewer to facilitate observation, sampling, and measurement of the wastes. Such manhole, when required, shall be fully accessible, safely located, and constructed in accordance with plans approved by the Director. Such plans shall be in accordance with current Pierce County Utilities Department Standard Sanitary Sewer Specifications and Standard Plans. The manhole shall be installed by the owner at the owner's expense and shall be maintained by the owner so as to be safe and accessible at all times by the Department.

(l) Septic Tank Contents. It shall be unlawful for anyone to discharge the contents of any septic tank, cesspool, chemical toilet, or sewage holding tank into the sewer system of the City. Any person or entity violating this subsection shall be subject to the civil/criminal liabilities/penalties set forth in DMC 21.02.080.

(m) Uncontaminated Wastewater. Whenever a multiple residential, commercial, or industrial customer or user of a public sewer system, either directly or indirectly, uses water for irrigation, cooling, heating, processing, or any other purpose that produces uncontaminated wastewater satisfactory for direct discharge into storm drains or surface waterways pursuant to subsections (d) and (e) of this section, the owner shall, at the owner's sole expense, separate this water from other sewage and discharge it into a storm drain or surface waterway as approved by the appropriate County, State, and/or federal departments. (Ord. 04-760 § 2, 2004).

21.02.050 Types and methods of providing sanitary sewerage service.

(a) Permanent Sewerage Facilities. The primary means of sewage collection and disposal in urbanizing areas shall be construction and extension of permanent sanitary sewers as required to an existing sewer system and sewage treatment plant. This construction shall be in accordance with any applicable Comprehensive Sewerage General Plan and Facilities Plan and with all other rules, regulations, and requirements as may be prescribed from time to time by the City and State of Washington agencies.

(b) Changed Conditions--Increased Wastewater Flows, BOD or SS. The City shall have the right to charge an owner of a parcel of property already connected to the City sewer system an additional connection charge and increase the monthly sewer service charge if:

(1) Wastewater flows disposed of into the City sewer system have increased above the amount for which the owner or previous owner(s) paid a connection charge; or

(2) BOD and/or SS are found to be greater than 225 mg/l and 225 mg/l, respectively.

(c) Connection to Existing Sewer Facilities. Properties, or portions thereof, which previously were not entitled to sewer service by reason of either not having been subject to a sewer assessment or connection charge by the City or otherwise qualifying for or being required to connect to but, where surrounding or contiguous existing facilities and capacity are now available, may be connected to the public sewers and served thereby; provided, that prior to obtaining said service the property owner pays to the City, in addition to any other charges which may be due, an amount of money which shall constitute a connection charge and which shall be determined and paid in the manner set forth in DMC 21.02.070. The connection charge may be paid in full prior to the issuance of building permits or sewer line extension plan approval.

(d) Utility Local Improvement District--Establishment. The City shall have the power to establish Utility Local Improvement Districts (ULIDs) for the purpose of constructing or reconstructing sewer systems, by the method and manner prescribed by Chapters 35.43 and 35.44 RCW, within the area of a sewer facility plan, and to levy special assessments to pay in whole the cost of any improvements.

(e) Connection of Non-ULID Properties to an Existing City Operational Sewer System. Property owners desiring sanitary sewer service by the connection of property to an existing operational Utility Local Improvement District/sewer line extension may do so; provided, that:

(1) The capacity in said existing facilities, as determined by the Director, which is to be paid for immediately and allocated on a first-come, first-served basis, is available in an amount to sufficiently accommodate the sewage generated by the added development; and

(2) The property owner consents to pay the connection charges for said property.

(f) Developers Sewer Line Extension Facilities. Property owners or developers of property electing to obtain sewer service by the construction and extension of existing public facilities may do so provided:

(1) The capacity in said existing facilities, as determined by the Director, which is to be paid for immediately and allocated on a first-come, first-served basis, is available in an amount to sufficiently accommodate the sewage generated by the added development;

(2) The proposed facility is to be constructed in accordance with the Comprehensive Sewerage General Plan;

(3) The sewer line extension is built to current County design criteria and construction standards as required pursuant to DMC 21.02.020(f);

(4) The property owner or developer agrees to the requirements for privately constructed sewer line extension facilities as set forth this chapter;

(5) The property owners pays to the City, in addition to any other charges which may be due, an amount of money which shall constitute connection charges as required pursuant to DMC 21.02.070 and a plan review fee and an inspection fee as set forth in DMC 21.02.090;

(6) The property owner uses the capacity purchased within 18 months of the purchase date and agrees to pay the monthly sewer service charges generated by the total amount of purchased capacity after 12 months of the purchase date;

(7) The property owner agrees that in the event that monthly sewer service charges and/or any assessments are not paid within 12 months of the purchase date, he/she shall forfeit all funds and capacity associated with the capacity purchase and that the purchased capacity shall then revert back to the City and be made available for resale by the City only to other property owners; and/or

(8) The property owner and future assignees understand that the City reserves the right to increase the connection charge and monthly sewer service charge if future wastewater flows, BOD or SS are found to be greater than the limits established in the most current Pierce County Department of Utilities “Pierce County Sewer Utility Prohibited Discharge and Industrial Pretreatment Regulations”; and also if the limits are greater than estimated at the time of the capacity purchase, the property owner and future assignees agree to pay the increased charges on notice from the City.

(g) Conveyance of Sewers to the City. Any sewer constructed in a public right-of-way or easement or easement conveyed to the City shall be dedicated to the City and thereafter shall be considered a public sewer facility under the jurisdiction of the City subject to acceptance by the City and; provided, that:

(1) All charges, inspection fees and other payments due to the City as provided for in this chapter shall be paid and, if applicable, legal documents shall be executed dedicating and acknowledging easements for all portions of said system located on private property. The cost of all aspects of the conveyance shall be at no cost to the City;

(2) At the discretion of the Director or designee, a sewer to be constructed in a private road may be conveyed to the City. The owner(s) of record of the private road(s) (for all new short plats, formal plats and large lot subdivisions) shall grant to the City across, over, and under the full width of the road a perpetual easement with

a right of immediate entry and continued access for the construction, improvement, maintenance and repair of water and sanitary sewer pipelines, manholes, and other appurtenant water and sewer structures;

(3) Prior to the City accepting such a conveyance, the owner(s) and/or developer(s) of said system shall certify that said system, as constructed, complies with the City design criteria and construction standards as required pursuant to DMC 21.02.020(f) and other applicable sections of this chapter; and

(4) Upon completion of installation, said sewer system shall be conveyed to the City free and clear of all liens or encumbrances. (Ord. 04-760 § 2, 2004).

21.02.060 Construction of sanitary sewer systems.

(a) Time, Manner and Repair of Required Sewer Connections. Pursuant to DMC 21.02.030, 21.02.040 and 21.02.050, any owner of each lot or parcel of real property required to make a connection to a public sewer shall make such connection within 60 days after the date written notification of public sewer availability is mailed from the Director to the owner of record listed as the taxpayer on the City Assessor/Treasurer records of the property to be serviced. All connections to the public sewers of the City shall be made in a permanent and sanitary manner in accordance with the provisions of this chapter and shall be sufficient to carry all wastewater of every kind from the building or structure into the public sewer. Each toilet, sink, stationary washstand, washing machine, dishwasher, floor drain and other type of equipment discharging sanitary wastewater shall be connected to the public sewer.

All plumbing outlets from any building or structure hereafter constructed or made available for human occupation and/or use for any purpose, when required pursuant to DMC 21.02.030, shall be connected to a public sewer of the City before the completion of the construction of such building or structure or before any occupancy or use thereof is allowed. In the event that a public sewer capable of serving that building or structure has not been completed by the City prior to the construction or occupancy of such building or structure, said building or structure may install an on-site septic and drainfield system approved by the proper regulatory agency and shall disconnect from the septic tank and drainfield system and be connected to the public sewer within 60 days after the date of written notification of public sewer availability from the Director.

Any needed repair to a building sewer or connection to a public sewer shall be made within 30 days after the date of mailing or personal service of a notice by the Director to the owner of the property served notifying such owner to make such repair. In the event of an emergency, the Director may establish a shorter period of time for the repair to be made or, if the owner cannot be located or does not promptly make such repairs, the City may make the repairs under the procedure set forth in subsection (c) of section.

(b) Authorization of Inspection of Existing Sewers and Appurtenances. The Director or duly authorized representative shall be authorized to enter upon premises served by any building sewer or connected with any public sewer at all reasonable hours to ascertain or make necessary tests as to whether the provisions of local, state and federal codes relative to sewerage have been complied with. In the event that entry is refused, necessary steps shall be taken to make application for a search warrant to accomplish the appropriate inspection. If said sewer, or its attachments, are in conflict with the provisions of any law or resolution in regard thereto, the owner of said premises, or his agent, shall be notified to cause said sewer or its attachments to be so altered, repaired, or reconstructed at the owner's expense, so as to make them conform to the requirements of the laws and resolutions within a reasonable time limit established by the Director from the time of receipt of such notice.

(c) Failure to Connect or Repair Building Sewer and Sewer Line Extensions. If any connection to or repair of a public sewer shall not be made within the time and in the manner provided in subsections (a) and (b) of this section, the Director may forthwith cause to be placed a recorded notice against the property that no new buildings, remodeling, or change in ownership shall be allowed until the connection or repairs of all sanitary sewer facilities are made. Said notice shall be recorded by the Director with the Pierce County Auditor.

If at this time or after a reasonable period so determined by the Director, connection of or repairs to the building sewer or sewer line extension remain to be completed and the Director has exhausted the means or methods available to the Director to make said connections or repairs as prescribed in subsections (a), (b), and (c) of this section, the City may, upon authorization of the Director, make said connections or repairs for and at the total expense of the owner or developer provided the Director takes the following steps:

(1) Notifies the owner or developer that the connections or repairs are delinquent pursuant to the provisions of subsections (a), (b), and/or (c) of this section, and informs said owner or developer that the City intends to make said connections or repairs itself;

(2) Notifies the owner or developer that the City shall charge said owner or developer for all costs associated with said connections or repairs including, but not limited to, all construction or repair costs and any other applicable costs which would normally be incurred by said owner or developer pursuant to the provisions of this chapter; and

(3) Notifies the owner or developer that any failure to reimburse the City for said costs shall result in the City filing a lien upon the property as provided for in RCW 35.21.290, in the amount of said unpaid cost plus interest and any applicable penalties.

(d) Connection of Non-Assessed Property. The owners of property which have not been subject to special assessments for sewers by the City may connect structures on that property to the public sewers of the City provided the owner has paid a connection charge and has obtained the required sewer permits as set forth in this chapter.

(e) Unlawful Connections to or Disturbances of Public Sewers. Any person who makes or causes to be made any connection to, opening into, use, alteration and/or disturbance of the public sewers of the City without receiving a permit authorizing such a connection, opening, use, alteration, and/or disturbance shall be subject to the violation provisions set forth in DMC 21.02.080.

(f) Backwater Valve Requirement. Any structure having a plumbing outlet that serves fixtures with flood level rims located below the elevation of the next upstream manhole cover of the structure connecting to the public sewer shall install an approved backwater valve.

(g) Information from the City. The owner of any building shall be responsible for obtaining from the Director the approximate location and elevation of the sewer wye, tee, or stub at the point of connection and, in the case of new construction, for planning the building and plumbing to provide adequate slope for building connection to the side sewer stub. The applicant for permit shall be responsible for determining the available grade between plumbing outlet and sewer wye, tee or stub. All Department supplied information shall be field checked by the owner/developer or his/her representative prior to design and/or commencing construction. The City is not liable for inaccurate information provided to the City by others.

(h) Disconnection of Building Sewer and Sewer Line Extensions. No structure may be disconnected from a building sewer and no building sewer may be disconnected from a public sewer for any reason without prior written notification to, and approval by, the Director. No approval shall be given unless the disconnection is lawful under this chapter and other applicable laws, and satisfactory protection is given by the owner or his contractor to the public sewers of the City including, but not limited to, the satisfactory capping of the building sewer. Sewer service charges for any structure disconnected or to be disconnected shall continue until such disconnection is approved by the City and the building sewer capped and otherwise protected to the satisfaction of the Director.

(i) Building Sewer and Sewer Line Extension Permits. The owner or his agent shall make application for a building sewer and/or sewer line extension permit on a special form furnished by the City. The permit application shall be supplemented by any plans, specifications, or other information considered pertinent at the discretion of the Director or as required by this chapter. A building sewer or sewer line extension permit shall be required of any owner of a lot(s), parcel of real estate or structure(s) either required or electing to make a connection to a public sewer or make a modification, repair, disconnection, inspection or addition to an existing building sewer or sewer line extension.

(j) Building Sewer or Sewer Line Extension Permit--Term and Fee. A building sewer or sewer line extension permit is valid for 12 months from the date of issuance. If a building sewer or sewer line extension permit expires but the owner still wishes to connect to a sewer, a new permit shall be obtained and the City shall again collect all applicable permit fees as identified in this chapter. If a building sewer or sewer line extension permit is cancelled by the owner, the full permit fee shall be forfeited.

(k) Building Sewer or Sewer Line Extension Permit Requirements. Building sewer or sewer line extension permits shall be obtained in the following manner:

(1) Permits shall be issued only upon proper application to the City Public Works Department;

(2) A permit which authorizes work in a public right-of-way or easement dedicated to the City or the connection with or opening into any public sewer other than through the normal opening of a wye, tee, or side sewer stub shall be issued to a registered building sewer contractor;

(3) A permit which authorizes building sewer work for residential structures on private property only may be issued to the owner of the property or to a registered building sewer contractor. For sewer line extensions and commercial buildings or structures, the permit shall require a registered building sewer contractor to connect the building to a public sewer through the normal opening of a wye, tee, or side sewer stub under the supervision of the Director or the Director's representative. For building sewers, the owner may perform only that portion of the connection located on private property and not in the public right-of-way or an easement dedicated to the City;

(4) Building sewer or sewer line extension permits shall not be transferable unless a written request to do so is received by the Department from the owner, and that request is approved by the Director. No person, including any registered building sewer contractor, shall lay any pipe pursuant to any other person's or contractor's permit;

(5) A building sewer or sewer line extension permit shall be issued prior to commencement of construction and only after approval of any required Sewer Facilities Plan by the Director, and only after all applicable charges and fees have been paid by the owner or developer;

(6) No building sewer permit allowing connection to the public sewer shall be issued before the main sewer is accepted by the Director, and the property owner so notified. An interim permit allowing building sewer construction without connection to a nonoperational public sewer may be issued at the discretion of the Director; and/or

(7) The permit must be posted on the job prior to commencing the work and must be readily accessible to the Director or the Director's representative.

(l) Plan Review and Inspection of Sewer Line Extensions and Building Sewers. The Director shall require the property owner to submit to the Director for his approval, a Sewer Facilities Plan prepared by a registered professional engineer for any new construction and/or extensions of privately owned sanitary sewer systems and/or connections to the public sanitary sewer. Single-family residences, individual duplexes, or two or less structures located on a single parcel served by an individual connection and which are not part of a residential complex or development are exempt from this requirement and shall not be considered sewer line extensions as defined in DMC 21.02.010(55). All other new sewer construction, extensions of and/or connection to the public sewer system shall be considered sewer line extensions and be required to comply with the provisions of this subsection.

Plans shall conform to standards and requirements described in the most current Pierce County Department of Utilities Standard Plans and Sanitary Sewer Specifications.

The property owner shall pay to the City, at the time the owner or the owner's representative submits plans for review, the minimum sum required for a plan review fee and an inspection fee as set forth in DMC 21.02.070 and 21.02.090.

Inspection of construction shall be made by the Director or the Director's representative to ascertain that the installation meets all the requirements of the approved plan and complies with the standards of the City as prescribed in this chapter. Approval by the Director shall be required prior to connection to the public sewer.

(m) Required Contractor Registration for Sewer Line Extensions. To assure proper construction in the connection of sewer line extension(s) to the public sewers of the City, no person may construct, install, repair, reconstruct, excavate, or connect a sewer line extension to the public sewers of the City, unless the person is a building sewer and sewer line extension contractor holding a valid unsuspended current Certificate of Registration issued by the Department of Labor and Industries of the State of Washington pursuant to Chapter 18.27 RCW, et seq.

(n) Private Operation of Pumping Facilities. Pumping facilities installed on private property by and at the expense of a property owner shall be owned, operated and maintained by the property owner. No pumping facility shall be permitted to serve more than three separate dwelling units unless it contains two pumps. The private pumping facility and force main shall be permitted to serve only those structures located on a single parcel of property (owned by a single individual).

Plans and specifications of the pumping facilities designed by a licensed professional engineer retained at the expense of the owner shall be submitted to the City for review and approval. City approval of the pumping facilities shall not guarantee that the pumping facility will operate as designed by the owner's engineer; the owner and/or his/her engineer will assume this liability.

The Department shall not accept for review any pumping facility plans and specifications prior to payment of the minimum plan review and inspection fee set forth this chapter.

(o) Costs of Building Sewer or Sewer Line Extension Borne by Owner. All costs and expense incidental to the installation, connection, maintenance, cleaning, repair and/or addition of a building sewer or sewer line extension shall be borne by the owner. This responsibility includes paying all costs incidental to the aforementioned activities performed on all segments of the sewer or sewer line extension, and including, but not limited to, side sewer stub, sewer tee, sewer wye and all other sewer appurtenances.

(p) Building Sewer for Each Building--Exceptions. A single building sewer shall be provided for each building unless the connection of more than one building to a single building sewer is approved in writing by the Director prior to the construction of such building sewer. No more than one multiple dwelling, industrial, or commercial building shall be connected to a single building sewer, unless otherwise approved in writing by the Director.

(q) Mutual Maintenance Agreement and Easement. If it is determined that a special condition(s) requires more than one separately owned residence to be served by a single building sewer, written authorization to do so shall be obtained from the Director after the owner(s) of said properties have entered into a Mutual Use Agreement. This document, assuring that all properties involved shall have perpetual mutual easements for the building sewer, and having provisions for mutual maintenance and access for repair purposes, shall be signed by the recorded owners and acknowledged and recorded with the County Auditor, and a copy thereof furnished to the Director prior to the issuance of a permit for the approval of the building sewer.

(r) Reuse of Old Building Sewers. Old building sewers, including septic tank lines, may be used only when they are found, on examination and test by the Director, to meet all requirements of this chapter. This examination and test shall be at the owner's expense. The owner or his/her agent shall demonstrate to the Director that no connection to such building sewer or septic tank line exists which conveys any material prohibited by the most current Department of Utilities "Pierce County Sewer Utility Prohibited Discharge and Industrial Pretreatment Regulations."

(s) Protection of Excavations and Restoration of Public Property. All excavations for building sewer or sewer line extension installations shall be adequately guarded with barricades and lights in accordance with State and City requirements so as to protect the public from hazard. Streets, sidewalks, parkways, and other public property disturbed in the course of the work shall be restored to original condition or better.

(t) Indemnification of City. The property owner or developer performing any of the sewer system improvements described in or required by the subsections of this chapter shall indemnify, defend, and hold harmless the City against any action for damages to personal or public property or against any action for damages to personal or public property or for personal injury caused by the performance of the property owner or developer, and, in addition, shall provide a warranty of all materials and workmanship used in connection with any such actions for a minimum period of one year from the date of acceptance of said actions by the Director. Such indemnification shall include, but not be limited to, the actions set forth in subsections (u) and (v) of this section.

(u) Performance/Guarantee Bond. Any owner or developer who constructs any sewer facilities pursuant to the sections of this chapter shall furnish to the City a performance bond naming the City as beneficiary or payee in a minimum amount of 100 percent of the value of the improvements to be constructed within the existing City rights-of-way and easements dedicated to the City. Said performance bond in a penal sum equal to a minimum of the

amount described above shall be conditioned upon the performance by the owner of all undertakings, covenants, terms, conditions and agreements of the extension, and upon the prompt payment by the owner to all persons supplying labor and materials for the completion of the work. Such bond shall be executed by the owner and a corporate bonding company licensed to transact such businesses in the State of Washington and approved by the City.

The performance bond shall be replaced after the construction is completed and accepted by the Department for operation with a maintenance bond equal to the greater of $5,000 or 10 percent of the value of improvements of that which is to be dedicated to the City.

The maintenance bond shall ensure against defects appearing or developing in the material or workmanship provided or performed under this agreement within a period of two years after acceptance for operation. At the end of the two-year guarantee period, the bond shall be released provided no latent defects have been discovered on the project. The expense of these bonds shall be borne by the owner. If at any time a surety on any such bond is declared bankrupt or loses its right to do business in the State of Washington, the owner shall substitute an acceptable bond (or bonds) in such form and sum and signed by such other surety or sureties as may be satisfactory to the City. The premiums on such bonds shall be paid by the owner.

(v) Evidence of Insurance. Any owner or developer who constructs any sewer facilities pursuant to this chapter shall secure and maintain for the period of time from the issuance of a building sewer or sewer line extension permit, "Start Work Order," or other written authorization to construct sewer facilities, until the City accepts and/or approves of said sewer facilities or for a longer period of time as determined by the Director, public liability insurance for bodily injury and property damage liability, including products and contemplated operations and blanket contractual liability. The owner or developer shall have the City specifically added as an additional named insured in said policies, at no cost to the City. The above insurance shall cover the City, owner, and contractors and/or subcontractors for claims or damages of any nature whatsoever, including, but not limited to, bodily injury, including wrongful death, as well as other claims for property damage which may arise from construction activities, whether such construction activities be by themselves or by any subcontractor or anyone directly or indirectly employed by either. The owner agrees, in addition, to indemnify and hold harmless the City from all suits, claims, demands, judgments, and attorneys' fees, expenses, or losses occasioned by the performance of construction activities by himself, any subcontractor, or persons working directly or indirectly for him, or on account of or in consequence of any neglect in safeguarding the work or failure to conform with the safety standards for construction work adopted by the Safety Division of the Department of Labor and Industries of the State of Washington.

The amount of such insurance shall be that required by the City. The owner or contractor shall not cause any policy to be cancelled or permit it to lapse. All policies shall include a clause to the effect that the policy or certificate shall not be subject to cancellation or to a reduction in the required limits of liability or amounts of insurance or any other material change until notice has been mailed to the City stating when, not less than 30 days thereafter, such cancellation or reduction or change shall be effective.

All certificates of insurance, authenticated by the proper officers of the insurer, shall state in particular those insured. (Ord. 04-760 § 2, 2004).

21.02.070 Sewer service charge and connection charges.

(a) Sewer Service Charge.

(1) Each single-family residence, multifamily unit, and commercial unit shall be charged a sewer service charge of $60.75 per unit, per month, effective January 1, 2004.

(2) Reduced Rates for Low Income Senior Citizens and Low Income Disabled Citizens.

(A) There shall be a 30 percent reduction of sewerage charges billed directly to low income senior citizens and low income disabled citizens who apply for such reduction.

(B) A low income senior citizen, for the purpose of subsection (a)(2) of this section, shall be a person defined as such in RCW 74.38.070(2)(a) as it now exists or may hereafter be amended.

(C) A low income disabled citizen, for the purpose of subsection (a)(2) of this section, shall be a person defined as such in RCW 74.38.070(2)(b) as it now exists or may hereafter be amended.

(b) Connection Charge. Property or portions thereof receiving permanent sanitary sewer service through the formation of a Utility Local Improvement District (ULID), by connection to an existing Utility Local Improvement District, or by the extension of or connection to any permanent wastewater facilities shall be required to pay a connection charge to purchase capacity in the City's system. The connection charge will be based on the year the connection is made to the City's system as indicated below:

Year	Amount
2004	$3,830
2005	$4,110
2006	$4,380
2007	$4,650

(c) Building Sewer Service or Sewer Line Extension Permit Fee. At the time of application for a building sewer or sewer service line extension permit, the owner shall pay to the City a permit fee to offset all City costs associated with the inspection and testing of the sewer line. A building sewer service permit fee shall be required for each building to be connected to a side sewer stub, side sewer tee, or public sewer. The amount of the building sewer or sewer line extension permit fee is set forth in DMC 21.02.090.

The Director, upon review of the building sewer or sewer line extension permit application and subsequent determination that the proposed action constitutes an action encompassing the construction, reconstruction, repair, and/or maintenance of public sewer facilities or sewer line extensions, shall also require a plan review fee and an inspection fee as set forth in subsections (d) and (e) of this section.

(d) Plan Review and Inspection Fee. As required for sewer line extensions in DMC 21.02.060(j), owners or developers submitting Sewer Facilities Plan(s) to the Department shall pay at the time of submitting said Plan(s) to the Department, the minimum amount of money set forth in DMC 21.02.090. The Department shall not accept for review any such plans, nor issue any building sewer service permits, nor in any manner approve of the commencement of construction until said minimum plan review and inspection fee is paid. Additional costs incurred by the City over and above the minimum fee shall be charged to the owner or developer on a time and materials basis. All additional fees shall be paid in full prior to the City approving and allowing the use of the sewer facilities.

(e) Building Sewer Return Inspection Fee. If circumstances or conditions require return inspection(s) of completed or partially completed building sewers, appurtenances thereto, and/or connections thereof to the public sewer system, the owners, developers, or contractors requesting a return inspection shall pay to the City an amount of money for each return inspection which shall constitute a return inspection fee in an amount equal to 70 percent of the building sewer permit fee cost for each return inspection required to complete the building sewer in accordance with current standard plans and sanitary sewer specifications.

(f) Excess BOD or SS Charges. The City shall have the right to charge an owner of a parcel of property already connected to the City sewer system an additional connection charge and increase the monthly sewer service charge if:

(1) Wastewater flows disposed of into the City sewer system have increased above the amount for which the owner or previous owner(s) paid a connection charge; or

(2) BOD and/or SS are found to be greater than 225 mg/l and 225 mg/l, respectively. (Ord. 04-760 § 2, 2004).

21.02.080 Violations of title.

(a) Civil Liability for Damages. Any person, or commercial entity who willfully or negligently breaks, damages, destroys, uncovers, defaces, or tampers with any structure, appurtenance, or piece of equipment which is a part of the City or private sewer facilities, or who willfully or negligently throws, dumps, or otherwise introduces any dirt, rocks, sticks, debris or any other foreign matter or unpermitted waste into the City sewer system shall be liable to the City for the costs of repair thereof.

(b) Criminal Penalty. Any person or commercial entity who willfully violates any of the terms or conditions of subsection (a) of this section shall be guilty of a misdemeanor, and on conviction thereof, shall be subject to a fine of not more than $1,000 and/or shall be confined in the County jail for not more than 90 days for each occurrence.

(c) Liability to City. Any person or commercial entity who violates any provision of subsection (a) of this section shall be liable to the City for any penalty or fine, plus the expense, loss, damage, cost of inspection, or cost of correction incurred by the City by reason of such violation, including any expenses or reasonable attorney fees incurred by the City in collecting from such person or commercial entity any penalty, fine, loss, damage, expense, cost of inspection or cost of correction.

(d) Notice of Violation. Any person or commercial entity found to be violating any provision of subsection (a) of this section shall be served by the City with written notice stating the nature of the violation and providing a time limit for the satisfactory correction thereof. The violator shall, within the period of time stated in such notice, permanently cease all violation and make all necessary corrections.

(e) Continued Violation--Penalty. Any person or commercial entity who continues any violation beyond the time limit provided for in subsection (d) of this section, shall in addition to the items of expense provided in subsection (c) of this section, become liable to the City for a penalty in the amount of 10 percent of such expense items, together with interest thereon at a rate of eight percent from the date of the time limit provided in subsection (d) of this section. Each separate day of violation and/or misdemeanor shall constitute a separate and distinct act of violation.

(f) Payment Delinquency. In the event that any person or commercial entity fails to pay any fee or charge as set forth in this chapter, that person or entity shall be subject to the procedures and penalties set forth in Chapter 17.02 DMC, et seq., the Uniform Utility Billing and Collection Procedure. (Ord. 04-760 § 2, 2004).

21.02.090 Fees.

(a) Building Sewer Permit Fees. At the time a building sewer permit is applied for the applicant shall pay to the City a building sewer permit fee as set forth herein and for any other charges, if applicable. Permit fees are not refundable. Permit fees shall be as follows:

(1) For each new building or structure to be connected to the “City sanitary sewerage system” (DMC 21.02.010(10)) or “private sewer facilities” (DMC 21.02.010(39)):

(A) Residential, $100.00; or

(B) Commercial, $150.00;

(2) For each modification, repair, or addition to an existing building sewer where work is done entirely on private property and connected to “City sanitary sewerage system” (DMC 21.02.010(10)) or “Private sewer facilities” (DMC 21.02.010(39)):

(A) Residential, $100.00;

(B) Commercial, $150.00;

(3) For each reinspection required by the City due to failure of building sewer construction to comply with state and local construction requirements, a building sewer reinspection fee shall be charged in the amount of 70 percent of the original building sewer permit fee.

(b) Plan Review and Inspection Fees. Along with the "sewer line extension" (DMC 21.02.010(55)) plan submittal to the City, the owner shall pay to the City a nonrefundable deposit of $500.00. The plan review and inspection fee shall provide for all costs of service performed by the Department including but not limited to planning, engineering review of plans, legal services, inspection of construction, and all other technical and administrative services provided relative to extensions to the existing City sewer system. The deposit fee shall be credited against the final City costs as outlined below, provided the final cost exceeds the amount of the nonrefundable deposit.

(1) The City's costs incurred during the duration of the project from plan review through completion of construction shall be based on time, equipment, and materials utilized. City personnel and equipment time rates shall be in accordance with the latest established City weighted rates. Material costs shall be based on the actual costs of materials plus 15 percent. Consultant costs shall be actual plus 10 percent.

(2) The City shall keep an accurate accounting of costs incurred. Should the total City costs exceed the amount of the nonrefundable deposit, the owner/developer shall pay the additional fees within 30 days following billing by the City and prior to the City granting final approval of the sewer system. Failure to do so will result in the City filing a lien against the subject real property parcel(s) for the unpaid balance. The processing of the lien shall be in the manner set forth in DMC 21.02.080.

(c) Other Fees. Administrative processing costs incurred by the Department for items not related to plan review and inspection (subsection (b) of this section) shall be paid as outlined herein in full prior to the City granting final approval of the owner's/developer's submittal. A nonrefundable $50.00 deposit must accompany each separate submittal. The deposit fee shall be credited against the final City costs as set forth in subsections (b)(1) and (b)(2) of this section. Should the owner/developer elect not to have the City complete the processing of the item submitted, the owner/developer shall still be responsible for reimbursing the City for all expenses incurred. The City shall withhold granting approval of the owner's/developer's submittal until all costs have been paid in full. Failure of the owner/developer to pay the fees within 30 days of notification shall result in the City filing and processing a lien as set forth in subsection (b)(2) of this section. Administrative processing costs shall include, but not be limited to, the following items:

(1) Environmental checklist/environmental impact statement reviews;

(2) Preparation of easements and/or legal descriptions;

(3) Processing of basin plans, updates, and amendments thereto;

(4) Advertising expenses;

(5) Public hearing expenses;

(6) Rental of meeting rooms;

(7) Legal advice;

(8) Travel expenses;

(9) Word processing expenses; and

(10) Processing of property segregations.

(d) Other Plan Review Fees.

(1) Grease Interceptor Plan Review: $50.00 nonrefundable fee plus time and materials billing for costs and expenses incurred in excess of the nonrefundable fee.

(2) Pretreatment Plan Review: $50.00 nonrefundable fee.

(3) Accidental Spill Prevention Plan: $50.00 nonrefundable fee plus time and materials billing for costs and expenses incurred in excess of the nonrefundable fee.

(4) Industrial Pretreatment Permit Plan Review: $100.00 nonrefundable fee plus time and materials billing for costs and expenses incurred in excess of the nonrefundable fee.

(5) Oil-Water Separator Plan Review: $50.00 nonrefundable fee plus time and materials billing for costs and expenses incurred in excess of the nonrefundable fee.

(6) Residential Pump Plan Review: $50.00 nonrefundable fee plus time and materials billing for costs and expenses incurred in excess of the nonrefundable fee.

(e) Sewer Line Tap Fees. For each sewer line tap, the permit fee shall be $200.00 nonrefundable fee plus time and materials billing for costs and expenses incurred in excess of the nonrefundable fee. The owner's contractor shall be responsible for tapping the sewer line in accordance with City requirements. Damage resulting to the City sewer system from the tap shall be repaired immediately and be the responsibility of the owner's contractor to repair at no cost to the City. (Ord. 04-760 § 2, 2004).

Chapter 21.03

Prevention of Contamination of Public Water

Sections:
21.03.010 Purpose.
21.03.020 Definitions.
21.03.030 Service restrictions.
21.03.040 City Engineer to administer.
21.03.050 Inspection--Right of entry.
21.03.060 Administrative Code adopted.
21.03.070 Penalty for violations.

21.03.010 Purpose.
It is the purpose of this chapter to protect the health of customers receiving water from the City of DuPont by protecting the public water system of the City of DuPont from contamination. (Ord. 394 § 1.10, August 9th, 1989).

21.03.020 Definitions.
Whenever used in this chapter:

(a) "Cross-connection" shall mean any physical arrangement whereby a public water supply is connected, directly or indirectly, with any other water supply system, sewer, drain, conduit, pool storage reservoir, plumbing fixture, or other device which contains or may contain contaminated water, sewer, or other waste or liquid of unknown or unsafe quality which may be capable of imparting contamination to the public water supply system of the City as a result of backflow.

(b) "Backflow" shall mean the flow, other than the intended direction of flow, of any foreign liquids, gases or substances into the City public water supply or distribution system.

(c) "Backflow prevention device" shall mean a device to counteract back pressure or to prevent siphonage.

(d) "City Engineer" shall mean a registered professional engineer designated by the City of DuPont to act as City Engineer.

(e) "Maintenance Supervisor" shall mean the person designated by the City of DuPont to be responsible for maintenance of the City's water system.

(f) Upon the filing of one copy with the City Clerk, all definitions contained in the State of Washington Administrative Code (WAC) 248-54-285, as now or hereafter amended, shall by this reference be considered definitions within this chapter. (Ord. 394 § 1.20, Aug. 9th, 1989).

21.03.030 Service restrictions.
(a) No water service connection from the City of DuPont's water system to any premise shall be installed or maintained unless the water supply is protected by backflow prevention devices as required by the City Engineer or his/her designee and the rules and regulations of the State Board of Health and this chapter. The installation or maintenance of a cross-connection which will endanger the City's water quality is prohibited. Any such cross-connection now existing or hereafter installed is hereby declared a nuisance and shall be abated. The control and/or elimination of cross-connections within the City of DuPont shall be in accordance with WAC 248-54-285 or superseding WAC.

(b) Service to any property, landowner, or water user receiving its water supply from the City of DuPont water supply system shall be contingent upon compliance with all requirements of the rules and regulations of the State Board of Health and of this chapter. Service shall be discontinued to any premise, water user or property owner for failure to comply and any discontinued service will not be reestablished until the City Engineer has approved compliance with such requirement of the rules and regulations contained herein. (Ord. 394 § 1.30, Aug. 9th, 1989).

21.03.040 City Engineer to administer.

The City Engineer shall be responsible for administering this chapter including the development of the necessary procedures and practices to accomplish same, consistent with the standards in this chapter and WAC 248-54-285. (Ord. 394 § 1.40, Aug. 9th, 1989).

21.03.050 Inspection--Right of entry.

The City Engineer, the Maintenance Supervisor, and other duly authorized employee(s) bearing proper credentials and identification shall be permitted to enter upon all properties receiving water service from the City of DuPont for the purposes of inspection, observation and testing in accordance with the provisions of this chapter. (Ord. 394 § 1.50, Aug. 9th, 1989).

21.03.060 Administrative Code adopted.

The provisions of WAC 248-54-285 as now or hereafter amended relating to cross-connection control and elimination and the use of backflow prevention devices when such are considered to be advisable, are hereby adopted and made a part hereof, and all provisions of said WAC may be executed and applied by the City Engineer and the Utilities Maintenance Department in determining when cross-connections are prohibited and when backflow prevention devices shall be required. (Ord. 394 § 1.60, Aug. 9th, 1989).

21.03.070 Penalty for violations.

Any person who shall violate or fail to comply with any provisions of this chapter shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine in any sum not exceeding three hundred dollars or by imprisonment for a term not exceeding thirty days, or by both such fine and imprisonment. (Ord. 394 § 2.10, August 9th, 1989).

Chapter 21.04

Fire Hydrant Use

Sections:
21.04.010 Permit required.
21.04.020 Issuance of permits.
21.04.030 Conditions for issuance of permits.
21.04.040 Exemptions.
21.04.050 Penalties for violations.

21.04.010 Permit required.
No person, firm or corporation shall withdraw water from publicly owned fire hydrants without first obtaining a permit from the City for said withdrawal. (Ord. 313 § 1, March 13th, 1985).

21.04.020 Issuance of permits.
The City may issue hydrant use permits upon application, after consultation with the City Utility Department, for a fee as provided for in the most current version of the City fees and charges schedule as adopted by resolution or ordinance of the DuPont City Council. (Ord. 313 § 2, March 13th, 1985; Ord. 10-908 § 1).

21.04.030 Conditions for issuance of permits.
Permits may be issued, conditioned or denied in a manner which protects the public safety and welfare and recognizes conditions existent at the time of application. (Ord. 313 § 3, March 13th, 1985).

21.04.040 Exemptions.
Government agencies acting in emergency situations are specifically exempt from the provisions of this chapter. (Ord. 313 § 4, March 13th, 1985).

21.04.050 Penalties for violations.
Any person, firm or corporation found guilty of violating the terms of this chapter may be subject to a fine not to exceed $250.00 or 30 days in jail, or both. (Ord. 313 § 5, March 13th, 1985).

Chapter 21.05

Water System Rates and Charges[1]

Sections:

21.05.010 Water meter permit fees.
21.05.020 Water meter connection fees.
21.05.021 Water service installation fees.
21.05.022 System development charge.
21.05.030 Water meter test deposit.
21.05.040 "Turn on" charges--Restoration of service.
21.05.050 Service trip charge.
21.05.060 Rates.
21.05.070 Water leak rate adjustment.

21.05.010

Water meter permit fees. For each new building, structure, or other water service to be connected to the City's water system, a water meter permit shall be obtained from the City. Applicant shall pay to the City at the time of application a water meter permit fee as provided for in the most current version of the City fees and charges schedule as adopted by resolution or ordinance of the DuPont City Council. Permit fees are not refundable. (Ord. 99-653 § 1; Ord. 10-908 § 2).

21.05.020 Water meter connection fees.

A water meter connection fee, as provided for in the most current version of the City fees and charges schedule as adopted by resolution or ordinance of the DuPont City Council, shall be charged and collected by the City for each new permanent connection to the water system.

(a) The water meter connection fee for meters up to and including two inches shall include the installation of the meter and associated accessories by the City.

(b) The water meter connection fee for any meter of a size greater than two inches to be installed by the City shall be the actual cost of the meter and associated accessories to the City plus 15 percent.

(c) The water meter connection fee for contractor installed meters of any size shall be the fee as provided for in the most current version of the City fees and charges schedule as adopted by resolution or ordinance of the DuPont City Council. (Ord. 99-653 § 2; Ord. 02-714 § 1; Ord. 10-908 § 3).

21.05.021 Water service installation fees.

It is generally the responsibility of the owner/contractor to perform the installation, abandonment, or upgrade of water service connections (as defined in DMC 21.01.010). In certain instances, the City may elect to perform this work. A fee of actual costs (labor, material, and equipment) plus 15 percent shall be charged for new water service installations performed by the City. (Ord. 10-908 § 4).

21.05.022 System development charge.

A system development charge (SDC) shall be levied against and shall be collected from the owners of each parcel of real property or portion thereof located within the SDC area at the time such property or portion becomes joined to and commences to use and/or receive benefit from the facilities of the water system. The SDC shall be levied for the purposes of assessing against such previously unconnected property or portion of real property a proportionate share of the utility's capital cost attributable to each subsequently developed portion of property in order that such portion may bear its fair share of the cost of the utility. The boundaries of the SDC area are shown on the Water Utility System Development Charge Area exhibit (attached as Exhibit A to the ordinance codified in this section), which together with all explanatory matters thereon, is hereby adopted by reference and declared to be a part of this title. The SDC must be paid prior to issuance of the water meter permit and shall be determined as to each requested connection by the application of the criteria set forth below:

(a) For all new water connections within the SDC area, an SDC shall be assessed based upon the following:

(1) Each water connection shall be assigned a “meter equivalent” (ME) factor;

(2) The water connection ME shall be determined based on the proposed water meter size;

(3) The water meter shall be sized in accordance with the current adopted plumbing code as amended and adopted by DMC Title 12;

(4) A water connection’s ME is based on the flow potential through its meter. A one inch and smaller single-family residential meter is assigned a base factor of one;

(5) The applicable SDC to be charged is calculated by multiplying the base SDC by the applicable ME factor based upon water meter size as follows:

Meter Equivalencies

Meter Size (in)	ME
Single-Family[1]	1.00
3/4	1.00
1	1.67
1 1/2	3.33
2	5.33
3	10.67
4	16.67
6	33.33
8	53.33
10	96.67
12	143.33

[1] Single-family meter (one inch or smaller).

(6) The base SDC shall be an amount as provided for in the most current version of the City fees and charges schedule as adopted by resolution or ordinance of the DuPont City Council. (Ord. 10-908 § 5).

21.05.030 Water meter test deposit.

The following water meter test deposits shall be applicable for water meter testing requested by the customer pursuant to DMC 21.01.330.

(a) The amount of the deposit shall be $75.00 for testing five-eighths-inch through one and one-half-inch meters.

(b) For two-inch meters and larger the deposit shall be $160.00. The person requesting the test shall be billed the actual cost for the meter test minus the deposit made. (Ord. 99-653 § 3; Ord. 10-908 § 6).

21.05.040 “Turn on” charges--Restoration of service.

A service charge, as provided for in the most current version of the City fees and charges schedule as adopted by resolution or ordinance of the DuPont City Council, shall be assessed for each “turn on” to restore water service after it has been discontinued by the City for any reason (subject to overtime charges for after hours service). (Ord. 99-653 § 4; Ord. 10-908 § 7).

21.05.050 Service trip charge.
The cost for this type of City response, as stated within the City ordinance regulating the use of water, shall be made to the City in the amount as provided for in the most current version of the City fee and charges schedule as adopted by resolution or ordinance of the DuPont City Council. (Ord. 99-653 § 5; Ord. 10-908 § 8).

21.05.060 Rates.
The fees and charges for services provided by the City shall be set forth in a fee schedule adopted by ordinance of the DuPont City Council, as shown in Exhibit A of the ordinance codified in this section.

The City of DuPont will supply and sell water service to consumers within the corporate limits of the City, using the following methods for calculating the charges:

(a) Water Service per Month.

(1) Single-Family Customers. Base rate for the first 500 cubic feet plus excess rate for each additional 100 cubic feet in excess of 500 cubic feet. Fractions shall be rounded to the nearest penny and calculated on a billing cycle basis only.

(b) Single-Family Life Line Rate. Reduced base rate for the first 500 cubic feet (base rate) plus excess rate for each additional 100 cubic feet. Fractions shall be calculated on a billing cycle basis only. To qualify, customers must apply and certify that they are at least 60 years of age or older with an income which would qualify them for a reduction from real or personal property taxes.

(c) Commercial and Multi-Dwelling Unit Customers. Customers shall be charged a base rate, based on meter size, for the first 500 cubic feet plus an excess rate for each 100 cubic feet in excess of 500 feet. Fractions shall be calculated on a billing cycle basis only. The base rate for meter sizes is included in the City fees and charges schedule.

(d) Payment and Penalties. Billing, payment and penalty procedures associated with water utility services shall be as provided for in Chapter 17.02 DMC.

(e) Deposit Charges. Deposit requirements will be waived for customers of record that are also the property owners. Deposits will be held by the City of DuPont until such time as the utility account is closed. The customer may, at his or her option, instruct the City of DuPont to apply the deposit towards the final bill. Upon application of the deposit and/or payment of the final bill, any remaining deposit will be mailed to the customer of record at the customer's last known address. Should the customer fail to make payment on the final bill prior to the delinquent date, the deposit will be applied to the outstanding balance and any remaining deposit amount will then be forwarded to the customer of record. The required deposit for water accounts is included in the City fees and charges schedule.

(f) Undeveloped Land Charge. Each parcel of property without a service line, in excess of one acre, which abuts a right-of-way or easement, which contains public water lines shall be charged per acre at a rate to be established in the City fees and charges schedule. Fractions shall be rounded to the nearest penny. Wetlands, buffer areas and dedicated open space shall not be included in the calculation.

(g) Temporary Water Use. The use of water for construction proposed shall be allowed if approved by the City Public Works Superintendent. Before commencing such usage, application shall be made to the City and a fee as established in the City fees and charges schedule shall be paid. Water shall be paid for at the excess rate for each 100 cubic feet of water.

(h) Fire Protection Service. The monthly service rate for private fire protection mains (two-inch and larger) shall be a base rate established in the City fees and charges schedule per month plus the excess rate per 100 cubic feet. (Ord. 99-653 § 6; Ord. 00-682 § 1; Ord. 04-772 § 1; Ord. 10-892 § 1; Ord. 10-908 § 9; Ord. 17-1025 § 1).

21.05.070 Water leak rate adjustment.[2]

(a) A City water utility customer may apply in writing to the City for a water leak rate adjustment. Making such a request does not extend the period for payment of the water bill. Requests for adjustments on delinquent accounts will not be acted upon until paid in full.

(b) A water leak rate adjustment is permitted once in a two-year period and can only be applied to one billing period. To be eligible for this rate adjustment, the following must apply:

(1) The affected water line must be owned by or be subject to the exclusive control of the customer; and

(2) The increase of water usage for which an adjustment is sought must be due to a verifiable water leak in the water line between the customer's side of the water meter and the customer's residence or structure; and

(3) The water usage sought for adjustment must exceed two times the customer's highest usage in any single billing period during the 12 months prior to the billing period sought for adjustment; and

(4) The customer must apply for a water leak rate adjustment within 30 days of the City's issuance of the water bill sought for adjustment; and

(5) The customer must provide proof that the affected water line has been repaired, such as photos of repair or a receipt from a licensed plumber.

(c) Following a request for a water leak rate adjustment, the City Administrator, or his/her designee, shall review the request and determine whether or not to approve a water leak rate adjustment. In order to make a proper determination, City staff shall be entitled to access, inspect, and approve the customer's water line repair prior to granting a water leak rate adjustment.

(d) If approved, the City shall make a water leak rate adjustment by issuing a credit to the customer's account. The adjustment shall not exceed the total water usage for the billing period sought for adjustment minus the customer's average water usage. For purposes of this subsection, the "average water usage" shall be computed by determining the total volume of water consumed, under normal use conditions, during the preceding 12 months and dividing that total volume by the number of times the City would typically read the customer's water meter in a 12-month period. For customers who have been receiving service for less than 12 months, the average water usage shall be based on average usage during the months of service. In no instance shall the water leak adjustment exceed $1,200. (Ord. 06-824 § 1; Ord. 06-817 § 1).

---

[1] Prior legislation: Ord. 336 § 4.

[2] Code reviser's note: Ord. 06-817 adds this section as DMC 21.05.060. It has been editorially renumbered to avoid duplication of section numbers.

Chapter 21.06

Sewage Lift Station Charges[1]

Sections:
21.06.010 Imposed.

21.06.010 Imposed.

(a) There is hereby imposed upon owners of schools which require the use of a sanitary sewage lift station, a sewer lift station charge in the amount of $50.00 per month.

(b) *Repealed by Ord. 99-646*.

(c) The charge imposed herein shall be in addition to and shall be payable in the same manner as other charges imposed for use of the sewer utility. (Ord. 290 §§ 1--3, Oct. 13th, 1982).

[1] Code reviser's note: Chapter 21.06 was formerly codified at DMC 21.01.120.

Division VII. Administration

Chapter 25.175
ADMINISTRATION OF DEVELOPMENT REGULATIONS

Sections:

25.175.010 Types of project permit applications.
25.175.020 Processing Type I – IV project permit applications.
25.175.030 Posting of public notice.
25.175.040 Consistency with development regulations.
25.175.050 Open record public hearings.
25.175.060 Administrative appeals.

25.175.010 Types of project permit applications.

(1) Procedures for Processing Project Permits. For the purpose of project permit processing, all development permit applications shall be classified as one of the following: Type I, Type II, Type III or Type IV. Legislative decisions are Type V actions, and are addressed in subsection (5) of this section. Exclusions from the requirements of project permit application processing are contained in subsection (7) of this section.

(2) Determination of Proper Procedure Type.

(a) The planning director or his/her designee (hereinafter the “director”) shall determine the proper procedure for all development applications. Questions concerning the appropriate procedure shall be resolved in favor of the higher numbered procedure.

(b) An application that involves two or more procedures may be processed collectively under the highest numbered procedure required for any part of the application or may be processed individually under each of the application procedures identified in subsection (4) of this section. The applicant may determine whether the application will be processed collectively or individually. If the applications are processed individually the director shall determine which procedure shall be undertaken first and the sequence of the other procedures so the project may be processed in as concurrent a fashion as possible.

(c) Applications processed in accordance with subsection (2)(b) of this section which have the same procedure number, but are assigned to different hearing bodies, shall be heard collectively by the highest decision maker; the city council being the highest body, followed by the hearing examiner and then the director. Joint public hearings with other agencies shall be processed according to subsection (4) of this section.

(3) The director of community development, or designee, may issue a written interpretation for any section of DMC Titles 23, Environment, 24, Subdivisions, or 25, Land Use Code, at any such time as the code is silent regarding an issue, duplicative or conflicts within itself. Such interpretation shall be processed as a Type I action and may be appealed to the hearing examiner.

(4) Joint Public Hearings with Other Governmental Entities for Type III Project Permit Applications.

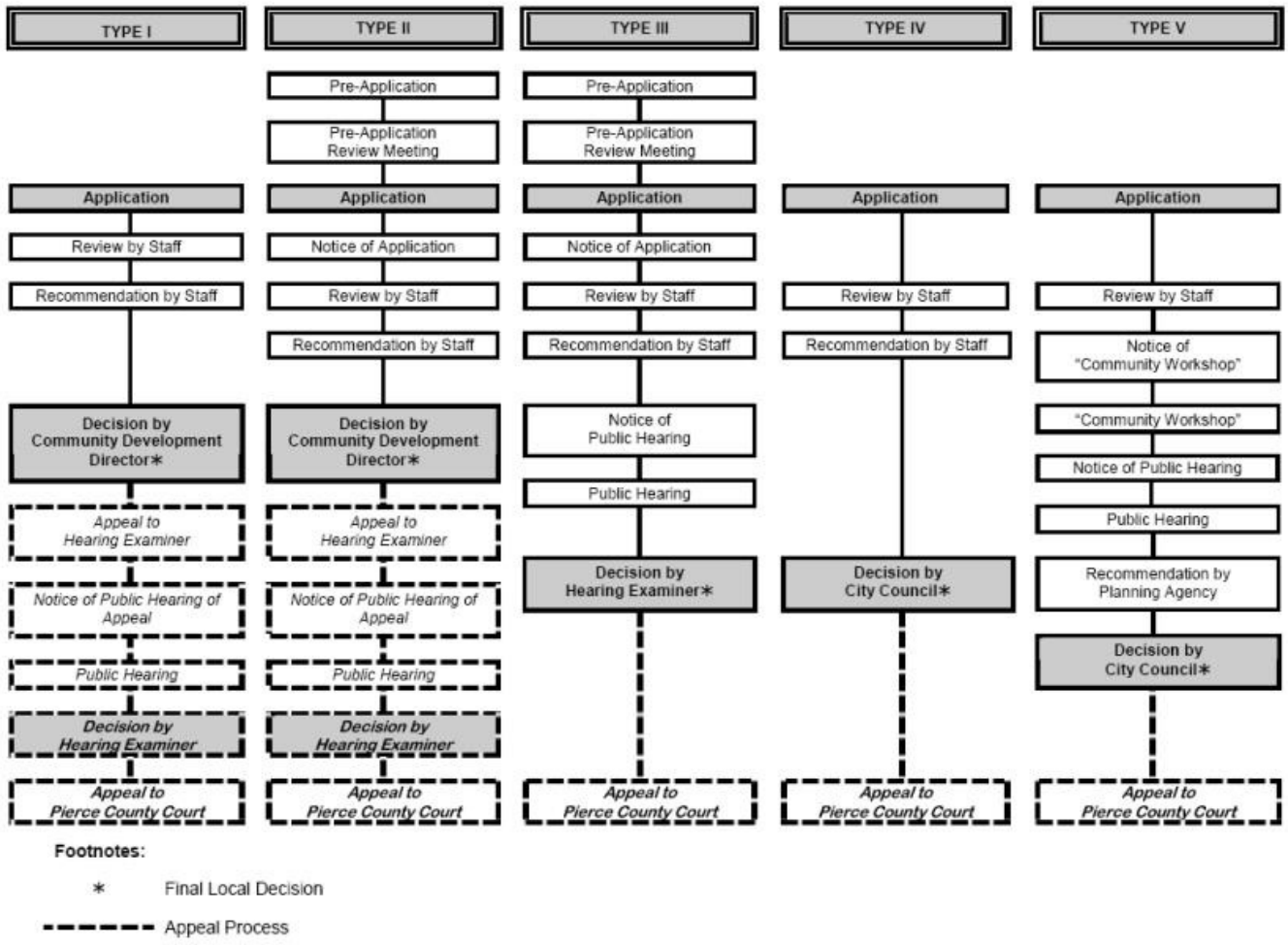
(a) The director may combine any public hearing on a Type III project permit application with any hearing that may be held by another local, state, regional, federal, or other agency, on the proposed action, as long as the hearing is held within the city limits, and the requirements of subsection (4)(c) of this section are met. A “Project Permit Summary:

Action Type" table is included below.

Project Permit Summary: Action Type

Type I	Type II	Type III	Type IV	Type V
• Permitted and accessory uses not requiring site plan review. • Short plat, short plat amendment. • Boundary line adjustment. • Lot line elimination. • Design review. • Administrative interpretation. • Administrative variance. • Minor amendment to site plan. • Time extension. • Home occupation. • Temporary use. • Sign permit. Landscape plan and plan modification.	• All site plan reviews and approvals with exceptions pursuant to Chapter 25.150 DMC. • Major amendment to Type II site plan. • Commercial district: drive thru window, utilities as designated in DMC 25.25.020, attached wireless facilities, and open-air vending. • Office district: service uses less than 10 percent of main building, utilities as designated in DMC 25.30.020. Mixed use village: multifamily, nonresidential, and mixed use buildings.	• Preliminary plat. • Plat alteration. • Site plan other than Type II pursuant to DMC 25.150.020. • Major amendment to site plan other than Type II. • Conditional use. • Variance. • Site-specific reclassification. • Binding site plan. • Shoreline permit. • Shoreline conditional use or variance. • Mineral resource extraction.	• Final plat.	• Comprehensive plan. o Text amendment. o Map amendment. • Land use code. o Text amendment. o Map amendment.
•Decision by:				
Community Development Director	Community Development Director	Hearing Examiner	City Council	City Council
Appeal to:				
Hearing Examiner	Hearing Examiner			
Pierce County Court	Pierce County Court	Pierce County Court	Pierce County Court	Pierce County Court

(b) The applicant may request that the public hearing on a permit application be combined as long as the joint hearing can be held within the time periods set forth in this title. In the alternative, the applicant may agree to a particular schedule if that additional time is needed in order to complete the hearings. A “Development Permit Application Processing Procedure by Type” diagram is included below.



(c) Prerequisites to Joint Public Hearing. A joint public hearing may be held with another local, state, regional, federal or other agency and the city, when:

(i) The other agency is not expressly prohibited by statute from doing so;

(ii) Sufficient notice of the hearing is given to meet each of the agencies’ adopted notice requirements as set forth in statutes, ordinances, or rules;

(iii) The agency has received the necessary information about the proposed project from the applicant in enough time to hold its hearing at the same time as the city hearing; or

(iv) The hearing is held within the geographic boundary of the city.

(5) Legislative Decisions.

(a) The following decisions are legislative, and are not subject to the procedures in this title, unless otherwise specified:

(i) Land use code text and development regulation amendments;

(ii) Area-wide rezones to implement new city policies; and

(iii) Adoption of the comprehensive plan and any plan amendments.

(b) The planning commission shall hold a public hearing and make recommendations to the city council on the decisions in this section. The public hearing shall be held in accordance with the requirements of DMC 25.175.050.

(c) City Council. The city council may consider the planning commission's recommendation in a public meeting or hold a separate public hearing on the matter held in accordance with the requirements of DMC 25.175.050.

(6) Legislative Enactments Not Restricted. Nothing in this chapter or the permit processing procedures shall limit the authority of the city council to make changes to the city's comprehensive plan, or the city's development regulations as part of the annual revision process.

(7) Exemptions from Project Permit Application Processing.

(a) Whenever a permit or approval in the DuPont Municipal Code has been designated as a Type I, II, III or IV permit, the procedures in this title shall be followed in project permit processing. The following permits or approvals are specifically excluded from the procedures set forth in this title:

(i) Landmark designations;

(ii) Street vacations;

(iii) Street use permits;

(b) Pursuant to RCW 36.70B.140(2), building permits, boundary line adjustments or other construction permits, or similar administrative approvals categorically exempt from environmental review under SEPA (Chapter 43.21C RCW and the city's SEPA/environmental policy ordinance, Chapter 23.01 DMC), or permits/approvals for which environmental review has been completed in connection with other project permits, are excluded from the following procedures:

(i) Notice of application (DMC 25.175.020(4)) unless an open record hearing is allowed on the project permit decision;

(ii) Except as provided in RCW 36.70B.140, optional consolidated project permit review processing (this section);

(iii) Joint public hearings (subsection (4) of this section);

(iv) Single report stating all of the decisions and recommendations made as of the date of the report that do not require an open public record hearing (DMC 25.175.050);

(v) Notice of decision (DMC 25.175.050(8)). (Ord. 19-1060 § 2 (Exh. A); Ord. 18-1034 § 2 (Exhs. 6, 7); Ord. 05-790 §§ 12, 13; Ord. 03-736 § 10; Ord. 02-707 § 1)

25.175.020 Processing Type I – IV project permit applications.

(1) Mandatory Preapplication Review.

(a) Prior to filing applications for development project permit that requires a short plat, Type II, III, or IV procedure as specified by DMC 25.175.010(4), the applicant shall file a preapplication review for the specific development project. The purpose of the preapplication review is to acquaint the applicant with the requirements of the DuPont Municipal Code.

(b) The preapplication submittal shall include:

(i) Conceptual site plan showing proposed building location, access, parking area and storm drainage concept;

(ii) Written narrative describing intended use of the site, general size and height of the building, estimated hours of operation and approximate total number of employees and employees per shift, if applicable.

(c) The preapplication meeting shall be held as expeditiously as practicable depending on the submittal time in relation to the scheduling of the city's technical review committee meetings.

(d) At the preapplication meeting the director shall provide the applicant:

(i) A form that lists the requirements for a complete application;

(ii) A general summary of the procedures to be used to process the application;

(iii) References to the relevant code provisions or development standards that may apply to approval of the application;

(iv) The city's design guidelines;

(v) Other relevant information;

(vi) Filing fee as established in the city's adopted fee schedule.

(e) Neither the discussions at the preapplication meeting nor the information provided on the form sent by the director to the applicant shall bind the director in any manner or prevent the director's future application or enforcement of all applicable codes, ordinances and regulations.

(2) Development Project Permit Application. Applications for development project permits shall be submitted on forms provided by the director. An application shall consist of all materials required by the applicable development regulations, and shall include the following general information:

(a) A completed project permit application form;

(b) A verified statement by the applicant that the property affected by the application is in the exclusive ownership of the applicant, or that the applicant has submitted the application with the consent of all owners of the affected property;

(c) A property and/or legal description of the site for all applications, as required by the applicable development regulations;

(d) The applicable fee;

(e) Evidence of adequate water supply as required by RCW 19.27.097;

(f) Evidence of sewer availability;

(g) Written narrative demonstrating how the development proposal meets the applicable decisional criteria; and

(h) All material specified in the preapplication review.

(3) Submission and Acceptance of Development Project Permit Application.

(a) Within 28 days after receiving a development project permit application, the city shall mail to the applicant a determination that states either: the application is complete; or the application is incomplete and what is necessary to make the application complete. Project applications shall not be officially accepted until complete.

(b) To the extent known by the city other agencies with jurisdiction over the project shall be identified in the determination of completeness.

(c) A project permit application is complete for purposes of this section when it meets the submission requirements in subsection (2) of this section, and the submission requirements of the applicable development regulations. The determination of completeness shall be made when the application is sufficiently complete for review even though additional information may be required or project modifications may be undertaken subsequently. The director's determination of completeness shall not preclude the director's ability to request additional information or studies whenever new information is required, or substantial changes are made to the proposed project.

(d) Incomplete Applications.

(i) Whenever the applicant receives a determination from the city that an application is not complete, the applicant shall have 90 days to submit the necessary information. Within 14 days after an applicant has submitted the requested additional information, the director shall make a determination of completeness and notify the applicant in the manner provided in subsection (3)(a) of this section.

(ii) If the applicant does not submit the additional information requested within the 90-day period, the director shall make findings and issue a decision, according to the Type I procedure described in DMC 25.175.010(4), that the application has lapsed for lack of information necessary to complete the review.

(iii) When the director determines that an application has lapsed because the applicant has failed to submit required information within the necessary time period, the applicant may request a refund of the application fee remaining after the city's determination of completeness.

(e) A development project permit application shall be deemed complete 28 days after filing a development project permit application if the director does not provide a written determination to the applicant that the application is incomplete as provided in subsection (3)(a) of this section.

(4) Notice of Application.

(a) A notice of application is only required for Type II and III project permit applications. The notice of application shall be provided to all city departments and agencies with jurisdiction of all Type II and III project permit applications.

(b) Public Issuance of Notice of Application.

(i) Within three days after the city has made a determination of completeness pursuant to subsection (3) of this section, the director shall issue a notice of application.

(ii) The notice shall be published in the city's official newspaper or in a newspaper of general circulation, and posted on the city's official notice board.

(iii) For a Type III application, the notice shall be posted on the site by the applicant as specified by the director.

(c) The notice of application shall include:

(i) The date of submission of the initial application, the date of the notice of completion and acceptance of the application, and the date of the notice of application;

(ii) A description of the proposed project and a list of the project permits requested in the application and, if applicable, a list of any studies requested under RCW 36.70B.070 or 36.70B.090;

(iii) For a Type III application, the notice shall be posted on the site by the applicant as specified by the director;

(iv) A description of existing environmental documents that evaluate the proposed project, and, if not otherwise stated on the document providing notice of application, the location where the application and any studies can be reviewed. If a threshold determination has been made, or is expected to be made pursuant to WAC 197-11-355, the comment period may be combined and run concurrently with the comment period for the notice of application pursuant to RCW 36.70B.110(1);

(v) A statement setting forth: the time for the public comment period, which shall be 14 days following the date of notice of application; the right of any person to comment on the application, receive notice of and participate in any hearings, and request a copy of the decision on the application; and any appeal rights;

(vi) The date, time, place and type of any public hearing required by this chapter or applicable state or federal law;

(vii) A statement of the preliminary determination of consistency required by DMC 25.175.040(1), if one has been made at the time of notice, and of those development regulations that will be used for project mitigation and as provided in Chapter 22.01 DMC;

(viii) Any other information determined appropriate by the director such as the director's threshold determination, if complete at the time of issuance of the notice of application;

(ix) If an open record predecision hearing is required for the requested development project permit, the notice of the application shall be provided at least 15 days prior to the open record hearing.

(d) Public Comment on the Notice of Application. All public comments received on the notice of application must be received in the department of planning by 5:00 p.m. on the last day of the comment period. Comments may be submitted via mail, personally delivered to the department of community development, by facsimile or via electronic mail to the address designated by the director; provided, that mailed comments received after the comment period has expired will not be accepted. Comments should be as specific as possible.

(e) SEPA Exempt Projects. A notice of application shall not be required for development project permits that are categorically exempt under Chapter 43.21C RCW, unless an open record appeal hearing is allowed on the project permit decision.

(5) Referral and Review of Project Permit Applications. Within five days of accepting a complete application, the director shall transmit a copy of the application, or appropriate parts of the application, to each affected government agency and city department for review and comment, including those responsible for determining compliance with state and federal requirements. (Ord. 19-1060 § 2 (Exh. A); Ord. 07-854 § 1; Ord. 05-790 §§ 14, 15, 16; Ord. 03-736 § 11; Ord. 02-707 § 1)

25.175.030 Posting of public notice.

(1) Posting of Public Notice of Application. In addition to the notice of application requirements at DMC 25.175.020(4), the director shall also provide public notice of Type III project permit applications by publication in the city's official newspaper or by directing the applicant to post the site and provide photographic proof thereof.

(a) Posting of the property for site-specific proposals shall consist of one or more notice boards as follows:

(i) A single notice board shall be placed by the applicant at the midpoint of the street fronting the site or as otherwise directed by the director for maximum visibility, five feet inside the street property line, except when the board is structurally attached to an existing building; provided, that no notice board shall be placed more than five feet from the street without approval of the director, so that the top of the notice board is no more than eight feet above grade, and where it is completely visible to pedestrians.

(ii) Additional notice boards may be required when the site does not abut a public road, a large site abuts more than one public road, or the director determines that additional notice boards are necessary to provide adequate public notice.

(iii) Notice boards shall be in place at least 30 days prior to the date of any hearing, and at least 15 days prior to the end of any required comment period, and removed within 15 days after the end of the notice period. Notice boards shall be maintained in good condition by the applicant during the notice period.

(iv) Removal of the notice board prior to the end of the notice period shall be cause for discontinuance of the department review until the notice board is replaced and remains in place for the specified time period.

(v) An affidavit of posting shall be submitted to the director by the applicant at least 10 days prior to the hearing or final comment date. If an affidavit is not filed as required, any scheduled hearing or date by which the public may comment on the application shall be postponed until there is compliance with the notice requirement.

(vi) Notice boards shall be constructed and installed in accordance with specifications promulgated by the director.

(2) Notice of Public Hearing.

(a) The notice of a public hearing required by this chapter shall contain:

(i) The name and address of the applicant and the applicant's representative;

(ii) A description of the subject property reasonably sufficient to inform the public of its location, including but not limited to a vicinity location or written description, a map or postal address, and a subdivision lot and block

designation, but need not include a legal description;

(iii) The date, time and place of the hearing;

(iv) The nature of the proposed use or development;

(v) A statement that all interested persons may appear and provide testimony;

(vi) The sections of the code that are pertinent to the public hearing procedure;

(vii) A statement explaining when information may be examined, and when and how written comments addressing findings required for a decision by the hearing body may be admitted;

(viii) The name of a city representative to contact and the telephone number where additional information may be obtained;

(ix) A statement that a copy of the application, all documents and evidence relied upon by the applicant, and applicable criteria are available for inspection at no cost and that copies will be provided at the requestor's cost pursuant to the city's adopted fee schedule; and

(x) A statement explaining that a copy of the staff report will be available for inspection at no cost at least seven days prior to the hearing and that copies will be provided at the requestor's cost pursuant to the city's adopted fee schedule.

(b) Mailed Notice. Mailed notice of the public hearing shall be provided as follows:

(i) Type I, Type II, and Type IV Actions. No public notice is required because no public hearing is held.

(ii) Type III Actions. The notice of the public hearing shall be mailed to the applicant, all owners of property within 300 feet of the subject property, any person who submits written or oral comments on an application, and for a plat alteration notice shall be as provided in RCW 58.17.080 and 58.17.090.

(iii) Type V Actions. For Type V legislative actions, the city shall publish notice as described in subsection (1) of this section in the city's official newspaper.

(iv) General Procedure for Mailed Notice of Public Hearing. The records of the Pierce County assessor's office shall be used for determining the property owner of record. Addresses for a mailed notice required by this code shall be obtained from the applicable county's real property tax records. The director shall cause to be issued a sworn certificate of mailing to all persons entitled to notice under this chapter. The director may provide notice to persons other than those required to receive notice under the code. All mailed public notices shall be deemed to have been received on the next business day following the day that the notice is deposited in the mail.

(c) Procedure for Posted or Published Notice of Public Hearing.

(i) Posted notice of the public hearing is required for all Type III permit procedures. The notice shall be posted as required by DMC 25.175.020(4)(b)(ii).

(ii) Published notice is required for all Type III and Type V procedures. Notice shall be published in the city's

official newspaper.

(d) Time and Cost of Notice of Public Hearing.

(i) Notice shall be mailed, posted and first published not less than 15 days prior to the hearing date. Posted notices shall be removed by the applicant within 15 days following the public hearing.

(ii) All costs associated with the public notice shall be borne by the applicant. (Ord. 19-1060 § 2 (Exh. A); Ord. 07-854 § 1; Ord. 05-790 §§ 17, 18, 19; Ord. 02-707 § 1)

25.175.040 Consistency with development regulations.

(1) Determination of Consistency.

(a) Consistency between a proposed project permit application, applicable regulations and comprehensive plan shall be determined through the process described in this section.

(b) During project permit application review, the director shall determine whether the development regulations applicable to the proposed project, or in the absence of applicable development regulations, the city's comprehensive plan, address the following:

(i) The type of land use permitted at the site, including uses that may be allowed if the criteria for their approval have been satisfied;

(ii) The level of development, such as units per acre, density of residential development in urban growth areas, or other measures of density;

(iii) Availability and adequacy of infrastructure and public facilities identified in the comprehensive plan;

(iv) Whether the plan or development regulations provide for funding of these facilities as required by Chapter 36.70A RCW; and

(v) The character of the proposed development, as authorized by development standards.

(c) Project Review. Project review by the director and appropriate city staff shall identify specific project design and conditions relating to the character of development, such as the details of site plans, curb cuts, drainage swales, or other measures to mitigate a proposal's probable adverse environmental impacts. During project review, neither the director nor any other city reviewing body may re-examine alternatives or hear appeals on matters found consistent with development regulations and/or the comprehensive plan, except for issues of code interpretation. (Ord. 19-1060 § 2 (Exh. A); Ord. 02-707 § 1)

25.175.050 Open record public hearings.

(1) Public Hearings.

(a) Public hearings on all Type III project permit applications shall be conducted in accordance with this chapter and shall be conducted by the city hearing examiner or her or his deputy examiners or an examiner pro tem (examiner). Public hearings conducted by the examiner shall also be subject to the hearing examiner's rules as provided in Chapter 1.11 DMC.

(b) Public hearings on Type V actions shall be conducted in accordance with the procedures adopted by the city council for the conduct of public hearings before it.

(2) The director shall:

(a) Schedule project applications for review and public hearing;

(b) Provide the required notice;

(c) Prepare the staff report on the application, which shall be a single report which sets forth all of the decisions made on the proposal as of the date of the report, including recommendations on project permits in the consolidated permit process that do not require an open record predecision hearing. The report shall also describe any mitigation required or proposed under the city's development regulations or SEPA authority. If the threshold determination, other than a determination of significance, has not been issued previously by the city the report shall include or append this determination.

(3) The hearing body shall be subject to the code of ethics and prohibitions on conflict of interest as set forth in RCW 35A.42.020 and Chapter 42.23 RCW, as the same now exists or may hereafter be amended.

(4) Ex Parte Communications for Type III Procedure.

(a) No examiner may communicate, directly or indirectly, regarding any issue in a proceeding before him or her, other than to participate in communications necessary to procedural aspects of maintaining an orderly process, unless he or she provides notice and opportunity for all parties to participate.

(b) If, before serving as the examiner in a quasi-judicial proceeding, the examiner receives an ex parte communication of a type that could not properly be received while serving, the examiner, promptly after starting to serve, shall disclose the communication as described in subsection (4)(c) of this section.

(c) If the examiner receives an ex parte communication in violation of this section, he or she shall place on the record:

(i) All written communications received;

(ii) All written responses to the communications;

(iii) The substance of all oral communications received, and all responses made; and

(iv) The identity of each person from whom the member received any ex parte communication. The examiner shall advise all parties that these matters have been placed on the record. Upon request made after notice of the ex parte communication, any party desiring to rebut the communication shall be allowed to place a rebuttal statement on the record.

(5) Except for Type V actions, the burden of proof is on the proponent. The project permit application must be supported by substantial evidence that it conforms to the applicable elements of the city's development regulations and comprehensive plan. The proponent must also prove that any significant adverse environmental impacts have been adequately mitigated.

(6) The order of proceedings for a hearing will depend in part on the nature of the hearing. The following shall be supplemented by administrative procedures as appropriate and set out in Chapter 1.11 DMC:

(a) Before receiving testimony and other evidence on the issue, the following shall be determined:

(i) Any objections on jurisdictional grounds shall be noted on the record and if there is objection, the examiner may proceed or terminate the proceeding;

(ii) Any disqualifications shall be determined.

(b) The examiner may take official notice of commonly known and accepted information, such as:

(i) Ordinances, resolutions, rules, officially adopted development standards, and state law;

(ii) Facts judicially noticeable by law.

(c) Information officially noticed need not be proved by submission of formal evidence to be considered by the examiner. Parties requesting official notice of any information shall do so on the record. The examiner, however, may take notice of matters listed in subsection (6)(b) of this section at any time. Any information given official notice may be rebutted.

(d) The examiner may view the proposed project site or planning area with or without notification to the parties, but shall put into the record a statement setting forth the time, manner and circumstances of the site visit.

(e) Information shall be received from the staff and from proponents and opponents. The examiner may, in his or her discretion, permit persons attending the hearing to ask questions. Unless the examiner specifies otherwise, approved questions will be asked of persons submitting testimony by the examiner.

(f) When the examiner has closed the public hearing portion of the hearing, the examiner may openly discuss the issue and may further question the staff or any person submitting information. An opportunity to present rebuttal shall be provided if new information is presented in the questioning. When all evidence has been presented and all questioning and rebuttal completed, the examiner shall officially close the record and end the hearing.

(7) Decision. Following the hearing procedure described in subsection (6) of this section, the examiner shall approve, conditionally approve, or deny the application. If the hearing is an appeal, the examiner shall affirm, reverse or, with the written consent of the applicant, which shall include a waiver of the statutory prohibition against two open record hearings, remand the decision for additional information.

(8) Notice of Final Decision.

(a) The city shall provide a notice of decision that also includes a statement of any threshold determination made under SEPA (Chapter 43.21C RCW) and the procedures for administrative appeal, if any.

(b) The notice of decision shall be provided to the applicant and to any person who, prior to the rendering of the decision, requested notice of the decision or submitted substantive comments on the application.

(c) The director shall issue a notice of final decision within 120 days of the issuance of the determination of completeness pursuant to DMC 25.175.020(3); provided, that the time period for preliminary plats, short plats and final plats shall be subject to the requirements of RCW 58.17.140. The notice shall include the SEPA threshold determination for the proposal and a description of any available administrative appeals. For Type III project permits, the notice shall explain that affected property owners may request a change in property tax valuation notwithstanding

any program of revaluation. The notice of final decision shall be mailed or otherwise delivered to the applicant, to any person who submitted comments on the application or requested a copy of the decision, and to the Pierce County assessor.

(d) In calculating the 120-day period for issuance of the notice of final decision, the following periods shall be excluded:

(i) Any period during which the applicant has been requested by the director to correct plans, perform required studies, or provide additional required information. The period shall be calculated from the date the director notifies the applicant of the need for additional information until the earlier of the date the director determines that the additional information provided satisfies the request for information, or 14 days after the date the additional information is provided to the city;

(ii) If the director determines that the information submitted is insufficient, the applicant shall be informed of the particular insufficiencies and the procedures set forth in subsection (8)(d)(i) of this section for calculating the exclusion period shall apply;

(iii) Any period during which an environmental impact statement (EIS) is being prepared pursuant to Chapter 43.21C RCW. The time period for preparation of an EIS shall be governed by Chapter 43.21C RCW;

(iv) Any period for consideration and issuance of a decision for administrative appeals of project permits, which shall be not more than 90 days for open record appeals and 60 days for closed record appeals, unless a longer period is agreed to by the director and the applicant;

(v) Any extension of time mutually agreed to by the director and the applicant.

(e) If the city is unable to issue its final decision on a project permit application within the time limits provided for in this section, it shall provide written notice of this fact to the project applicant. The notice shall include a statement of reasons why the time limits have not been met and an estimated date for issuance of the notice of decision.

(f) The time limits established in this title do not apply if a project permit application:

(i) Requires an amendment to the comprehensive plan or a development regulation;

(ii) Requires siting approval of an essential public facility as provided in RCW 36.70A.200; or

(iii) Is substantially revised by the applicant, in which case the time period shall start from the date that a determination of completeness for the revised application is issued by the director pursuant to DMC 25.175.020(3) and RCW 36.70B.070. (Ord. 19-1060 § 2 (Exh. A); Ord. 05-790 § 20; Ord. 02-707 § 1)

25.175.060 Administrative appeals.

(1) The type of appeal for all non-Type III project permit applications and Type V land use decisions shall be as described in the matrix set forth in DMC 25.175.010(4). Appeals to the hearing examiner shall be conducted pursuant to this section and Chapter 1.11 DMC.

(2) All appeals of non-Type III project permit application decisions including but not limited to SEPA threshold determinations other than appeals of determinations of significance (DS), and exempt permits and approvals under DMC 25.175.010(7), shall be considered together in a consolidated administrative appeal.

(3) Standing to Initiate an Administrative Appeal.

(a) Limited to Parties of Record. Only parties of record may file an administrative appeal.

(b) Definition. The term “parties of record,” for the purposes of this chapter, shall mean:

(i) The applicant;

(ii) Any person who commented during the public comment period on the notice of application as provided at DMC 25.175.020(4) (excluding persons who have only signed petitions or submitted form letters);

(iii) Any department or agency receiving notice of application pursuant to DMC 25.175.020(4)(a); and/or

(iv) DuPont city council.

(4) Appeals of the director’s decision on a project permit application shall be governed by the following:

(a) Only parties of record have standing to appeal the director’s decision.

(b) An appeal must be filed within 14 calendar days after the final decision. Appeals shall be delivered to the director by mail or by personal delivery to the department of community development, before 5:00 p.m. on the last business day of the appeal period. Appeals received by mail after 5:00 p.m. on the last day of the appeal period will not be accepted, no matter when such appeals were mailed or postmarked.

(c) For the purposes of computing the time for filing an appeal, the day the final decision is issued shall not be counted. If the last day of the appeal is a Saturday, Sunday, or holiday designated by RCW 1.16.050 or by a city ordinance, then the appeal must be filed on the next business day.

(d) Appeals shall be in writing, be accompanied by the required appeal fee, and contain the following information:

(i) Appellant’s name, address and phone number and the name, address, email address, and phone number of anyone representing the appellant;

(ii) A statement describing appellant’s standing to appeal;

(iii) Identification of the application that is the subject of the appeal;

(iv) Appellant’s statement of grounds for appeal and the facts upon which the appeal is based with specific references to the facts in the record;

(v) The specific relief sought;

(vi) A statement that the appellant has read the appeal and believes the contents to be true, followed by the appellant’s signature.

(e) The timely filing of an appeal shall stay the director’s decision until such time as the appeal is withdrawn, or proceedings are concluded and an order is issued by the hearing examiner.

(f) The director shall provide mailed notice of the appeal to all parties of record as defined in subsection (3) of this

section.

(g) Dismissal of Appeal. The hearing examiner may summarily dismiss an appeal without hearing when such appeal is determined by the examiner to be without merit on its face, frivolous, brought merely to secure a delay, or that the appellant lacks standing to appeal. The failure to timely file an appeal shall be considered jurisdictional and untimely filed appeals shall be dismissed by the examiner. The examiner is authorized to toll appeal deadlines as authorized by the common law doctrine of equitable tolling.

(h) Burden. Unless otherwise provided by law, the party seeking to appeal the director's final decision on a project permit application shall have the burden to establish that the director's decision is not supported by evidence that is substantial when viewed in light of the entire administrative record. Issues on appeal are confined to those issues explicitly raised in the notice of appeal. The determination of the director shall be presumed prima facie correct and shall be afforded substantial weight. Appeals shall be limited to the records of the director.

(i) Administrative Appeal. An appeal of the director's final decision on a project permit application shall be held in an open record hearing where admission of evidence shall be confined to the appellant(s), the city, any other party the hearing examiner has affirmatively recognized as a party to the proceeding prior to the date of hearing, and the hearing examiner pursuant to Chapter 1.11 DMC.

(5) Any permit application or other request for approval submitted pursuant to this chapter that is denied shall not be resubmitted or accepted by the director for reconsideration for a period of 12 months from the date of the last action by the city on the application or request unless, in the opinion and discretion of the director, there has been a significant change in the application or a significant change in conditions related to the impacts of the proposed project. (Ord. 19-1060 § 2 (Exh. A); Ord. 05-790 § 21; Ord. 02-707 § 1)

The DuPont Municipal Code is current through Ordinance Ordinance 19-1065, passed June 11, 2019.

Disclaimer: The city clerk's office has the official version of the DuPont Municipal Code. Users should contact the city clerk's office for ordinances passed subsequent to the ordinance cited above.

City Website: http://www.dupontwa.gov/
City Telephone: (253) 964-8121

Code Publishing Company

Dupont Water System, City of

STANDARD SERVICE AGREEMENT ESTABLISHING WATER UTILITY SERVICE AREA BOUNDARIES

PREAMBLE

THIS AGREEMENT establishing water utility service area boundaries is entered into this day for purposes of identifying the external boundaries of the service area for which this water purveyor has assumed water service responsibility.

WHEREAS, service area agreements are required by WAC 246-293-250 to help assure that water reserved for public water supply purposes within Pierce County will be utilized in the future in an efficient and planned manner; and

WHEREAS, the designation of retail water service area and future service planning areas, together with the cooperation of other utilities, will help assure efficient planning to accommodate growth, avoid duplication of service, and facilitate the best use of resources; and

WHEREAS, The responsibilities applicable to water purveyors are outlined in the Pierce County Coordinated Water System Plan (CWSP) and by the adopted rules and regulations of the Washington State Department of Health (DOH); and

WHEREAS, It is not the intent of this Agreement to give new authority or responsibilities to the water purveyor or to the County or State regulatory agencies, in addition to those requirements imposed by law; and

WHEREAS, the provisions within the Agreement which identify guidelines for the transfer of customers between two water purveyors, the submittal of information to the designated lead agency within Pierce County, and the procedures to be followed in adjusting the boundaries established at the time the Agreement is signed, are intended to satisfy the conditions of Chapter 70.115 RCW, the "Public Water Systems Coordination Act";

NOW, THEREFORE, the undersigned party, having entered into this Agreement by its signature, concur with and will abide by the following provisions:

Section 1. The terms used within the contract shall be as defined in the implementing regulations of Chapter 70.116 RCW, except as identified below.

A. Lead Agency shall mean the department or organization within Pierce County that has been designated by the Pierce County Executive as being administratively responsible for the coordination and filing of the Pierce County Water Service Area map, Standard Service Agreement Establishing Water Utility Service Area Boundaries, Agreements for Retail Service Areas, Utility Service Policies, and other administrative documents necessary for the implementation of the Pierce County CWSP.

B. Pierce County Coordinated Water System Plan (CWSP) shall mean the plan adopted by the Pierce County Council for public water systems within critical water supply service areas within Pierce County which identifies the present and future needs of the systems and sets forth means for meeting those needs in the most efficient manner possible.

C. Pierce County Water Service Area Map shall mean the map referenced in this Agreement for the retail service area signed by the water purveyor, except as amended in accordance with the CWSP procedures and with the concurrence of the affected water purveyors.

D. Retail Service Area shall mean the designated geographical area within Pierce County in which the undersigned water purveyor assumes full responsibility for providing water service to individual customers.

E. Utility Service Policies shall mean those policies and conditions of service that are attached to the provision of water service for individual customers. The identified policies and conditions of service are those conditions incorporated within the water purveyor's water system improvement and expansion plans required under the provisions of the Public Water Systems Coordination Act and DOH.

F. Wholesale Service Area shall mean the 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.

Section 2. Lead Agency. The lead agency for administering the Pierce County Water Utility service area agreements shall be the Pierce County Department of Public Works and Utilities unless otherwise established by the Pierce County Executive. The lead agency shall function only as a coordination center. The lead agency will maintain the original documents and will be responsible for updating the water system map and agreements as provided for in the CWSP.

Section 3. Authority The authority for this Agreement is granted by the Public Water Systems Coordination Act of 1977, Chapter 70.116 RCW.

Section 4. Service Area Boundaries. The undersigned Water Purveyor acknowledges that the Pierce County Water Service Area Maps identifying its retail service area boundaries, dated August, 1994 and included as Attachment A to this Agreement, identify the Water purveyor's present and future service area. The undersigned further acknowledges that there are no service area conflicts with an adjacent water utility or purveyor, or, if such a conflict exists, agrees that no new water service will be extended within disputed areas except as stipulated in an adjudication by DOH.

This agreement shall apply to service areas existing as of August, 1994, and to the service area boundaries identified in the above referenced maps, or as shown on current revisions thereof, provided that no revisions of service areas shown on these maps shall be made without prior written concurrence of the water utilities/purveyors involved and such written concurrence is filed with the Lead Agency. Revisions may also require an amendment to the purveyor's or utility's service plans.

Section 5. Common Service Area Transfer. Common service areas between this purveyor and the adjacent purveyor, if they exist, are described in Attachment B to this agreement. The undersigned party agrees that any water line for retail service extending outside of the retail service area boundary, as set forth in Section 2, 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:

(a) A determination by the present owners of service lines that maintenance, repair, and/or replacement costs exceed attributable income; or

(b) Planned or imminent major street improvements or major improvements to either or both water systems are anticipated which include an opportunity to transfer service.

It is understood that in the interim, those purveyors or utilities may continue existing water service within the boundaries of neighboring utilities until a date certain upon which they must be removed or transferred to the adjacent utility or purveyor as described herein.

The terms of the transfer of service are described in this Section shall be established in a separate agreement among the adjacent purveyors or utilities whose boundaries are affected. Unless otherwise set forth in said transfer agreement:

(a) The purveyor or utility discontinuing service shall be responsible to provide the connection of service lines to the accepting water purveyor or utility, and shall also be responsible for removal of existing meters, and any surface repairs as may be required by the transfer;

(b) the accepting purveyor or utility shall install its meters and perform all steps necessary to assume water service responsibility to the customer(s) on said water lines.

Any transfer agreements between this purveyor and adjacent utilities are attached hereto as Attachment B and incorporated herein by this reference.

Section 6. Boundary Streets. Unless separate agreements are made with adjacent utilities, this party agrees that the utility which is located to the north or west of the 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.

Section 7. Boundary Adjustments. If, at some time in the future it is in the best interest of the undersigned parties to make service area boundary adjustments, such modifications must be by written concurrence of all involved utilities and the proper legislative authority(ies), and must be noted and filed with the designated Pierce County lead agency and DOH. It is understood by the undersigned utility that it may decline to provide service within its designated service area boundary, but in that case, an applicant may be referred to other adjacent purveyors or utilities or a new utility may be created and the original service area boundary will be adjusted accordingly.

Section 8. System Extension Policies. The undersigned utility agrees that in order to expand its existing water service area, (other than by addition of retail customers to existing water mains), or to serve in the capacity of a prequalified satellite system management agency (SSMA), it shall have adopted design standards and Utility Service extension policies. The design standards shall meet or exceed the Pierce County Water System Minimum Standards and Specifications.

A water utility anticipating expansion of retail service in unincorporated areas of Pierce County, or intending to operate as an SSMA, shall identify utility service policies in its updated water system plan. The undersigned utility agrees to identify, for information, its utility service policies or provide a copy of the updated water system plan to the Lead Agency prior to application for extension of its existing water system into new service areas within the unincorporated areas of Pierce County.

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 the level of service provided for their customers inside the city limits with similar service requirements, and must also meet or exceed Pierce County's minimum design standards.

Section 9. Special Working Agreements. Special working agreements, if they exist and are relevant, between this water purveyor and an adjacent water purveyor shall be attached to this Agreement as Attachment B and incorporated herein by this reference.

Section 10. Compliance with the CWSP. Nothing in this Agreement shall waive any requirement of the state, federal or local government regarding the provision of water service. This Agreement shall comply with the interlocal agreement requirement of the CWSP.

IN WITNESS WHEREOF, the undersigned party has executed this Agreement as of September 13, 1994.

DuPont Water Dept. 20500P
Water Purveyor

Gilland F Schubel
Representative

Mayor
Title

Receipt Acknowledged:

_____
Tacoma-Pierce County Health Department

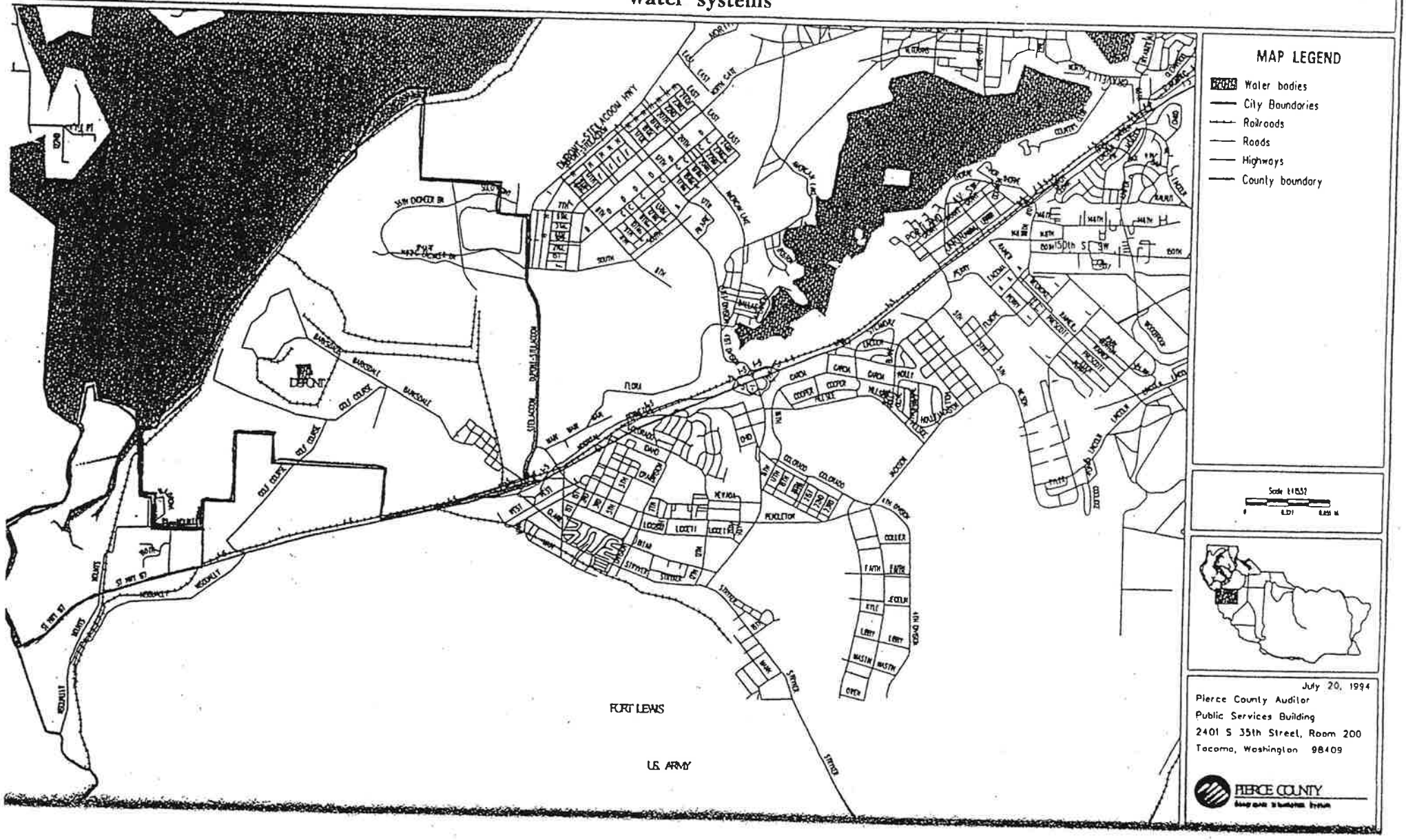
_____
Date

STANDARD SERVICE AGREEMENT
ATTACHMENT B

Utility shall include copies of separate agreements, relating to common service areas, transfer arrangements, special working agreements, and/or retail service agreements with adjacent utilities. These agreements will be included by reference in this Interlocal Agreement.

map9sdj

water systems



0439.2004.0440

FILE NO. 439 PROPOSAL NO. 2003-69

Sponsored by: Councilmember Shawn Bunney

Requested by: County Executive/Public Works & Utilities Department

ORDINANCE NO. 2003-69

AN ORDINANCE OF THE PIERCE COUNTY COUNCIL REPEALING CHAPTER 19D.120 OF THE PIERCE COUNTY CODE, "COORDINATED WATER SYSTEM PLAN AND WATER GENERAL PLAN"; AND ADOPTING A NEW CHAPTER 19D.120, "COORDINATED WATER SYSTEM PLAN AND REGIONAL SUPPLEMENT 2001."

WHEREAS, The Public Water System Coordination Act, Chapter 70.116 Revised Code of Washington (RCW), grants counties the authority to adopt coordinated water system plans; and

WHEREAS, The Pierce County Council declared Pierce County as a critical water supply service area, pursuant to the provisions of RCW 70.116, in Ordinance No. 83-9, which was passed on March 8, 1983; and

WHEREAS, The Pierce County Council established a Water Utility Coordinating Committee in Resolution No. R83-130 on August 23, 1983; and

DISTRIBUTION:

JOHN LADENBURG, EXECUTIVE \
SUSAN CLARK, WATER PROGRAMS \
LIBRARY \
MUNICIPAL RESEARCH & SERVICES CENTER/yes \ no ___
LAW LIBRARY \
STATE EXAMINER \
SUSAN LONG, CODE REVISOR \
BOOK \

10/6 AD
Date/initials

WHEREAS, The Pierce County Council adopted the Coordinated Water System Plan and Water General Plan in Ordinance No. 86-116S4 on August 23, 1988; and

WHEREAS, The Pierce County Council repealed the 1988 Coordinated Water System Plan and Water General Plan as a General Planning Document to the Pierce County Comprehensive Plan in Ordinance No. 96-91s on November 26, 1996; and

WHEREAS, The Pierce County Council adopted the 1995 Coordinated Water System Plan and Regional Supplement as a Pierce County General Planning Document to the Pierce County Comprehensive Plan in Ordinance No. 96-91S on November 26, 1996; and

WHEREAS, The 1995 Coordinated Water System Plan and Regional Supplement contains a Section entitled Regional Water Supply Requirements; and

WHEREAS, On December 23, 1997, Pierce County Public Works & Utilities Department, Water Programs, supported by the Pierce County Regional Water Association and Tacoma-Pierce County Health Department, submitted a "Referendum 38" project proposal to the Washington State Department of Health requesting funding of $20,000 to develop population, housing, and employment projections for each of the water purveyors serving with the Pierce County Urban Growth Area required to submit a water system plan to the Washington State Department of Health, thereby enhancing the existing water demand

figures contained in the Pierce County Coordinated Water System Plan and Regional Supplement; and

WHEREAS, On April 20, 1998, Contract Number NO7448 was executed with the Washington State Department of Health for "Referendum 38" funds; and

WHEREAS, The 1995 Coordinated Water System Plan and Regional Supplement contains a Dispute Resolution Process which states:

> *"In addition, 'timely and reasonable service' should be defined pursuant to guidelines established by DOH pursuant to RCW 70.116.060(3)(b). Such guidelines, when finalized by DOH, shall be reviewed by the WUCC for incorporation into the CWSP."*

(Pierce County CWSP, November 26, 1996, page II-35); and

WHEREAS, The Washington State Department of Health has made available a Local Government Guidance Manual on Timely and Reasonable Criteria; and

WHEREAS, A subcommittee of the Water Utilities Coordinating Committee reviewed the Local Government Guidance Manual on Timely and Reasonable Criteria and made recommendations to the Water Utilities Coordinating Committee for its incorporation into the CWSP and Pierce County Code 19D.120; and

WHEREAS, The Water Utility Coordinating Committee held public informational meetings on December 19, 2000, and April 24, 2001, to receive public comments concerning the proposed amendments; and

WHEREAS, In compliance with the State Environmental Policy Act (Chapter 43.21C RCW) and Pierce County Code 17.08 et seq., environmental review has been completed for the amendments to the Coordinated Water System Plan; and

WHEREAS, The Pierce County Planning Commission held a public hearing on October 23, 2001, to receive public comments concerning the proposed amendments, and forwarded its recommendation to the Pierce County Council; and

WHEREAS, The Pierce County Council has determined that adopting the amendments to the Coordinated Water System Plan is in the public interest, protects the public health, safety, and welfare, and complies with the Comprehensive Plan for Pierce County, Washington and the Growth Management Act (Chapter 36.70A RCW); NOW, THEREFORE,

BE IT ORDAINED by the Pierce County Council:

Section 1. Chapter 19D.120 of the Pierce County Code is hereby repealed.

Section 2. A new Chapter 19D.120 PCC is hereby adopted as set forth in Exhibit "A", which is attached hereto and incorporated herein by reference.

Section 3. The Pierce County Council hereby adopts the Coordinated Water System Plan and Regional Supplement, as set forth in Exhibit "B", and finds the Plan to be consistent with RCW 70.116.050(4), and requests the Executive to take the necessary steps to forward the draft to the Washington State Department of Health for final approval.

PASSED this 23rd day of September, 2003.

ATTEST:

Patty Face for
Denise Johnson
Clerk of the Council

PIERCE COUNTY COUNCIL
PIERCE COUNTY, Washington

Harold G. Moss
Councilmember Harold Moss
Council Chair

Approved As To Form Only:

Deputy Prosecuting Attorney

PIERCE COUNTY EXECUTIVE
John Ladenburg

Approved ✓ Vetoed ____
this 26 day of Sept,
2003.

Date of Publication of
Notice of Public Hearing: September 3, 2003

Effective Date of Ordinance: October 6, 2003

EXHIBIT "A" TO ORDINANCE NO. 2003-69

"NEW CHAPTER"

Chapter 19D.120

COORDINATED WATER SYSTEM PLAN AND REGIONAL SUPPLEMENT 2001

Code Revisor's Note: The Coordinated Water System Plan and Water General Plan was adopted by Ordinance No. 86-116S4 and codified as Chapter 19.68 PCC.

Title 19 PCC was repealed in its entirety by Ordinance No. 94-82S, 1994.

The Coordinated Water System Plan was readopted by Ordinance No. 94-82S, 1994, as a General Planning Document codified as Chapter 19B.120 PCC.

The 1988 Coordinated Water System Plan and Water General Plan was repealed as a General Planning Document to the Pierce County Comprehensive Plan and the 1995 Coordinated Water System Plan and Regional Supplement was adopted as a Pierce County Planning Document to the Pierce County Comprehensive Plan by Ordinance No. 96-91S, 1996.

The Coordinated Water System Plan was later recodified as Chapter 19D.120 PCC by Ordinance No. 96-111, 1996.

The Coordinated Water System Plan, codified as Chapter 19D.120 PCC, was repealed by Ordinance No. 2003-69.

The Coordinated Water System Plan and Regional Supplement 2001 was adopted by Ordinance No. 2003-69 and codified as Chapter 19D.120 PCC.

Exhibit "B" to ord. No. 2003-69

Coordinated Water System Plan

and Regional Supplement 2001

WUCC Recommended April 24, 2001

PLANNING COMMISSION RECOMMENDED: OCTOBER 23, 2001

Pierce County
Public Works & Utilities - Water Programs
9315 Gravelly Lake Drive SW, Suite 203
Lakewood, Washington 98499
(253) 798-2725

CITY OF DuPONT
WASHINGTON
ORDINANCE NO. 18-1050

AN ORDINANCE OF THE CITY OF DuPONT, PIERCE COUNTY, WASHINGTON, AMENDING CHAPTER 21.05.060 OF THE DuPONT MUNICIPAL CODE, RELATING TO THE WATER SYSTEM RATES AND CHARGES; PROVIDING FOR SEVERABILITY; AND ESTABLISHING AN EFFECTIVE DATE.

WHEREAS, the City of DuPont is a municipal corporation operating under the laws of the state of Washington as a code city pursuant to Chapter 35A of the Revised code of Washington; and

WHEREAS, City of DuPont would like to update the utility rate.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF DuPONT, WASHINGTON DO HEREBY ORDAIN AS FOLLOWS:

Section 1. DMC Title 21 Chapter 5 Section 60 Amended. DMC Title 21, Chapter 5, Section 60 is hereby amended to read as follows:

21.05.060 Rates

The fees and charges for services provided by the City shall be set forth in a fee schedule adopted by ordinance of the DuPont City Council, as shown in Exhibit A of the ordinance codified in this section.

The City of DuPont will supply and sell water service to consumers within the corporate limits of the City, using the following methods for calculating the charges:

(a) Water Service per Month.

(1) Single-Family Customers. Base rate for the first 500 cubic feet plus excess rate for each additional 100 cubic feet in excess of 500 cubic feet. Fractions shall be rounded to the nearest penny and calculated on a billing cycle basis only.

(b) Single-Family Life Line Rate. Reduced base rate for the first 500 cubic feet (base rate) plus excess rate for each additional 100 cubic feet. Fractions shall be calculated on a billing cycle basis only. To qualify, customers must apply and certify that they are at least 60 years of age or older with an income which would qualify them for a reduction from real or personal property taxes.

(c) Commercial and Multi-Dwelling Unit Customers. Customers shall be charged a base rate, based on meter size, for the first 500 cubic feet plus an excess rate for each 100 cubic feet in excess of 500 feet. Fractions shall be calculated on a billing cycle basis only. The base rate for meter sizes is included in the City fees and charges schedule.

(d) Payment and Penalties. Billing, payment and penalty procedures associated with water utility services shall be as provided for in Chapter 17.02 DMC.

(e) Deposit Charges. Deposit requirements will be waived for customers of record that are also the property owners. Deposits will be held by the City of DuPont until such time as the utility account is closed. The customer may, at his or her option, instruct the City of DuPont to apply the deposit towards the final bill. Upon application of the deposit and/or payment of the final bill, any remaining deposit will be mailed to the customer of record at the customer's last known address. Should the customer fail to make payment on the final bill prior to the delinquent date, the deposit will be applied to the outstanding balance and any remaining deposit amount will then be forwarded to the customer of record. The required deposit for water accounts is included in the City fees and charges schedule.

(f) Undeveloped Land Charge. Each parcel of property without a service line, in excess of one acre, which abuts a right-of-way or easement, which contains public water lines shall be charged per acre at a rate to be established in the City fees and charges schedule. Fractions shall be rounded to the nearest penny. Wetlands, buffer areas and dedicated open space shall not be included in the calculation.

(g) Temporary Water Use. The use of water for construction proposed shall be allowed if approved by the City Public Works Superintendent. Before commencing such usage, application shall be made to the City and a fee as established in the City fees and charges schedule shall be paid. Water shall be paid for at the excess rate for each 100 cubic feet of water.

(h) Fire Protection Service. The monthly service rate for private fire protection mains (two-inch and larger) shall be a base rate established in the City fees and charges schedule per month plus the excess rate per 100 cubic feet.

Section 2. City Clerk Shall File and Maintain Copies of Codes. The City Clerk shall file and maintain in the City Clerk's office one copy of each of the referenced Codes in the form in which they were adopted for use and examination by the public.

Section 3. Severability. Should any section, paragraph, sentence, clause or phrase of this Ordinance, or its application to any person or circumstance, be declared unconstitutional or otherwise invalid for any reason, or should any portion of this Ordinance be pre-empted by state or federal law or regulation, such decision or pre-emption shall not affect the validity of the remaining portions of this Ordinance or its application to other persons or circumstances.

Section 4. Effective Date. This Ordinance shall be published in the official newspaper of the City and shall take effect and be in force (5) days after the date of publication.

PASSED by City Council and approved by the Mayor, this 20 day of Nov, 2018.

Michael P. Courts, Mayor

Attest:

Karri Muir, City Clerk

Approved as to Form:

Gordon Karg, City Attorney

Filed with the City Clerk:
Passed by the City Council:
Date of Publication:
Effective Date:

EXHIBIT A
CITY OF DUPONT WATER RATE

Water Base Rates and Excess Volume Rate

	Meter Equivalent	2018	2019	2020	2021	2022	2023
Annual % Rate Increase		2%	2%	2%	0%	0%	0%
Base Monthy Rate (1)(2)							
Single Family	1.00	$32.08	$32.72	$33.37	$33.37	$33.37	$33.37
Single Family -- lifeline	0.70	$22.46	$22.90	$23.34	$23.34	$23.34	$23.34
Non-Single Family (3)							
3/4" inch (includes 5 ccf)	1.00	$32.08	$32.72	$33.37	$33.37	$33.37	$33.37
1" meter	1.67	$53.57	$54.64	$55.74	$55.74	$55.74	$55.74
1-1/2"meter	3.34	$107.14	$109.29	$111.47	$111.47	$111.47	$111.47
2" meter	5.33	$170.98	$174.40	$177.89	$177.89	$177.89	$177.89
3" meter	10.67	$342.26	$349.11	$356.09	$356.09	$356.09	$356.09
4" meter	16.67	$534.74	$545.43	$556.34	$556.34	$556.34	$556.34
6" meter	33.33	$1,069.22	$1,090.60	$1,112.41	$1,112.41	$1,112.41	$1,112.41
8" meter	53.33	$1,710.80	$1,745.01	$1,779.91	$1,779.91	$1,779.91	$1,779.91
10" meter	96.67	$3,101.06	$3,163.08	$3,226.34	$3,226.34	$3,226.34	$3,226.34
Undeveloped Land Charge		$9.10	$9.28	$9.47	$9.47	$9.47	$9.47
Fire Protection Service (all sizes)	0.94	$30.14	$30.74	$31.36	$31.36	$31.36	$31.36
Temporary Water Use	1.00	$32.08	$32.72	$33.37	$33.37	$33.37	$33.37
Water Hydrant Use	1.00	$32.08	$32.72	$33.37	$33.37	$33.37	$33.37
Excess Volume Rate - per 100 cf of water use over 500 cf/month		$2.24	$2.29	$2.33	$2.33	$2.33	$2.33

(1) Rates for each calendar year are effective January 1st of that year.

(2) Base rate includes 500 cubic feet (cf) of water use each month.

(3) Non-Single Family customers include commercial, industrial, and irrigation.

CITY OF DuPONT
WASHINGTON

RESOLUTION NO. 17-530

A RESOLUTION OF THE CITY OF DuPONT, WASHINGTON, ADOPTING AN AMENDED FEE SCHEDULE.

WHEREAS, the purpose of the Fee Schedule is to provide accurate fees payable for services provided by the City of DuPont departments and agencies; and

WHEREAS, DuPont Municipal Code 2.04.010 authorizes the governing body of the City of DuPont to adopt a fee schedule for the City of DuPont government;

WHEREAS, the City Council finds that it is in the public interest to adopt the amended Fee Schedule, attached hereto as Exhibit A.

NOW THEREFORE, BE IT RESOLVED by the City of DuPont:

Section 1. The City Council hereby adopts by resolution the amended Fee Schedule attached hereto as Exhibit A.

ADOPTED BY THE DuPONT CITY COUNCIL AT A REGULAR MEETING THEREOF ON THE 26 DAY OF SEPTEMBER, 2017.

CITY OF DuPONT

Michael P. Courts, Mayor

ATTEST/AUTHENTICATED:

Karri Muir, CMC, City Clerk

Approved as to Form:

Gordon P. Karg, City Attorney

Filed with the City Clerk: 9/26/17
Passed by the City Council: 9/26/17
Resolution No.: 17-530

ADMINISTRATION & FINANCE:

Admissions Tax License	$10.00
Animals	
Administrative Fee-Dangerous or Potentially Dangerous Dog Hearing	$25.00
Appeal Hearing Fee-Dangerous or Potentially Dangerous Dog Hearing	$75.00
Pet License dogs (neutered)	$20.00
Pet License cats (neutered)	$12.00
Pet License dogs (non-neutered)	$60.00
Pet License cats (non-neutered)	$60.00
Pet License – Late Fee (30 to 59 days)	$10.00
Pet License – Late Fee (60 + days)	$20.00
Pet License Replacement Tag	$5.00
Registration Fee (Initial)-Dog Declared Dangerous	$250.00
Registration Fee (Annual)-Dog Declared Dangerous	$50.00
Registration Fee (initial)-Dog Declared Potentially Dangerous	$100.00
Registration Fee (Annual)-Dog Declared Potentially Dangerous	$50.00
Business Licenses	
Cabaret	$100.00
Cabaret – 24 hours	$5.00
Business License (DuPont Home Occupation 1st year)	$75.00
Business License (DuPont Home Occupation Renewal)	$20.00
Business License (DuPont Home Occupation less than $10,000 income)	$20.00
Business License (General 0-24 Employees)	$75.00
Business License (General 25-99 Employees)	$300.00
Business License (General 100 or more Employees)	$500.00
Business License (Peddling or Hawking)	$15.00
Business License (Residential Rental 1 Unit)	$75.00

Business License (Residential Rental 2-4 Units)	$100.00
Business License (Residential Rental 5-24 Units)	$200.00
Business License (Residential Rental 25 or more Units)	$1,000.00
Business License (Temporary – 24 hours)	$5.00
Gambling License	$10.00
Invoice Processing Fee for reimbursable expenses	$100 or 10% of Outside Consultant Fees (Min. $10.00)
Non-Sufficient Fund or Returned Checks	$35.00
Notary Services (Residents)	$5.00
Notary Services (Non-Residents)	$10.00
Power Source Connection Daily Usage (<10 Connections)	$5.00
Power Source Connection Daily Usage (>10 Connections)	$25.00
Power Source Connection Permit Fee (<10 connections)	$20.00
Power Source Connection Permit Fee (>10 connections)	$30.00
Scanning Fee (per page)	$0.15

RECORDS:

Copies (per side)	$0.15
Copies (greater than 11x17")	$9.00/Sheet
Copies- Color (per side)	$0.15
Copies – Color (greater than 11x17)	$12.00 / sheet
Faxing (per page)	$0.25
Scanned Electronic Documents	$0.10 per page
Electronic files or attachments sent via electronic delivery	$0.05 per four or more files/attachments
Public documents/records transmitted in an electronic format	$0.10 per gigabyte
Compact Disc	$1.00 per disc
Envelope for delivery of public documents/records	
Postage for delivery of public documents/records	

BUILDING:

Building Code Council (pursuant to 51-50WAC)	$4.50
Building Permit Fees (Total Valuation[1] Fees)	
Permit (total valuation $1 to $2,000)	$96.00

Permit (total valuation $2,001 to $25,000)	$96.00 for first $2,000 + $20.15 for each additional $1,000 or fraction thereof
Permit (total valuation $25,001 to $50,000)	$559.45for first $25,000 + $14.50 for each additional $1,000 or fraction thereof
Permit (total valuation $50,001 to $100,000)	$921.95 for first $50,000 + $10.00 for each additional $1,000 or fraction thereof
Permit (total valuation $100,001 to $500,000)	$1,421.95 for first $100,000 + $8.00 for each additional $1,000 or fraction thereof
Permit (total valuation $500,001 to $1,000,000)	$4,621.95 for first $500,000 + $6.80 for each additional $1,000 or fraction thereof
Permit (total valuation $1,000,001 and up)	$8,021.95 for first $1,000,000 + $5.25 for each additional $1,000 or fraction thereof
Building Permit Fees: Misc. Permits[2]	$30 Administration Fee + Inspection Fees (Hours to be determined by Building Official)
Building Plan Review Fee	75% of building permit fee
Consultant Fees	Actual Costs** + 10% for overhead
Energy Code Plan Check (Residential)	$60.00
Energy Code Plan Check (Residential Addition)	$45.00
Energy Code Plan Check (New Non-Residential)	$150.00
Energy Code Plan Check (Non-Residential Addition)	$100.00
Grading Permit Fees Volume of grading quantities used in calculating the permit fee shall be the combined total of cut, fill, and strippings.	
50 cubic yards or less	$23.50
51 to 100 cubic yards	$37.00
101 to 1,000 cubic yards	$37.00 for the first 100 cubic yards + $17.50 for each additional 100 cubic yards or fraction thereof
1,001 to 10,000 cubic yards	$194.50 for the first 1,000 cubic yards + $14.50 for each additional

	1,000 cubic yards or fraction thereof
10,001 to 100,000 cubic yards	$325.00 for the first 100,000 + $66.00 for each additional 10,000 cubic yards or fraction thereof
100,001 cubic yards or more	$919.00 for the first 100,000 + $36.50 for each additional 10,000 cubic yards or fraction thereof

(Note: Grading Permit and Plan Review fees shall additionally include any consultant fees incurred by the City in administering the permit.)

Grading Permit Plan Review Fees
Volume of grading quantities used in calculating the grading plan review fee shall be the larger of the cut (including strippings) or fill quantities.

50 cubic yards or less	No fee
51 to 100 cubic yards	$23.50
101 to 1,000 cubic yards	$37.00
1,001 to 10,000 cubic yards	$49.25
10,001 to 100,000 cubic yards	$49.25 for the first 10,000 cubic yards + $24.50 for each additional 10,000 cubic yards or fraction thereof
100,001 to 200,000 cubic yards	$269.75 for the first 100,000 cubic yards + $13.25 for each additional 10,000 cubic yards or fraction thereof
200,001 cubic yards or more	$402.25 for the first 200,000 cubic yards + $7.25 for each additional 10,000 cubic yards or fraction thereof
Additional plan review required by changes, additions, or revisions to approved grading plans (Min. ½ hr)	$50.50/hour*
Inspection - After Hours (Min. 2-hrs)	$61.00/hr*/per person
Inspection– Other (Min. ½ hr)	$47.00/hr*/per person
Inspection – Re-Inspect	$47.00/hr*/per person
Mechanical Permit Fee (Commercial)	$15/fixture[3] + $30 filing fee
Mechanical Permit Fee (Residential)	$10/fixture[3] + $30 filing fee
Mechanical Plan Review Fee (Commercial)	75% of Mechanical Permit Fee
Plumbing Permit Fee (Commercial)	$15/fixture[4] + $30 filing fee

Plumbing Permit Fee (Residential)	$10/fixture[4]+ $30 filing fee
Plumbing Plan Review Fee (Commercial)	75% of Plumbing Permit Fee
Plan Review Additional changes, revisions, etc. (Min. ½ Hr)	$47.00/hr*
Spa/Hot Tub Permit/Swimming Pool (SFD*** Only[5])	$47.00
Spa/Hot Tub/Swimming Pool[5] Permit (Other)	refer to Building Permit total valuation[1] fees
Temporary Certificate of Occupancy	$200.00
Demolition Residential	$58
Demolition (Commercial/Industrial)	refer to Building Permit total valuation[1] fees
Re-Roof (Residential)	$58
Re-Roof (Commercial / Industrial)	refer to Building Permit total valuation[1] fees
After-the-fact Permit	3 x plan check & permit fee

* or total cost to the jurisdiction ,whichever is greater

**Include administrative and overhead costs

***Single Family Dwelling

[1]Total Valuation is defined as the total value of work for which the permit is being issued, such as all electrical, gas, mechanical, and plumbing equipment and other permanent systems, and including all materials, finish work, and labor. The Total Valuation shall be the higher of the applicant's contract costs or the cost as determined by the Building Official in accordance with nationally accepted industry standards utilizing such tools as the "Square Foot Construction Costs" multiplier identified in the most current edition of the Building Safety Journal published by the International Code Council (ICC), BNI Construction Cost Book or the Building Construction Cost Data by R.S. Means.

[2] Misc. Permits: Re-Roof, Fences, Guards, Walls, etc.

[3]. Appliance or piece of equipment regulated by Chapter 51-52 WAC (most current edition).

[4] Plumbing Fixtures or appurtenance to a plumbing system regulated by Chapters 51-56 and 51-57 WAC (most current edition).

[5] Pools, Spas, and Hot Tubs as regulated by Chapter 51-51 WAC (most current edition).

FIRE:

Emergency Response, Events Coverage and Standby Fees - Personnel

Fire Chief	$60.00/hr
Captain – Regular Time	$48.00/hr
Captain - Overtime	$72.00/hr
Firefighter/EMT or Fire Prevention Specialist – Regular Time	$40.00/hr
Firefighter/EMT or Fire Prevention Specialist – Overtime	$60.00/hr
Reserve Firefighter/EMT	$6.21/hr

Emergency Response and Standby Fees - Apparatus/Equipment

Air Unit	$35.00/hr
Ambulance	$60.73/hr
Engine	$130.00/hr
Equipment Damaged	Actual Costs to Replace
Fire Prevention Trailer/Mobile Command	$25.00/hr
Staff Vehicle	$19.00/hr

Administration Fees

Application Fee - Fire Department Employment	$30
Bike Helmets	$8
Multi-purpose Helmet	$11
Ski and snow boarding helmets	$15
CPR/ First Aid Classes per attendee - early registration	$30.00
CPR/ First Aid Classes per attendee Late Registration (within 10 days of class)	$40.00
Negligent Alarm	Use Emergency Response Fees

Nuisance Alarm (more than three false alarms within one year)	$100.00 per incident
Plan Review Resubmittal (second or subsequent time)	50% of Original Fee
Reinspection (second or subsequent time)	50% of Original Fee
Work Without Permits	25% plus Original Fee
Work Without Permits (second time in one year)	100% plus Original Fee
Expedite Plan Review	50% plus Original Fee
Consultant Fee	Actual Costs
Appeal of Fire Code Requirements	$66/hr due prior to appeal hearing
Technical Report Review	$224
After Hour Inspection	$66/hr due prior to inspection
Ambulance Transport Rates	
Basic Life Support	$600.00
Advanced Life Support	$850.00
Mileage	$18.00 per mile
Fire Department Plan Review Fees (Required at time of submission)	
Planning	
Review of Professional Studies	See Technical Report Review
Street Standards Variance	$66/hr - one hour minimum
Temporary Use	$66/hr - one hour minimum
Type I or II Procedure	$66/hr - one hour minimum
Type I or II Decision Appeal (Fire Related)	$66/hr - one hour minimum
Type III Procedure	$66/hr - one hour minimum
Type IV Procedure	$66/hr - one hour minimum
Type V Procedure	$66/hr - one hour minimum
Environmental Impact Statement	$66/hr - one hour minimum

Site Plan Review	$66/hr - one hour minimum
New Construction Projects (Building Permit Review)	
Commercial, Industrial, Multi-Family	
0-10,000 Square Feet	$132
10,001 - 50,000 Square Feet	$198
50,001 - 100,000 Square Feet	$264
For each 50,000 Square Feet Above 100,000	$66
Tenant Improvements (Building Permit Review)	
Commercial, Industrial, Multi-Family	
0-10,000 Square Feet	$66
10,001 - 50,000 Square Feet	$132
50,001 - 100,000 Square Feet	$198
For each 50,000 Square Feet Above 100,000	$66
NFPA 13 Fire Sprinkler Systems	
Commercial and Industrial Buildings	
0-10,000 Square Feet	$132
10,001 - 50,000 Square Feet	$165
50,001 - 100,000 Square Feet	$198
For each 50,000 Square Feet Above 100,000	$66
NFPA 13R and 13D Fire Sprinkler Systems	
Multi-Family and Single Family	
0-10,000 Square Feet	$99
10,001 - 50,000 Square Feet	$132
50,001 - 100,000 Square Feet	$198
For each 50,000 Square Feet Above 100,000	$66

NFPA 13/13R Fire Sprinkler System Tenant Improvement	
Minor less than 15 fire sprinkler heads	$33
Major 16 to 30 fire sprinkler heads	$66
Above 30 fire sprinkler heads charged as NFPA 13 Fire Sprinkler System	See NFPA 13/13R Fees above
NFPA 14 Standpipe Systems	
Commercial, Industrial, and Multi-Family	
0-10,000 Square Feet	$132
10,001 - 50,000 Square Feet	$165
50,001 - 100,000 Square Feet	$198
For each 50,000 Square Feet Above 100,000	$66
NFPA 20 Fire Pumps	
0-10,000 Square Feet	$132
10,001 - 50,000 Square Feet	$165
50,001 - 100,000 Square Feet	$198
For each 50,000 Square Feet Above 100,000	$66
NFPA 24/13 Underground Fire Service Mains	
Commercial, Industrial, Multi-Family	
0-10,000 Square Feet	$99
10,001 - 50,000 Square Feet	$132
50,001 - 100,000 Square Feet	$165
For each 50,000 Square Feet Above 100,000	$66
NFPA 72 Fire Alarm System	
Commercial, Industrial, Multi-Family	
0-10,000 Square Feet	$99
10,001 - 50,000 Square Feet	$132

50,001 - 100,000 Square Feet	$165
For each 50,000 Square Feet Above 100,000	$66
NFPA 72 Fire Alarm Tenant Improvement	
Commercial, Industrial, Multi-Family	
Minor less than 15 fire alarm appliances	$66
Major 16 to 30 fire alarm appliances	$99
Above 30 fire alarm appliances charged as NFPA 72 Fire Alarm Systems	See NFPA 72 charges above
NFPA 96/17 Fixed Fire Suppression System	
Fixed Fire Suppression System	$99
Class I Hood and Duct System	$99
Other Specialty Fixed Suppression System (FM, etc)	$132
Tenant Improvement of Fixed Fire Suppression Systems	$66
Smoke Removal System	
0-10,000 Square Feet	$165
10,001 - 50,000 Square Feet	$199
50,001 - 100,000 Square Feet	$284
For each 50,000 Square Feet Above 100,000	$66
Flammable and Combustible Liquids	
Underground Storage Tank Installation	$132
Aboveground Storage Tank Installation	$132
Removal of Underground or Aboveground Storage Tanks	$66
Pipeline and Appurtenances	$66

Fire Department Inspection Fees (Required at time of Plan Submission)

New Construction Projects	
Commercial, Industrial, Multi-Family	
0-10,000 Square Feet	$132
10,001 - 50,000 Square Feet	$199
50,001 - 100,000 Square Feet	$264
For each 50,000 Square Feet Above 100,000	$66
Tenant Improvements	
Commercial, Industrial, Multi-Family	
0-10,000 Square Feet	$66
10,001 - 50,000 Square Feet	$99
50,001 - 100,000 Square Feet	$132
For each 50,000 Square Feet Above 100,000	$66
NFPA 13 Fire Sprinkler Systems	
Commercial and Industrial Buildings	
0-10,000 Square Feet	$132
10,001 - 50,000 Square Feet	$199
50,001 - 100,000 Square Feet	$264
For each 50,000 Square Feet Above 100,000	$66
NFPA 13R and 13D Fire Sprinkler Systems	
Multi-Family and Single Family	
0-10,000 Square Feet	$132
10,001 - 50,000 Square Feet	$199
50,001 - 100,000 Square Feet	$264
For each 50,000 Square Feet Above 100,000	$66
NFPA 13/13R Fire Sprinkler System Tenant Improvement	
Minor less than 15 fire sprinkler heads	$66

Major 16 to 30 fire sprinkler heads	$99
Above 30 fire sprinkler heads charged as NFPA 13 Fire Sprinkler System	See NFPA 13/13R Inspection Fees
NFPA 14 Standpipe Systems	
Commercial, Industrial, and Multi-Family	
0-10,000 Square Feet	$132
10,001 - 50,000 Square Feet	$199
50,001 - 100,000 Square Feet	$264
For each 50,000 Square Feet Above 100,000	$66
NFPA 20 Fire Pumps	
0-10,000 Square Feet	$132
10,001 - 50,000 Square Feet	$199
50,001 - 100,000 Square Feet	$264
For each 50,000 Square Feet Above 100,000	$66
NFPA 24/13 Underground Fire Service Mains	
Commercial, Industrial, Multi-Family	
0-10,000 Square Feet	$132
10,001 - 50,000 Square Feet	$199
50,001 - 100,000 Square Feet	$264
For each 50,000 Square Feet Above 100,000	$66
NFPA 72 Fire Alarm System	
Commercial, Industrial, Multi-Family	
0-10,000 Square Feet	$132
10,001 - 50,000 Square Feet	$199
50,001 - 100,000 Square Feet	$264
For each 50,000 Square Feet Above 100,000	$66

NFPA 72 Fire Alarm Tenant Improvement	
Commercial, Industrial, Multi-Family	
Minor less than 15 fire alarm appliances	$66
Major 16 to 30 fire alarm appliances	$99
Above 30 fire alarm appliances charged as NFPA 72 Fire Alarm Systems	See NFPA 72 Inspection Fees
NFPA 96/17 Fixed Fire Suppression System	
Fixed Fire Suppression System	$66
Class I Hood and Duct System	$66
Other Specialty Fixed Suppression System (FM, etc)	$99
Tenant Improvement of Fixed Fire Suppression Systems	$66
Smoke Removal System	
0-10,000 Square Feet	$132
10,001 - 50,000 Square Feet	$199
50,001 - 100,000 Square Feet	$264
For each 50,000 Square Feet Above 100,000	$66
Flammable and Combustible Liquids	
Underground Storage Tank Installation	$66 per tank
Aboveground Storage Tank Installation	$66 per tank
Removal of Underground or Aboveground Storage Tanks	$99 per tank
Pipeline and Appurtenances	$66 per tank
Annual Fire Inspection for Existing Occupancies	
0-1,000 Square Feet	$30.00 Plus Permits, if any
1,001 - 2,000 Square Feet	$40.00 Plus Permits, if any
2,001 - 3,000 Square Feet	$50.00 Plus Permits, if any
3,001 - 4,000 Square Feet	$60.00 Plus Permits, if any

4,001 - 5,000 Square Feet	$70.00 Plus Permits, if any
5,001 to 6,000 Square Feet	$80.00 Plus Permits, if any
6,001 - 7,000 Square Feet	$90.00 Plus Permits, if any
7,001 - 8,000 Square Feet	$100.00 Plus Permits, if any
8,001 - 9,000 Square Feet	$110.00 Plus Permits, if any
9,001 - 10,000 Square Feet	$120.00 Plus Permits, if any
10,001 - 20,000 Square Feet	$150.00 Plus Permits, if any
20,001 - 30,000 Square Feet	$180.00 Plus Permits, if any
30,001 - 40,000 Square Feet	$210.00 Plus Permits, if any
40,001 - 50,000 Square Feet	$240.00 Plus Permits, if any
50,001 - 100,000 Square Feet	$270.00 Plus Permits, if any
100,001 and above	$300.00 Plus Permits, if any
International Fire Code Permits (IFC Section 105.6)	
Aerosol Products	$100
Battery Systems	$100
Carnivals and Fairs	$100 plus standby fees if any
Cellulose Nitrate Film	$100
Combustible Dust-Producing Operations	$150
Combustible Fibers	$150
Compressed Gases	$100
Cryogenic Fluids	$100
Cutting and Welding	$29
Dry Cleaning Plants	$100
Exhibits and Trade Shows	
0-100 people	$100
101-above people	$150

Explosives	$150
Fire Hydrants and Valves	$29
Flammable and Combustible Liquids	$100
Floor Finishing	$100
Fumigation and Thermal Insecticidal Fogging	$100
Hazardous Materials	$500 annually
HPM Facilities	$500 annually
High Piled Combustible Storage	$500 annually
Hot Work Operations	$29
Industrial Ovens	$100
Lumber Yards and Wood Working Plants	$100
Liquid - or Gas-Fueled Vehicles or Equipment in Assembly Buildings	$29
LP Gas	$100
Magnesium	$150
Miscellaneous Combustible Storage	$100
Open Burning	$15
Open Flames and Torches	$29
Open Flames and Candles	$29
Organic Coatings	$100
Places of Assembly	$100
Private Fire Hydrants	$29
Pyrotechnic Special Effects Material	$100
Pyroxylin Plastics	$150
Refrigeration Equipment	$100
Repair Garages and Motor Fueling-dispensing Facilities	$100

Spraying and Dipping	$150
Storage of Tires and Tire Byproducts	$200
Temporary Membrane Structures, Tents and Canopies	$29 per structure, tent & canopy
Tire-Rebuilding Plants	$500
Waste Handling	$100
Wood Products	$100

PLANNING:

Annexation	$500.00
Developer Agreement	$1200
Home Occupation	$100.00
Home Occupation Address Change	$25.00
Residential plot plan review	$50/lot
Review of Professional Studies	$750 + Consultant Cost + 10 overhead
Right of way (street) vacation	$4,000.00
Sign Permit Application	$100.00
Sign Permit Application (Temporary)	$25.00
Street Standards Variance	$750.00 + Consultant Cost + 10 overhead
Temporary use	$100.00
Type I or Type II Procedure	$1,500.00+Consultant Cost + 10 overhead
Type I and Type II Decision Appeal	$1,500.00+Consultant Cost + Hearing Examiner Cost + 10% overhead
Type III Procedure	$3,000.00+Consultant Cost + Hearing Examiner Cost + 10% overhead
Type IV Procedure	$4,000.00+Consultant Cost + Hearing Examiner Cost + 10% overhead
Type V Procedure	$5,000.00+Consultant Cost + Hearing Examiner Cost + 10% overhead
Shoreline Exemption letter	$350

Environmental Review & Determination (use of consultant)	$750 + Consultant Cost & 10% overhead
Environmental Impact Statement	$3,000.00+Consultant & 10% overhead
Recording Fees	Cost of Recording with Pierce County + 10% + $75 for staff cost
GIS FEES (Maps)	
Color Copy of Existing 8.5 x 11	$1.00
Color Copy of Existing 11 x 17	$1.50
Color Copy of Existing 20 x 20	$10.00
Color Copy of Existing 34 x 56	$20.00
Other	$70 Per Hour
Data Development to CD Media*	$70 Per Hour
GIS Data Coverage	$150 Per Coverage

* Prior to initiating any work a deposit of $150 shall be required before data is released

POLICE:

Alarm Permit	$50.00
Background Record Check	$10.00
Impounded Vehicle Release Fee	$100.00
Personnel:	
Police Officer (per hour - Regular)	$40.00/hr
Police Officer (per hour – Overtime)	$60.00/hr
Police Sergeant (per hour - Regular)	$50.00/hr
Police Sergeant (per hour - Overtime)	$75.00/hr
Police Lieutenant (per hour – Regular)	$52.00/hr
Police Lieutenant (per hour – Overtime)	$78.00/hr
Police Chief	$60.00/hr

PUBLIC WORKS:

Call-Out Charge	$300.00
Personnel:	
Facility Attendant	$15.00/ hour
Maintenance Worker – Regular Time	$37.00/hr
Maintenance Worker – Overtime	$55.00/hr

Public Works Analyst – Regular Time	$32.00/hr
Public Works Anlayst – Overtime	$48.00/hr
Parks & Recreation Coordinator – Regular Time	$31.00/hr
Parks & Recreation Coordinator – Overtime	$47.00/hr
Tourism/Museum Coordinator – Regular Time	$25.00/hr
Tourism/Museum Coordinator – Overtime	$38.00/hr

Community Center and Civic Center Reservation/Use Rental Fees:

Training, meetings, activities or programs

Community Center Meeting Room Rentals (Resident)	
Large Meeting Room Rental Fee (up to two hours)	$80.00
Rental Fee for each additional hour thereafter	$40.00 per hour
Small Meeting Room Rental Fee (up to two hours)	$20.00
Rental Fee for each additional hour thereafter	$10.00 per hour
Community Center Meeting Room Rentals (Non-Resident)	
Large Meeting Room Rental Fee (up to two hours)	$96.00
Rental Fee for each additional hour thereafter	$48.00 per hour
Small Meeting Room Rental Fee (up to two hours)	$24.00
Rental Fee for each additional hour thereafter	$12.00 per hour
Civic Center Council Chambers/EOC (Resident) Minimum of two hours	$75 per hour
Civic Center Council Chambers/EOC (Non Resident) Minimum of two hours	$90 per hour
Damage and Clean-up Deposits (Refundable)	
Large Meeting Room	$200.00
Small Meeting Room	$50.00
(Larger deposits may be required if deemed necessary for a specific use)	
Key Deposit – per key (Refundable)	$15.00 per key
Kitchen Use Rental Fee	$50.00 flat rate
(Kitchen use available with large meeting room rental only)	
Tables and Chairs Rental Fee for use at Community Center –	$60.00 flat rate
Rental fee provides for the following for a large meeting room:	

Up to 9 - 72" round tables with 8 chairs per table; OR Up to 8 - 96" rectangular tables with 8 chairs per table	
60" Round Table Rental Fee for Outside Community Center	$10 per table
Chair Rental Fee for Outside Community Center	$1.25 per chair
Delivery and Pick Up of Rental Tables and Chairs Outside Community Center – *Note delivery can only be made inside the City of DuPont limits.* *NOTE – Small meeting room rental fee includes 2 rectangular tables and 12 chairs*	$200 flat fee
Other Facility Rental Charges - Community Center/Civic Center/Parks Facility Use Fees – Alcohol Related *(Note – all City requirements for serving alcohol at City-owned facilities must be met)*	
Alcohol Fee (additional fee required to serve alcohol)	$50.00
Alcohol-Related Deposit (additional deposit required - refundable)	$200.00

Park Facility Reservation/Use Rental Fees:

Clocktower Stage Rental (DuPont Resident)	$75.00 per hour
Clocktower Stage Rental (Non-Resident)	$100.00 per hour
Clocktower Stage Rental Deposit	$200.00
Park Facility Reservation/Use Rental (DuPont Resident)	$36.00, 4-hr rental
Additional hours beyond 4- hour minimum (Resident)	$9.00/ add'l hour
Park Facility Reservation/Use Rental (Non-Resident)	$52.00, 4-hr rental
Additional hours beyond 4-hour minimum (Non-resident)	$13.00/ add'l hour
Minimum Security Deposit for Park Facility Use	$50.00 deposit
Discount for Non-profit Organizations	10% discount
Special Event Permit	$75.00 plus any inspection fees
Sports Field Hourly Reservation/Use Rates	
Youth/Practice (Resident Team or Group)	$4.00/hour
Youth/Practice (Non-resident Team or Group)	$5.00/hour
Youth/Games (Resident Team or Group)	$4.00/hour
Youth/Games (Non-resident Team or Group)	$5.00/hour
Adult/Practice (Resident Team or Group)	$5.75/hour

Adult/Practice (Non-resident Team or Group)	$5.75/hour
Adult/Games (Resident Team or Group)	$5.75/hour
Adult/Games (Non-resident Team or Group)	$5.75/hour
Tournament/Camps (Resident Team or Group)	$15.00/hour
Tournament/Camps (Non-resident Team or Group)	$15.00/hour
Fundraising/Non-profit Event (Resident Team or Group)	$15.00/hour
Fundraising/Non-profit Event (Non-resident Team/Group)	$15.00/hour
Minimum Security Deposit for Field Reservation/Use	$100.00 deposit
Tent (60X40) Rental	$1200
Refundable Damage Deposit	$500.00

UTILITY FEES:

Stormwater System Development (SDC) Charge	$1,000.00 per Equivalent Residential Unit (ERU)
Water Hydrant Meter Permit	$50.00
Water Hydrant Meter Deposit	$1,000.00
Water Meter Connection (3/4" or smaller)	$400.00
Water Meter Connection (1")	$440.00
Water Meter Connection (1 1/2")	$1,445.00
Water Meter Connection (1 1/2" Fire Service)	$1,020.00
Water Meter Connection (2" Fire Service)	$1,170.00
Water Meter Connection (2")	$1,635.00
Water Meter Connection (larger than 2")	Actual cost of meter & installation + 15%
Water Meter Connection (contractor installed)	$245.00
Water Permit New Meter (Commercial)	$135.00
Water Permit New Meter (Residential)	$100.00

Water System Development (SDC) Charge

Water System Development Charge (SDC)		
Meter Size	**SDC [1]**	**Meter Equiv.**
Single Family	$ 2,888.00	1.00
Non-Single Family		
3/4"	$ 2,888.00	1.00
1"	$ 4,822.96	1.67
1 1/2"	$ 9,617.04	3.33
2"	$ 15,393.04	5.33
3"	$ 30,814.96	10.67
4"	$ 48,142.96	16.67
6"	$ 96,257.04	33.33
8"	$ 154,017.04	53.33
10"	$ 279,182.96	96.67

SDC Area



APPENDIX F

MONITORING SCHEDULES AND PLANS

Helpful Hints

- Good sample collection technique can reduce the possibility of having a total coliform-present sample.
- Make sure to collect every routine and repeat sample.
- Find and fix any sanitary defects as soon as you are aware of them.
- Remember to send us your completed Level 1 and Level 2 assessment documentation.
- If you are a seasonal water system, remember to follow your start-up procedure before providing water to the public at the beginning of each new season.

For more information

Call our regional office:

Eastern Region: Spokane Valley
509-329-2100

Northwest Region: Kent
253-395-6750

Southwest Region: Tumwater
360-236-3030

You can also visit our website at www.doh.wa.gov/CommunityandEnvironment/DrinkingWater

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

DOH PUB #331-556
December 2015

If you need this publication in an alternative format, call 800.525.0127 (TDD/TTY call 711). This and other publications are available at www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/PublicationsandForms.



Revised Total Coliform Rule

The **Revised Total Coliform Rule (RTCR)** will replace the Total Coliform Rule on April 1, 2016. EPA expects the RTCR to protect public health better by requiring systems vulnerable to microbial contamination to "find and fix" problems that allow contamination to enter a water system.

We have always required water systems to look for any maintenance or operational defects that could allow contamination to enter a system. RTCR formalizes the process and requires water systems to submit a water system assessment report to us any time they have total coliform-present sample results.

RTCR Introduces the *E. coli* MCL

RTCR calls the acute Maximum Contaminant Level (MCL) an "*E. coli* MCL." An *E. coli* MCL violation can occur four ways:

- 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*.
- New. A system fails to take 3 repeat samples following an *E. coli*-present routine sample.

Required Routine Monitoring

Water systems will continue to collect the same number of routine samples at the same frequency as they do now. See your Water Facilities Inventory (WFI) form for your system's monitoring schedule.

RTCR requires all water systems to collect 3 repeat samples for every total coliform-present routine sample. Systems that collect 1 sample a month will collect 3 repeats instead of 4. Systems that collect 2 or more routine samples will continue to collect 3 repeats. If a system fails to collect 3 repeat samples for every total coliform-present routine sample, RTCR will require it to conduct a water system assessment.

RTCR does not allow any system to use a source sample as both a repeat sample and a groundwater source sample. Instead, it will require all systems to collect a raw water sample from each groundwater source that was in use on the day they collected the routine sample.

RTCR requires water systems to collect their normal number of routine samples the month after a total coliform-present routine sample. Systems that serve 4,100 or fewer people no longer have to collect 5 routine samples.

"Sanitary Defects" and "Defects"

RTCR distinguishes between "sanitary defects" and "defects." Either might cause a total coliform-present sample, which triggers the assessment requirement.

Sanitary defect: A pathway for contaminants to enter the water system or the failure or imminent failure of an existing barrier.

Defect: An issue identified during an assessment that could have caused total coliform-present samples, such as using an improper sample collection technique.

Assessment Elements

Evaluate anything that might affect water quality in the distribution system, or indicate that quality is impaired, such as:

- *Atypical events.*
- *Changes in distribution system operation and maintenance, including water storage.*
- *Source and treatment considerations.*
- *Existing water quality data.*
- *Inadequate sample sites, sample protocols, or sample processing.*
- *Others, depending on the size and complexity of the system.*

Treatment Techniques Trigger Assessments

A treatment technique trigger is a situation that requires a water system to take action. RTCR requires water systems to conduct an assessment to "find and fix" any sanitary defects whenever a treatment technique trigger occurs. There are two assessment levels. Both evaluate the entire system from the sample collection point to the source of supply.

You can anticipate that a treatment technique trigger might occur any time you collect routine and repeat samples. Therefore, you should be ready to start a system evaluation as soon as the lab notifies you of total coliform-present results, which trigger the assessment requirement.

Don't wait to hear from us. You must complete a Level 1 and Level 2 assessment within 30 days after the treatment trigger occurs.

Level 1 Assessment

A basic water system evaluation an owner, manager, or other knowledgeable person can do. A Level 1 treatment technique trigger occurs any time a water system:

- Collects fewer than 40 routine samples a month and has 2 or more total coliform-present results the same month.
- Collects 40 or more routine samples a month and has total coliform-present results in more than 5 percent of its routine and repeat samples.
- Fails to collect 3 repeats for every total coliform-present routine sample.

Level 2 Assessment

A complex evaluation that only a person with state-required qualifications can do. A Level 2 treatment technique trigger occurs when a water system has

- An *E. coli* MCL violation.
- A second Level 1 treatment technique trigger within a rolling 12-month period.



Water samples under black light. The positive sample fluoresces.

Seasonal Water Systems

RTCR recognizes a new noncommunity seasonal water system. RTCR's seasonal system doesn't operate year-round, totally depressurizes the water lines at the end of each operating season, and has at least one month when it serves no people

Complete system shutdown creates opportunities for contamination to enter or spread through the distribution system. Therefore, all seasonal water systems must:

- Have a state-approved start-up procedure by March 31, 2016.
- Follow the procedure before opening for the season each year.
- Send us a certificate declaring that they followed the procedure before serving water to the public.

Failure to do so is a treatment technique violation, which requires public notification to water system customers.



Treatment Technique Violations

RTCR requires public notification within 30 days when a:

- Water system fails to conduct a required Level 1 or Level 2 assessment within 30 days of learning about the treatment technique trigger.
- Water system fails to correct a sanitary defect identified in a Level 1 or Level 2 assessment within 30 days of learning about the treatment technique trigger.
- Seasonal system fails to complete state-approved startup procedures before providing water to customers.

Monitoring Violations

- A water system fails to collect every routine sample.
- A lab fails to test a total coliform-present routine sample for *E. coli*.

Reporting Violations

- Water system fails to submit a monitoring report or completed assessment report in a timely manner.
- Water system fails to notify us of an *E. coli*-present sample in a timely manner.
- Seasonal system fails to submit certification of completion of approved start-up procedure.

Coliform Monitoring Plan for: City of DuPont, Pierce County, Washington

A. System Information

Plan Date: 2018

Water System Name DuPont Water System City of	**County** Pierce	**System I.D. Number** 20500P
Name of Plan Preparer Karl Johnson	**Position** Consultant	**Daytime Phone** **360-292-7481**
Sources: DOH Source Number, Source Name, Well Depth, Pumping Capacity	S01, Village Wells 1 and 2, Wellfield, inactive S02, 26050Q/JBLM Fort Lewis, Intertie, emergency only S03, Well 1 Bell Hill, 300', 1,000 gpm S04, Well 2 Bell Hill, 516', 1,000 gpm S05, Well 1 Hoffman Hill, 497', 1,100 gpm S06, Well 3 Bell Hill, 282.5', 1,000 gpm S07, Village Well 1, Inactive S08, Village Well 2, Inactive S09, Well 2 Hoffman Hill, 375', 1,100 gpm	
Storage: List and Describe	Bell Hill Reservoir, 1.01 MG, OF 273.75' Hoffman Hill Reservoir, 3.53 MG, OF 401.5'	
Treatment: Source Number & Process	All Sources chlorinated	
Pressure Zones: Number and name	1. 400' Pressure Zone 2. 530' Pressure Zone	
Population by Pressure Zone	1. 400': 6,891 2. 530': 2,824	
Number of Routine Samples Required Monthly by Regulation:		10
Number of Sample Sites Needed to Represent the Distribution System:		36
***Request DOH Approval of Triggered Source Monitoring Plan?**		**Yes** ☐ **No** ☒

*If approval is requested a fee will be charged for the review.

B. Laboratory Information

Laboratory Name Water Management Labs	**Office Phone 253-531-3121** **After Hours Phone 253-841-0732**
Address 1515 80th Street E., Tacoma, WA 98404	**Cell Phone 253-312-1651** **Email** customerservice@watermanagementlabs.com
Hours of Operation Mon. - Fri.: 8:00 AM - 5:00 PM Saturday: 8:00 AM-12:00 PM Sunday: Closed	
Contact Name Jeff Bertsch	
Emergency Laboratory Name Dragon Analytical Laboratory	**Office Phone 360-866-0543** **After Hours Phone - -**
Address 627 Durell Road SE, Suite B-105 Tumwater, WA 98501	**Cell Phone - -** **Email** info@dragonlaboratory.com
Hours of Operation 24 hour service available.	
Contact Name	

C. Wholesaling of Groundwater

	Yes	No
We are a consecutive system and purchase groundwater from another water system.	☐	☒
If yes, Water System Name: Contact Name: Telephone Numbers Office - - After Hours - -		
We sell groundwater to other public water systems.	☐	☒
If yes, Water System Name: Contact Name: Telephone Numbers Office - - After Hours - -		
If yes, Water System Name:		

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

Sample Sites List

Site ID	Sample Site Name	Sample Site Location (Nearest Address)
1	Williamson Place Sample Station	2725 Williamson Place
2	Mitchell Sample Station	2690 Mitchell Street
3	Manchester Sample Station	2500 Manchester Place
4	International Place Sample Station	3400 International Place
5	Glacier NW	4301 Pioneer Avenue
6	Creekside Sample Station	1680 Sequalitchew Drive
7	Amazon Sample Station	2700 Center Drive
8	Girl Scouts Sample Station	1000 Davis Place
9	Bell Hill Place Sample Station	1042 Bell Hill Place
10	El Rancho Madrona Sample Station	#2 Lapsley Drive
11	Wilmington Sample Station	1000 Wilmington Drive
12	Spencer Court Sample Station	1886 Spencer Court
13	Richmond Sample Station	1450 Richmond Court
14	McDonald Sample Station	1825 McDonald Avenue
15	Jiffy Lube Sample Station	1175 Center Drive
16	Clock Tower Sample Station	1055 McDonald Avenue
17	Center @ Bobs Hollow Sample Station	2200 block of Center Drive
18	Walker Sample Station	3147 Walker Road
19	Sinclair Sample Station	1302 Sinclair Drive
20	Ridgeview UPZ Sample Station	1865 Ridgeview Drive
21	Packwood Sample Station	1596 Packwood
22	Hoffman Hill Boulevard Sample Station	3600 Swan Loop
23	Grant Sample Station	1394 Grant Avenue
24	Foreman Road Sample Station	1392 Foreman Road
25	Burnside Sample Station	1260 Burnside Place
26	Brackenridge Sample Station	1550 Brackenridge
27	Wren Road Sample Station	1808 Wren Road
28	Wallace Sample Station	2299 Wallace Road
29	Ridgeview LPZ Sample Station	3088 Ridgeview Place
30	Jensen South Sample Station	2802 Jensen Avenue
31	Jensen Park Sample Station	1861 Jensen Avenue
32	Golf Course Sample Station	2380 Golf Course Road
33	Garry Oaks Sample Station	1901 Garry Oaks Avenue
34	Chief Leschi Sample Station	1755 Ridgeview Drive
35	Museum Sample Station	205 Barksdale
36	BBB Sample Station	1000 Station Drive
37	511 Barksdale Sample Station	511 Barksdale

Sample Schedule

January, April, July, October		February, May, August, November		March, June, September, December		Triggered Source Sample Sites **
Routine Sample Sites	Repeat Sample Sites	Routine Sample Sites	Repeat Sample Sites	Routine Sample Sites	Repeat Sample Sites	
3	1, 2, 3	1	1, 3, 8	4	1, 4, 5	All
5	3, 4, 5	2	2, 3, 7	6	6, 7, 17	All
9	8, 9, 36	7	2, 6, 7	8	1, 8, 9	All
15	11, 15, 16	12	12, 14, 16	10	10, 19, 22	All
17	14, 17, 27	13	11, 13, 14	11	11, 15, 36	All
19	10, 19, 26	16	11, 15, 16	14	12, 14, 17	All
21	18, 21, 25	20	18, 20, 29	18	18, 20, 21	All
22	10, 22, 19	23	24, 24, 34	27	17, 27, 28	All
24	23, 24, 34	25	12, 25, 29	29	20, 29, 32	All
28	28, 31, 33	26	19, 26, 34	30	28, 30, 31	All
32	29, 31, 32	31	28, 30, 31	34	20, 26, 34	All
35	35, 36, 37	33	27, 28, 33	37	35, 36, 37	All
		36	35, 36, 9			All

Note: Colors of sample site numbers in Sample Schedule table correspond to colors of sample sites in System Map.

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

Important Notes for Sample Collector:

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

No reduced triggered source monitoring requested.

F. Routine Sample Rotation Schedule

Month	Routine Site(s)	Month	Routine Site(s)
January	3, 5, 9, 15, 17, 19, 21, 22, 24, 28, 32, 35	July	3, 5, 9, 15, 17, 19, 21, 22, 24, 28, 32, 35
February	1, 2, 7, 12, 13, 16, 20, 23, 25, 26, 31, 33, 36	August	1, 2, 7, 12, 13, 16, 20, 23, 25, 26, 31, 33, 36
March	4, 6, 8, 10, 11, 14, 18, 27, 29, 30, 34, 37	September	4, 6, 8, 10, 11, 14, 18, 27, 29, 30, 34, 37
April	3, 5, 9, 15, 17, 19, 21, 22, 24, 28, 32, 35	October	3, 5, 9, 15, 17, 19, 21, 22, 24, 28, 32, 35
May	1, 2, 7, 12, 13, 16, 20, 23, 25, 26, 31, 33, 36	November	1, 2, 7, 12, 13, 16, 20, 23, 25, 26, 31, 33, 36
June	4, 6, 8, 10, 11, 14, 18, 27, 29, 30, 34, 37	December	4, 6, 8, 10, 11, 14, 18, 27, 29, 30, 34, 37

G. Level 1 and Level 2 Assessment Contact Information

Name Frederick D. Foreman	Office Phone 253-964-8121 After Hours Phone 253-377-4971
Address 1700 Civic Drive DuPont, WA 98327	Email FForeman@dupontwa.gov
Name Scott Hein	Office Phone 253-377-4626 After Hours Phone 253-912-5389
Address 1700 Civic Drive DuPont, WA 98327	Email SHein@dupontwa.gov

H. *E. coli*-Present Sample Response

Distribution System *E. coli* Response Checklist				
Background Information	**Yes**	**No**	**N/A**	**To Do List**
We inform staff members about activities within the distribution system that could affect water quality.	☐	☐	☐	☒
We document all water main breaks, construction & repair activities, and low pressure and outage incidents.	☐	☐	☐	☒
We can easily access and review documentation on water main breaks, construction & repair activities, and low pressure and outage incidents.	☐	☐	☐	☒
Our Cross-Connection Control Program is up-to-date.	☒	☐	☐	☐
We test all cross-connection control devices annually as required, with easy access to the proper documentation.	☒	☐	☐	☐
We routinely inspect all treatment facilities for proper operation.	☒	☐	☐	☐
We identified one or more qualified individuals who are able to conduct a Level 2 assessment of our water system.	☒	☐	☐	☐
We have procedures in place for disinfecting and flushing the water system if it becomes necessary.	☐	☐	☐	☒
We can activate an emergency intertie with an adjacent water system in an emergency.	☐	☐	☐	☒
We have a map of our service area boundaries.	☒	☐	☐	☐
We have consumers who may not have access to bottled or boiled water.	☒	☐	☐	☐
There is a sufficient supply of bottled water immediately available to our customers who are unable to boil their water.	☐	☐	☐	☒
We have identified the contact person at each day care, school, medical facility, food service, and other customers who may have difficulty responding to a Health Advisory.	☐	☐	☐	☒
We have messages prepared and translated into different languages to ensure our consumers will understand them.	☐	☐	☐	☒
We have the capacity to print and distribute the required number of notices in a short time period.	☒	☐	☐	☐
Policy Direction	**Yes**	**No**	**N/A**	**To Do List**
We have discussed the issue of *E. coli*-present sample results with our policy makers.	☐	☐	☐	☒
If we find *E. coli* in a routine distribution sample, the policy makers want to wait until repeat test results are available before issuing advice to water system customers.	☐	☐	☐	☒
(Cont.)				

Distribution System *E. coli* Response Checklist				
Potential Public Notice Delivery Methods	**Yes**	**No**	**N/A**	**To Do List**
It is feasible to deliver a notice going door-to-door.	☒	☐	☐	☐
We have a list of all of our customers' addresses.	☒	☐	☐	☐
We have a list of customer telephone numbers or access to a Reverse 9-1-1 system.	☐	☒	☐	☐
We have a list of customer email addresses.	☐	☒	☐	☐
We encourage our customers to remain in contact with us using social media.	☒	☐	☐	☐
We have an active website we can quickly update to include important messages.	☒	☐	☐	☐
Our customers drive by a single location where we could post an advisory and expect everyone to see it.	☐	☒	☐	☐
We need a news release to supplement our public notification process.	☒	☐	☐	☐

Distribution System *E. coli* Response Plan

If we have *E. coli* in our distribution system we will immediately:

1. Call DOH.
2. Collect repeat and triggered source samples per Part D. Collect additional investigative samples as necessary.
3. If additional samples are positive, provide public notification approved by DOH.
4. Disinfect the contaminated well and resample
5. Inspect wells, reservoirs, booster pump stations, and other facilities for any evidence of intrusion or contamination.
6. Isolate contaminated areas. Flush and disinfect water mains.
7. Discuss with DOH whether to issue a Health Advisory based on the findings of steps 3-6.

E. coli-Present Triggered Source Sample Response Checklist – All Sources				
Background Information	**Yes**	**No**	**N/A**	**To Do List**
We review our sanitary survey results and respond to any recommendations affecting the microbial quality of our water supply.	☒	☐	☐	☐
We address any significant deficiencies identified during a sanitary survey.	☒	☐	☐	☐
There are contaminant sources within our Wellhead Protection Area that could affect the microbial quality of our source water, and If yes, we can eliminate them.	☐ ☐	☐ ☒	☒ ☐	☐ ☐
We routinely inspect our well site(s).	☒	☐	☐	☐
We have a good raw water sample tap installed at each source.	☒	☐	☐	☐
After we complete work on a source, we disinfect the source, flush, and collect an investigative sample.	☒	☐	☐	☐
Public Notice	**Yes**	**No**	**N/A**	**To Do List**
We discussed the requirement for immediate public notice of an *E. coli*-present source sample result with our water system's governing body (board of directors or commissioners) and received direction from them on our response plan.	☐	☐	☐	☒
We discussed the requirement for immediate public notice of an *E. coli*-present source sample result with our wholesale customers and encouraged them to develop a response plan.	☐	☐	☒	☐
We have prepared templates and a communications plan that will help us quickly distribute our messages.	☐	☐	☐	☒

E. coli-Present Triggered Source Sample Response Checklist – Source S03*				
Alternate Sources	**Yes**	**No**	**N/A**	**To Do List**
We can stop using this source and still provide reliable water service to our customers.	☒	☐	☐	☐
We have an emergency intertie with a neighboring water system that we can use until corrective action is complete (perhaps for several months).	☒	☐	☐	☐
We can provide bottled water to all or part of the distribution system for an indefinite period.	☐	☒	☐	☐
We can quickly replace our existing source of supply with a more protected new source.	☒	☐	☐	☐
Temporary Treatment	**Yes**	**No**	**N/A**	**To Do List**
This source is continuously chlorinated, and our existing facilities can provide 4-log virus treatment (CT = 6) before the first customer. If yes, at what concentration? 0.5 mg/L	☒	☐	☐	☐
We can quickly introduce chlorine into the water system and take advantage of the existing contact time to provide 4-log virus treatment to a large portion of the distribution system.	☒	☐	☐	☐
We can reduce the production capacity of our pumps or alter the configuration of our storage quantities (operational storage) to increase the amount of time the water stays in the system before the first customer to achieve CT = 6.	☒	☐	☐	☐
We can alter the demand for drinking water (maximum day or peak hour) through conservation messages to increase the time the water is in the system prior to the first customer in order to achieve 4-log virus treatment with chlorine.	☒	☐	☐	☐

E. coli-Present Triggered Source Sample Response Checklist – Source S04*				
Alternate Sources	**Yes**	**No**	**N/A**	**To Do List**
We can stop using this source and still provide reliable water service to our customers.	☒	☐	☐	☐
We have an emergency intertie with a neighboring water system that we can use until corrective action is complete (perhaps for several months).	☒	☐	☐	☐
We can provide bottled water to all or part of the distribution system for an indefinite period.	☐	☒	☐	☐
We can quickly replace our existing source of supply with a more protected new source.	☒	☐	☐	☐
Temporary Treatment	**Yes**	**No**	**N/A**	**To Do List**
This source is continuously chlorinated, and our existing facilities can provide 4-log virus treatment (CT = 6) before the first customer. If yes, at what concentration? 0.5 mg/L	☒	☐	☐	☐
We can quickly introduce chlorine into the water system and take advantage of the existing contact time to provide 4-log virus treatment to a large portion of the distribution system.	☒	☐	☐	☐
We can reduce the production capacity of our pumps or alter the configuration of our storage quantities (operational storage) to increase the amount of time the water stays in the system before the first customer to achieve CT = 6.	☒	☐	☐	☐
We can alter the demand for drinking water (maximum day or peak hour) through conservation messages to increase the time the water is in the system prior to the first customer in order to achieve 4-log virus treatment with chlorine.	☒	☐	☐	☐

E. coli-Present Triggered Source Sample Response Checklist – Source S05*				
Alternate Sources	**Yes**	**No**	**N/A**	**To Do List**
We can stop using this source and still provide reliable water service to our customers.	☒	☐	☐	☐
We have an emergency intertie with a neighboring water system that we can use until corrective action is complete (perhaps for several months).	☒	☐	☐	☐
We can provide bottled water to all or part of the distribution system for an indefinite period.	☐	☒	☐	☐
We can quickly replace our existing source of supply with a more protected new source.	☒	☐	☐	☐
Temporary Treatment	**Yes**	**No**	**N/A**	**To Do List**
This source is continuously chlorinated, and our existing facilities can provide 4-log virus treatment (CT = 6) before the first customer. If yes, at what concentration? 0.5 mg/L	☒	☐	☐	☐
We can quickly introduce chlorine into the water system and take advantage of the existing contact time to provide 4-log virus treatment to a large portion of the distribution system.	☒	☐	☐	☐
We can reduce the production capacity of our pumps or alter the configuration of our storage quantities (operational storage) to increase the amount of time the water stays in the system before the first customer to achieve CT = 6.	☒	☐	☐	☐
We can alter the demand for drinking water (maximum day or peak hour) through conservation messages to increase the time the water is in the system prior to the first customer in order to achieve 4-log virus treatment with chlorine.	☒	☐	☐	☐

E. coli-Present Triggered Source Sample Response Checklist – Source S06*				
Alternate Sources	**Yes**	**No**	**N/A**	**To Do List**
We can stop using this source and still provide reliable water service to our customers.	☒	☐	☐	☐
We have an emergency intertie with a neighboring water system that we can use until corrective action is complete (perhaps for several months).	☒	☐	☐	☐
We can provide bottled water to all or part of the distribution system for an indefinite period.	☐	☒	☐	☐
We can quickly replace our existing source of supply with a more protected new source.	☒	☐	☐	☐
Temporary Treatment	**Yes**	**No**	**N/A**	**To Do List**
This source is continuously chlorinated, and our existing facilities can provide 4-log virus treatment (CT = 6) before the first customer. If yes, at what concentration? 0.5 mg/L	☒	☐	☐	☐
We can quickly introduce chlorine into the water system and take advantage of the existing contact time to provide 4-log virus treatment to a large portion of the distribution system.	☒	☐	☐	☐
We can reduce the production capacity of our pumps or alter the configuration of our storage quantities (operational storage) to increase the amount of time the water stays in the system before the first customer to achieve CT = 6.	☒	☐	☐	☐
We can alter the demand for drinking water (maximum day or peak hour) through conservation messages to increase the time the water is in the system prior to the first customer in order to achieve 4-log virus treatment with chlorine.	☒	☐	☐	☐

E. coli-Present Triggered Source Sample Response Checklist – Source S09*				
Alternate Sources	**Yes**	**No**	**N/A**	**To Do List**
We can stop using this source and still provide reliable water service to our customers.	☒	☐	☐	☐
We have an emergency intertie with a neighboring water system that we can use until corrective action is complete (perhaps for several months).	☒	☐	☐	☐
We can provide bottled water to all or part of the distribution system for an indefinite period.	☐	☒	☐	☐
We can quickly replace our existing source of supply with a more protected new source.	☒	☐	☐	☐
Temporary Treatment	**Yes**	**No**	**N/A**	**To Do List**
This source is continuously chlorinated, and our existing facilities can provide 4-log virus treatment (CT = 6) before the first customer. If yes, at what concentration? 0.5 mg/L	☒	☐	☐	☐
We can quickly introduce chlorine into the water system and take advantage of the existing contact time to provide 4-log virus treatment to a large portion of the distribution system.	☒	☐	☐	☐
We can reduce the production capacity of our pumps or alter the configuration of our storage quantities (operational storage) to increase the amount of time the water stays in the system before the first customer to achieve CT = 6.	☒	☐	☐	☐
We can alter the demand for drinking water (maximum day or peak hour) through conservation messages to increase the time the water is in the system prior to the first customer in order to achieve 4-log virus treatment with chlorine.	☒	☐	☐	☐

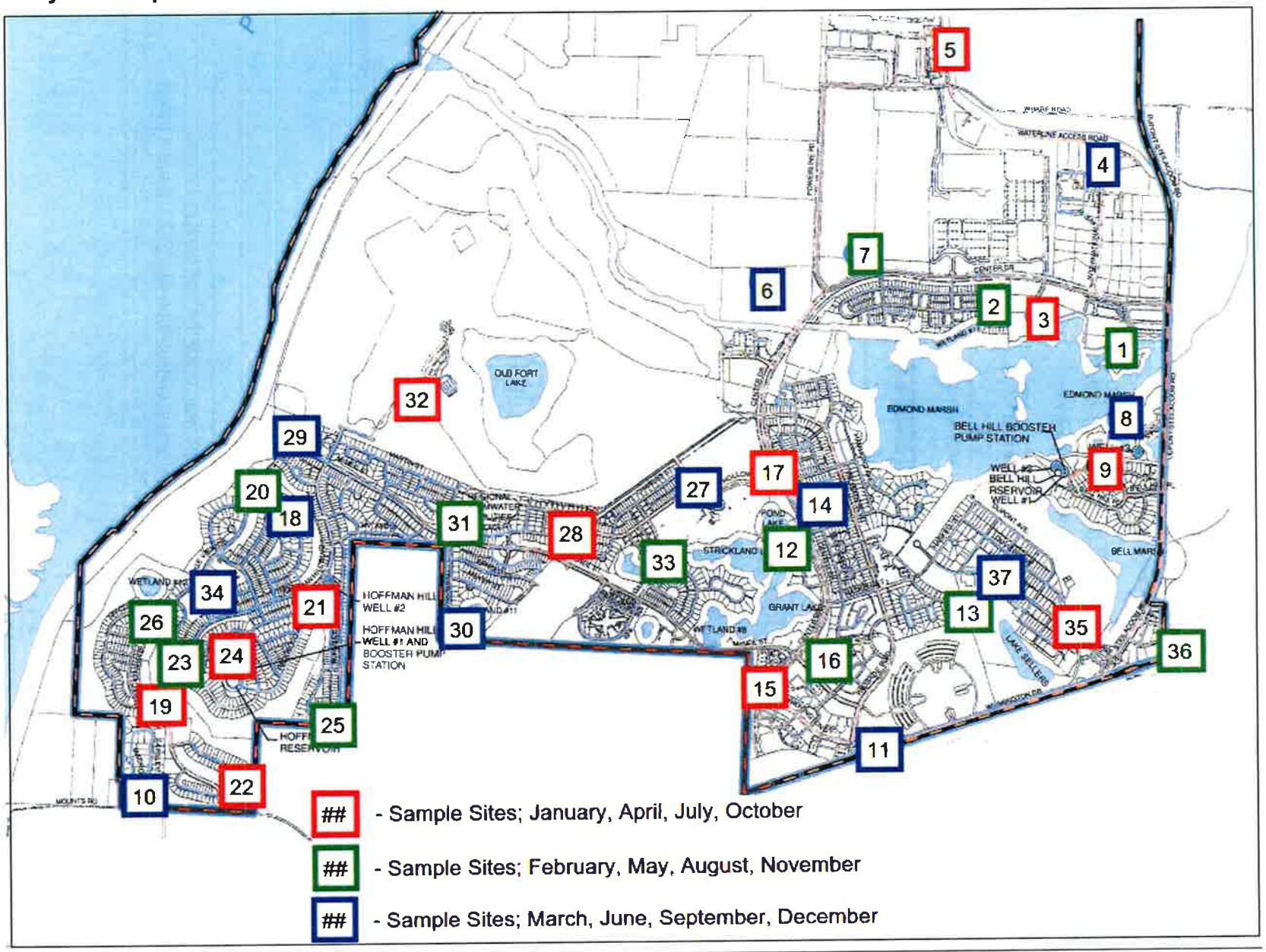
*NOTE: If your system has multiple sources, you may want to complete a separate checklist for each source.

E. coli-Present Triggered Source Sample Response Plan – Source ALL

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

1. Call DOH.
2. Take the contaminated source out of service.
3. Provide public notification pursuant to DOH requirements.
4. Disinfect the contaminated well
5. Contingent on good samples from the contaminated well, place the well back in service.
6. Contingent on good distribution system samples, and in consultation with DOH, issue a public notification stating that the water is safe to drink.

I. System Map


5
4
7
6
2
3
1
32
8
29
9
17
20
27
14
18
31
28
12
33
37
34
13
35
26
21
30
36
24
23
16
19
15
25
11
22
10
OLD FORT LAKE
EDMOND MARSH
BELL HILL BOOSTER PUMP STATION
HOFFMAN HILL WELL #2
HOFFMAN HILL WELL #1 AND BOOSTER PUMP STATION
GRANT LAKE
- Sample Sites; January, April, July, October
- Sample Sites; February, May, August, November
- Sample Sites; March, June, September, December

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: Fax: Email:	(253) 395-6750 (253) 395-6760 carol.stuckey@doh.wa.gov ingrid.salmon@doh.wa.gov
Southwest Region	PO Box 47823 Olympia WA 98504-7823	Phone: Fax: Email:	(360) 236-3030 (360) 664-8058 swro.coli@doh.wa.gov
Eastern Region	16201 Indiana Ave Suite 1500 Spokane Valley WA 99216	Phone: Fax: Email:	(509) 329-2100 (509) 329-2104 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?**	☐ Yes ☐ No ☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ Yes ☐ No ☐ N/A	
b. Have there been changes in sampling conditions or procedures? Describe:	☐ Yes ☐ No	☐ Yes ☐ 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?	 ☐ Yes ☐ No ☐ Yes ☐ No	 ☐ Yes ☐ No ☐ Yes ☐ No	
d. Do the coliform sample results from the last 90 days suggest ongoing water quality issues?	☐ Yes ☐ No	☐ Yes ☐ 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?**	☐ Yes ☐ No	☐ Yes ☐ No	

Part A: Assessment		Corrective action needed?	Description, Comments, and Recommendations
2. Distribution			
a. Are procedures in place to:			
i. Replace and repair system parts?	☐ Yes ☐ No	☐ Yes ☐ No	
ii. Regularly flush?	☐ Yes ☐ No	☐ Yes ☐ No	
iii. Routinely inspect vault(s)?	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A	
iv. Implement a cross connection control program?	☐ Yes ☐ No	☐ Yes ☐ No	
v. Maintain positive pressure?	☐ Yes ☐ No	☐ Yes ☐ No	
b. Have there been:			
i. Recent reports of low pressure (less than 20 PSI) or complete loss of pressure?	☐ Yes ☐ No	☐ Yes ☐ No	
ii. Changes in condition or operation?	☐ Yes ☐ No	☐ Yes ☐ No	
c. Inspect the distribution system. Are there any:			
i. Visible line breaks or leaks?	☐ Yes ☐ No	☐ Yes ☐ No	
ii. Observed unprotected cross connections?	☐ Yes ☐ No	☐ Yes ☐ No	
iii. Waterlogged pressure tanks?	☐ Yes ☐ No	☐ Yes ☐ No	
iv. Evidence of vandalism or other security breaches?	☐ Yes ☐ No	☐ Yes ☐ No	
v. Other:			
3. Storage Facilities - Is there a water storage tank? If no, skip to Section 4. Note: Pressure and hydropneumatic tanks are **not** storage tanks	☐ Yes ☐ No	☐ Yes ☐ No	
a. Are there:			
i. Procedures for periodic inspection and upkeep of the facility?	☐ Yes ☐ No	☐ Yes ☐ No	
ii. Any changes in storage condition or operations?	☐ Yes ☐ No	☐ Yes ☐ No	
b. Inspect each storage tank. Are there:			
i. Overflow lines constructed to prevent contaminants?	☐ Yes ☐ No	☐ Yes ☐ No	
ii. Cracks or unprotected openings in the tank walls?	☐ Yes ☐ No	☐ Yes ☐ No	
iii. Reservoir roof cracks?	☐ Yes ☐ No	☐ Yes ☐ No	
iv. Unprotected roof openings?	☐ Yes ☐ No	☐ Yes ☐ No	
v. Improperly constructed access hatch or seal?	☐ Yes ☐ No	☐ Yes ☐ No	
vi. Evidence of vandalism or other security breaches?	☐ Yes ☐ No	☐ Yes ☐ No	
c. If there is an air vent or opening for a water-level gauge, is it constructed to prevent entry of contaminants?	☐ Yes ☐ No	☐ Yes ☐ 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?	☐ Yes ☐ No	☐ Yes ☐ No	
4. Treatment - Is treatment in use for any source? If no, skip to Section 5.	☐ Yes ☐ No	☐ Yes ☐ No	
a. If treatment includes disinfection, were chlorine residuals normal during the month the TTT occurred?	☐ Yes ☐ No	☐ Yes ☐ No	

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?	☐ Yes ☐ No	☐ Yes ☐ No	
1. Is the treatment system operating properly?	☐ Yes ☐ No	☐ Yes ☐ No	
ii. Changes in equipment or process? Describe.	☐ Yes ☐ No	☐ Yes ☐ No	
iii. Evidence of vandalism or other security breaches?	☐ Yes ☐ No	☐ Yes ☐ No	
5. Source			
a. Are there procedures in place for periodic inspection and maintenance of the source facilities?	☐ Yes ☐ No	☐ Yes ☐ 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	☐ Yes ☐ No	☐ Yes ☐ No	
c. Inspect the source facilities. Is the:			
i. Sanitary control area free of all potential sources of contamination?	☐ Yes ☐ No	☐ Yes ☐ No	
ii. Wellhead or spring box above grade with no potential for flooding?			
iii. Well cap sealed and watertight?	☐ Yes ☐ No	☐ Yes ☐ No	
iv. Well casing free of unprotected openings?			
v. Pressure tank waterlogged?	☐ Yes ☐ No	☐ Yes ☐ No	
vi. Spring box (structure, hatch, and overflow) free of any unprotected openings?	☐ Yes ☐ No	☐ Yes ☐ No	
	☐ Yes ☐ No	☐ Yes ☐ No	
vii. Other:	☐ Yes ☐ No	☐ Yes ☐ No	
d. Have there been any changes in condition or operation?	☐ Yes ☐ No	☐ Yes ☐ 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? ☐ Yes ☐ No

Likely Cause Determined? ☐ Yes ☐ No Sanitary Defects Identified? ☐ Yes ☐ No Corrective Actions Complete? ☐ Yes ☐ No ☐ N/A

Corrective Action Plan Included? ☐ Yes ☐ No ☐ N/A Corrective Action Plan approved? ☐ Yes ☐ No ☐ 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?	☐ Yes ☐ No	☐ Yes ☐ No	
b. Is there a program to ensure that all sample collectors are trained before being allowed to collect compliance samples?	☐ Yes ☐ No	☐ Yes ☐ No	
c. Are routine and repeat sample sites regularly monitored to ensure that no site will contaminate the sample?	☐ Yes ☐ No	☐ Yes ☐ No	
d. Do the coliform sample results from the last 24 months suggest ongoing or reoccurring water quality issues?	☐ Yes ☐ No	☐ Yes ☐ No	
e. Relative to the Unsatisfactory samples associated with the TTT: 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?	 ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No	 ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No	

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:	☐ Yes ☐ No ☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No	
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.	☐ Yes ☐ No	☐ Yes ☐ 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?	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ N/A ☐ Yes ☐ No	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No	
b. Is there a fully implemented cross connection control program?	☐ Yes ☐ No	☐ Yes ☐ No	
c. Is each air-vacuum-relief-valve vented above-grade?	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No	
d. Following work done in distribution system or any pressure loss event, are investigative coliform samples collected?	☐ Yes ☐ No	☐ Yes ☐ 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?	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ N/A ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ 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:	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ N/A ☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No	
3. Storage Facilities – Is there storage? If no, skip to Section 4.	☐ Yes ☐ No		
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?	☐ Yes ☐ No	☐ Yes ☐ 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?	☐ Yes ☐ No	☐ Yes ☐ 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?	☐ Yes ☐ No	☐ Yes ☐ No	
d. If there is an air vent, is it constructed to prevent entry of contaminants?	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No	
e. If there is a fitting for a level gage or level controls, is it constructed to prevent entry of contaminants?	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ 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?	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No	
g. Has there been: i. Any recent work done at a storage facility? ii. Any other changes in storage conditions or operations?	 ☐ Yes ☐ No ☐ Yes ☐ No	 ☐ Yes ☐ No ☐ Yes ☐ No	
h. Inspect each storage tank. Are there any: i. Any floating objects in the tank? ii. Cracks or unprotected openings in tank walls? iii. Unprotected openings in the tank roof? iv. Gaps or weak areas in access hatch seals? v. Holes in the air vent screen? vi. Weak points in the attachment of the screen to the vent structure? vii. Holes in the screen on the open end of overflow line? viii. Obstructions compromising the proper air gap where the overflow line discharges into a storm drain, surface water, or sanitary sewer? ix. Indications of vandalism or other security breach? x. Other:	 ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ N/A ☐ Yes ☐ No ☐ N/A ☐ Yes ☐ No ☐ N/A ☐ Yes ☐ No ☐ N/A ☐ Yes ☐ No ☐ N/A	 ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No	
4. Treatment – Is there treatment? If no, skip to Section 5.	☐ Yes ☐ No		
a. List every type of treatment in use:			
b. Is any source continuously treated with a disinfectant? If yes, Are there standard procedures for: i. Proper operation and maintenance of disinfection treatment facilities? ii. Monitoring disinfectant residual frequency per DOH requirement? Were: iii. Chlorine residuals 0.2 mg/L or greater in the Unsatisfactory samples? List residuals: iv. Chlorine residuals normal throughout the month the TTT occurred? v. All chlorine residual measurements from the last 90 days indicative of any on-going or recurring treatment issue?	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No	 ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No	

Part A: Assessment		Corrective Action Needed?	Description, Comments, and Recommendations
c. Have there been any: i. Changes in treatment equipment or processes? ii. Recent interruptions in any treatment process? iii. Recent maintenance performed on any treatment component?	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No	
d. Inspect the treatment facilities: i. Is the treatment system operating properly? ii. Is there any evidence of vandalism or other security breach? iii. Other:	☐ Yes ☐ No ☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ 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)?	☐ Yes ☐ No	☐ Yes ☐ No	
b. Are all sources protected from fecal contamination by appropriate placement and construction?	☐ Yes ☐ No	☐ Yes ☐ No	
c. Are there standard procedures for periodic inspection and maintenance of the source facilities?	☐ Yes ☐ No	☐ Yes ☐ No	
d. Are the source facilities secured from unauthorized entry and vandalism?	☐ Yes ☐ No	☐ Yes ☐ No	
e. Has there been any: i. Recent use of an unapproved source? ii. Recent land use changes? iii. Standing water, heavy precipitation, or flooding around a source in the last month? iv. Recent failure of a source pump? v. Recent maintenance on a source pump or other source component? vi. Other changes in source conditions or operations?	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ N/A ☐ Yes ☐ No ☐ Yes ☐ No	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No	
f. Inspect the source facilities. Is: i. Sanitary control area free of all potential sources of contamination? ii. Top of well casing or spring box at risk of submergence? iii. Well cap sealed and watertight? iv. Well casing or spring box free of unprotected openings? v. Pressure tank water logged or off-line? vi. There any evidence of vandalism or other security breach? vii. Other:	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ N/A ☐ Yes ☐ No ☐ Yes ☐ No ☐ N/A ☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ 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:	☐ Yes ☐ 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? ☐ Yes ☐ No

Likely Cause Determined? ☐ Yes ☐ No Sanitary Defects Identified? ☐ Yes ☐ No Corrective Actions Complete? ☐ Yes ☐ No ☐ N/A

Corrective Action Plan Included? ☐ Yes ☐ No ☐ N/A Corrective Action Plan approved? ☐ Yes ☐ No ☐ N/A

Comments: Click here to enter text

E. coli-Present Triggered Source Sample Response Checklist – All Sources				
Background Information	**Yes**	**No**	**N/A**	**To Do List**
We review our sanitary survey results and respond to any recommendations affecting the microbial quality of our water supply.	☐	☐	☐	☐
We address any significant deficiencies identified during a sanitary survey.	☐	☐	☐	☐
There are contaminant sources within our Wellhead Protection Area that could affect the microbial quality of our source water, and If yes, we can eliminate them	☐ ☐	☐ ☐	☐ ☐	☐ ☐
We routinely inspect our well site(s).	☐	☐	☐	☐
We have a good raw water sample tap installed at each source	☐	☐	☐	☐
After we complete work on a source, we disinfect the source, flush, and collect an investigative sample.	☐	☐	☐	☐
Public Notice	**Yes**	**No**	**N/A**	**To Do List**
We discussed the requirement for immediate public notice of an *E. coli*-present source sample result with our water system's governing body (board of directors or commissioners) and received direction from them on our response plan.	☐	☐	☐	☐
We discussed the requirement for immediate public notice of an *E. coli*-present source sample result with our wholesale customers and encouraged them to develop a response plan.	☐	☐	☐	☐
We have prepared templates and a communications plan that will help us quickly distribute our messages.	☐	☐	☐	☐

E. coli-Present Triggered Source Sample Response Checklist – Source S__*

Alternate Sources	Yes	No	N/A	To Do List
We can stop using this source and still provide reliable water service to our customers.	☐	☐	☐	☐
We have an emergency intertie with a neighboring water system that we can use until corrective action is complete (perhaps for several months).	☐	☐	☐	☐
We can provide bottled water to all or part of the distribution system for an indefinite period.	☐	☐	☐	☐
We can quickly replace our existing source of supply with a more protected new source.	☐	☐	☐	☐
Temporary Treatment	**Yes**	**No**	**N/A**	**To Do List**
This source is continuously chlorinated, and our existing facilities can provide 4-log virus treatment (CT = 6) before the first customer. If yes, at what concentration? _____ mg/L	☐	☐	☐	☐
We can quickly introduce chlorine into the water system and take advantage of the existing contact time to provide 4-log virus treatment to a large portion of the distribution system.	☐	☐	☐	☐
We can reduce the production capacity of our pumps or alter the configuration of our storage quantities (operational storage) to increase the amount of time the water stays in the system before the first customer to achieve CT = 6.	☐	☐	☐	☐
We can alter the demand for drinking water (maximum day or peak hour) through conservation messages to increase the time the water is in the system prior to the first customer in order to achieve 4-log virus treatment with chlorine.	☐	☐	☐	☐

*NOTE: If your system has multiple sources, you may want to complete a separate checklist for each source.

E. coli-Present Triggered Source Sample Response Plan – Source ___

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

1. Call DOH.
2. _____
3. _____
4. _____
5. _____

Distribution System *E. coli* Response Checklist

Background Information	Yes	No	N/A	To Do List
We inform staff members about activities within the distribution system that could affect water quality.	☐	☐	☐	☐
We document all water main breaks, construction & repair activities, and low pressure and outage incidents.	☐	☐	☐	☐
We can easily access and review documentation on water main breaks, construction & repair activities, and low pressure and outage incidents.	☐	☐	☐	☐
Our Cross-Connection Control Program is up-to-date.	☐	☐	☐	☐
We test all cross-connection control devices annually as required, with easy access to the proper documentation.	☐	☐	☐	☐
We routinely inspect all treatment facilities for proper operation.	☐	☐	☐	☐
We identified one or more qualified individuals who are able to conduct a Level 2 assessment of our water system.	☐	☐	☐	☐
We have procedures in place for disinfecting and flushing the water system if it becomes necessary.	☐	☐	☐	☐
We can activate an emergency intertie with an adjacent water system in an emergency.	☐	☐	☐	☐
We have a map of our service area boundaries.	☐	☐	☐	☐
We have consumers who may not have access to bottled or boiled water.	☐	☐	☐	☐
There is a sufficient supply of bottled water immediately available to our customers who are unable to boil their water.	☐	☐	☐	☐
We have identified the contact person at each day care, school, medical facility, food service, and other customers who may have difficulty responding to a Health Advisory.	☐	☐	☐	☐
We have messages prepared and translated into different languages to ensure our consumers will understand them.	☐	☐	☐	☐
We have the capacity to print and distribute the required number of notices in a short time period.	☐	☐	☐	☐
Policy Direction	**Yes**	**No**	**N/A**	**To Do List**
We have discussed the issue of *E. coli*-present sample results with our policy makers.	☐	☐	☐	☐
If we find *E. coli* in a routine distribution sample, the policy makers want to wait until repeat test results are available before issuing advice to water system customers.	☐	☐	☐	☐

(Cont.)

Distribution System *E. coli* Response Checklist				
Potential Public Notice Delivery Methods	**Yes**	**No**	**N/A**	**To Do List**
It is feasible to deliver a notice going door-to-door.	☐	☐	☐	☐
We have a list of all of our customers' addresses.	☐	☐	☐	☐
We have a list of customer telephone numbers or access to a Reverse 9-1-1 system.	☐	☐	☐	☐
We have a list of customer email addresses.	☐	☐	☐	☐
We encourage our customers to remain in contact with us using social media.	☐	☐	☐	☐
We have an active website we can quickly update to include important messages.	☐	☐	☐	☐
Our customers drive by a single location where we could post an advisory and expect everyone to see it.	☐	☐	☐	☐
We need a news release to supplement our public notification process.	☐	☐	☐	☐

Distribution System *E. coli* Response Plan

If we have *E. coli* in our distribution system we will immediately:

1. Call DOH.
2. Collect repeat and triggered source samples per Part D. Collect additional investigative samples as necessary.
3. _____
4. _____
5. _____
6. _____
7. Discuss with DOH whether to issue a Health Advisory based on the findings of steps 3-6.

System Map

WATER MANAGEMENT LABORATORIES INC.

BACTERIA SAMPLING

HOW TO TAKE A WATER SAMPLE

Always thoroughly disinfect the faucet and/or tap with a solution of 1 part bleach (unscented) to 9 parts water in a spray bottle. Avoid using a kitchen tap and/or swivel faucet. Prior to sampling remove the aerator screen and disinfect faucet with bleach/water solution. When using an outside tap, make sure it is clean and not surrounded by bushes, etc. Never take a sample from a garden hose. Avoid using a frost-free tap or sampling during rain and wind. Do not remove the cap from the sample bottle until immediately before taking the sample. If you have any questions regarding the tap you are going to use or sampling procedures, please feel free to call the lab.

1. Disinfect tap with bleach/water solution. Turn on water and let it run hard for 5 minutes.
2. Disinfect tap a second time, then turn the flow down until there is a smooth steady stream. Let water run for 2 minutes.
3. Uncap the bottle and fill it to the shoulder. Place the cap back on the bottle.

Sample must be kept cold by placing in a cooler or a refrigerator. Deliver the sample to the lab within 24 hours from the time it is taken. We will not accept samples after 5:00 p.m. without prior arrangements.

1515 80th St E * Tacoma, WA 98404
(253) 531-3121

Updated: 11-13 T:\masters\sampling\bacteria
2013 * PROPERTY OF WATER MANAGEMENT LABORATORIES, INC.

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

Water Quality Monitoring Schedule

System: DUPONT WATER SYSTEM CITY OF
Contact: Frederick D Foreman

PWS ID: 20500 P
Group: A - Comm

Region: NORTHWEST
County: PIERCE

NOTE: To receive credit for compliance samples, you must fill out laboratory and sample paperwork completely, send your samples to a laboratory accredited by Washington State to conduct the analyses, AND ensure the results are submitted to DOH Office of Drinking Water. There is often a lag time between when you collect your sample, when we credit your system with meeting the monitoring requirement, and when we generate the new monitoring requirement.

Coliform Monitoring Requirements

	May 2018	Jun 2018	Jul 2018	Aug 2018	Sep 2018	Oct 2018	Nov 2018	Dec 2018	Jan 2019	Feb 2019	Mar 2019	Apr 2019
Coliform Monitoring Population	11552	11553	11552	11552	11553	11552	11553	11552	11552	11556	11552	11553
Number of Routine Samples Required	10	10	10	10	10	10	10	10	10	10	10	10

- Collect samples from representative points throughout the distribution system.
- Collect required repeat samples following an unsatisfactory sample. In addition, collect a sample from each operating groundwater source.
- For systems that chlorinate, record chlorine residual (measured when the coliform sample is collected) on the coliform lab slip.

Chemical Monitoring Requirements

Distribution Monitoring

Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*
Lead and Copper	30	Jan 2017 - Dec 2019	standard - 3 year	09/25/2016	Aug 2019
Asbestos	0	Jan 2011 - Dec 2019	waiver - 9 year		
Total Trihalomethane (THM)	2	Jan 2018 - Dec 2018	reduced - 1 year	07/24/2017	***Jul 2018***
Halo-Acetic Acids (HAA5)	2	Jan 2018 - Dec 2018	reduced - 1 year	07/27/2017	***Jul 2018***

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

Water Quality Monitoring Schedule

Notes on Distribution System Chemical Monitoring

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

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

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

Source Monitoring

- Collect 'source' chemical monitoring samples from a tap after all treatment (if any), but before entering the distribution system.
- Washington State grants monitoring waivers for various test panels /analytes. Please note that we may require some monitoring as a condition of some waivers. We have granted complete waivers for dioxin, endothal, glyphosate, diquat, and insecticides.
- Nitrate, arsenic, iron, and other individual inorganics are included as part of a Complete Inorganic (IOC) analysis when it is collected.

Source S03 *Well 1 Bell Hill CAN722* *Well* *Use - Permanent* *Susceptility - Moderate*

Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*
Nitrate	1	Jan 2018 - Dec 2018	standard - 1 year	10/11/2017	***Oct 2018***
Complete Inorganic (IOC)	1	Jan 2011 - Dec 2019	waiver - 9 year	07/25/2016	
Volatile Organics (VOC)	1	Jan 2017 - Dec 2022	waiver - 6 year	06/13/2017	
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	10/25/2013	Oct 2022
Pesticides	1	Jan 2014 - Dec 2022	waiver - 9 year	10/25/2013	Oct 2022
Soil Fumigants	0	Jan 2017 - Dec 2019	waiver - 3 year		
Gross Alpha	1	Jan 2014 - Dec 2019	standard - 6 year	12/10/2015	
Radium 228	1	Jan 2014 - Dec 2019	standard - 6 year	12/10/2015	

Source S04 *Well 2 Bell Hill CAN756* *Well* *Use - Permanent* *Susceptility - Low*

Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*
Nitrate	1	Jan 2018 - Dec 2018	standard - 1 year	12/14/2017	***Oct 2018***
Complete Inorganic (IOC)	1	Jan 2011 - Dec 2019	waiver - 9 year	07/19/2016	
Iron	1	Jan 2017 - Dec 2019	standard - 3 year	07/19/2016	Sep 2019

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

Water Quality Monitoring Schedule

Source Monitoring

- Collect 'source' chemical monitoring samples from a tap after all treatment (if any), but before entering the distribution system.
- Washington State grants monitoring waivers for various test panels /analytes. Please note that we may require some monitoring as a condition of some waivers. We have granted complete waivers for dioxin, endothal, glyphosate, diquat, and insecticides.
- Nitrate, arsenic, iron, and other individual inorganics are included as part of a Complete Inorganic (IOC) analysis when it is collected.

Source S04	*Well 2 Bell Hill CAN756*	*Well*	*Use - Permanent*	*Susceptility - Low*	
Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*
Manganese	1	Jan 2017 - Dec 2019	standard - 3 year	10/07/2016	Aug 2019
Volatile Organics (VOC)	1	Jan 2014 - Dec 2019	waiver - 6 year	06/13/2017	
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	05/29/2012	May 2021
Pesticides	1	Jan 2014 - Dec 2022	waiver - 9 year	05/29/2012	May 2021
Soil Fumigants	0	Jan 2017 - Dec 2019	waiver - 3 year		
Gross Alpha	1	Jan 2014 - Dec 2019	standard - 6 year	12/10/2015	
Radium 228	1	Jan 2014 - Dec 2019	standard - 6 year	12/10/2015	

Source S05	*Well 1 Hoffman Hill AAD989*	*Well*	*Use - Permanent*	*Susceptility - Low*	
Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*
Nitrate	1	Jan 2018 - Dec 2018	standard - 1 year	10/11/2017	***Oct 2018***
Complete Inorganic (IOC)	1	Jan 2011 - Dec 2019	waiver - 9 year	07/19/2016	
Volatile Organics (VOC)	1	Jan 2014 - Dec 2019	waiver - 6 year	06/14/2017	
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	10/25/2013	Oct 2022
Pesticides	1	Jan 2014 - Dec 2022	waiver - 9 year	11/12/2013	Oct 2022
Soil Fumigants	0	Jan 2017 - Dec 2019	waiver - 3 year		
Gross Alpha	1	Jan 2014 - Dec 2019	standard - 6 year	12/10/2015	
Radium 228	1	Jan 2014 - Dec 2019	standard - 6 year	12/10/2015	

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

Water Quality Monitoring Schedule

Source Monitoring

- Collect 'source' chemical monitoring samples from a tap after all treatment (if any), but before entering the distribution system.
- Washington State grants monitoring waivers for various test panels /analytes. Please note that we may require some monitoring as a condition of some waivers. We have granted complete waivers for dioxin, endothal, glyphosate, diquat, and insecticides.
- Nitrate, arsenic, iron, and other individual inorganics are included as part of a Complete Inorganic (IOC) analysis when it is collected.

Source S06	Well 3 Bell Hill AEF217	Well	Use - Permanent	Susceptility - Low	
Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*
Nitrate	1	Jan 2018 - Dec 2018	standard - 1 year	12/15/2017	**Oct 2018**
Complete Inorganic (IOC)	1	Jan 2011 - Dec 2019	waiver - 9 year	07/25/2016	
Volatile Organics (VOC)	1	Jan 2014 - Dec 2019	waiver - 6 year	06/13/2017	
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	08/22/2012	Aug 2021
Pesticides	1	Jan 2014 - Dec 2022	waiver - 9 year	08/22/2012	Aug 2021
Soil Fumigants	0	Jan 2017 - Dec 2019	waiver - 3 year		
Gross Alpha	1	Jan 2014 - Dec 2019	standard - 6 year	08/22/2012	**Aug 2018**
Radium 228	1	Jan 2014 - Dec 2019	standard - 6 year	08/22/2012	**Aug 2018**

Source S09	Well 2 Hoffman Hill AHM258	Well	Use - Permanent	Susceptility - Low	
Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*
Nitrate	1	Jan 2018 - Dec 2018	standard - 1 year	10/11/2017	**Oct 2018**
Complete Inorganic (IOC)	1	Jan 2011 - Dec 2019	waiver - 9 year	07/19/2016	
Volatile Organics (VOC)	1	Jan 2014 - Dec 2019	waiver - 6 year	06/14/2017	
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	10/14/2010	Oct 2019
Pesticides	1	Jan 2014 - Dec 2022	waiver - 9 year	10/14/2010	Oct 2019
Soil Fumigants	0	Jan 2017 - Dec 2019	waiver - 3 year		
Gross Alpha	1	Jan 2014 - Dec 2019	standard - 6 year	08/16/2017	
Radium 228	1	Jan 2014 - Dec 2019	standard - 6 year	08/16/2017	

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

Water Quality Monitoring Schedule

Other Information

Other Reporting Schedules	*Due Date*
Measure chlorine residuals and submit monthly reports if your system uses continuous chlorination:	monthly
Submit Consumer Confidence Report (CCR) to customers and ODW (Community systems only):	07/01/2018
Submit CCR certification form to ODW (Community systems only):	10/01/2018
Submit Water Use Efficiency report online to ODW and to customers (Community and other municipal water systems only):	07/01/2018
Send notices of lead and copper sample results to the customers sampled:	30 days after you receive the laboratory results
Submit Certification of customer notification of lead and copper results to ODW:	90 days after you notify customers

Special Notes

None

Northwest Regional Water Quality Monitoring Contacts

For questions regarding chemical monitoring:	Steve Hulsman: (253) 395-6777 or Steve.Hulsman@doh.wa.gov
For questions regarding DBPs:	Steve Hulsman: (253) 395-6777 or Steve.Hulsman@doh.wa.gov
For questions regarding coliform bacteria and microbial issues:	Carol Stuckey or Ingrid Salmon: (253) 395-6775: or carol.stuckey@doh.wa.gov or ingrid.salmon@doh.wa.gov

Additional Notes

The information on this monitoring schedule is valid as of the date in the upper left corner on the first page. However, the information may change with subsequent updates in our water quality monitoring database as we receive new data or revise monitoring schedules. There is often a lag time between when you collect your sample and when we credit your system with meeting the monitoring requirement.

We have not designed this monitoring schedule to display all compliance requirements. The purpose of this schedule is to assist water systems with planning for most water quality monitoring, and to allow systems to compare their records with DOH ODW records. Please be aware that this monitoring schedule does not include constituents that require a special monitoring frequency, such as monitoring affiliated with treatment.

Any inaccuracies on this schedule will not relieve the water system owner and operator of the requirement to comply with applicable regulations.

If you have any questions about your monitoring requirements, please contact the regional office staff listed above.

APPENDIX G

HYDRAULIC MODELING

2018 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-589	0	263.16	268.25	2.2
J-662	0	263.07	268.15	2.2
J-586	0	262.97	268.25	2.29
J-663	0	257.33	265.04	3.34
J-672	0	257.02	265.61	3.72
J-584	0	258.41	268.25	4.26
J-583	0	258.34	268.25	4.29
J-585	0	258.36	268.25	4.29
J-582	0	258.26	268.25	4.33
J-587	0	257.91	268.25	4.48
J-588	0	257.38	268.25	4.71
J-668	0	257.02	267.98	4.75
J-1	0	256.9	268.25	4.92
J-659	0	380.49	395.88	6.67
J-323	0	380.32	395.82	6.72
J-667	0	379.99	395.78	6.84
J-660	0	379.72	395.84	6.98
J-661	0	379.67	395.88	7.02
J-665	0	360.56	394.94	14.9
J-324	0	359.78	394.95	15.24
J-658	0	360.68	395.88	15.26
HH16	0	327.5	394.86	29.19
RM4	6.88	305.16	394.79	38.84
RM2	6.88	296.14	394.8	42.75
J-322	6.88	288.64	391.16	44.42
HH12	6.88	284.17	390.99	46.28
66	6.88	282.78	390.5	46.68
J-393	6.88	282.82	390.89	46.83
72	6.88	281.15	390.56	47.41
J-655	6.88	280.17	390.96	48.01
64	6.88	278.75	389.96	48.19
112	6.88	278	390.17	48.61
HH14	0	283.47	395.88	48.71
J-104	6.88	276.85	390.96	49.44
J-591	6.88	276.78	391.01	49.5
J-592	6.88	276.78	391.01	49.5
PH_4	6.88	275.95	390.96	49.84
J-103	6.88	275.4	390.69	49.96
122	0	281.94	398.05	50.31
J-106	6.88	273.67	391.34	50.99
J-518	6.88	272.92	390.72	51.04
70	6.88	272.04	389.96	51.09
J-593	6.88	273.44	391.36	51.09
J-112	6.88	270.75	390.79	52.01
J-653	6.88	270.79	390.95	52.06
J-107	6.88	270.19	391.76	52.68
J-654	6.88	265.5	390.89	54.33
J-108	6.88	266.26	391.91	54.44
J-517	6.88	263.81	390.51	54.9

2018 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-206	6.88	262.08	388.89	54.95
HH138	6.88	262.06	389.77	55.33
J-205	6.88	261	388.9	55.42
FH_4	6.88	261.34	390.63	56.02
J-109	6.88	261.3	392.05	56.65
HH18	6.88	263.81	394.81	56.76
J-207	6.88	257.8	388.9	56.81
J-102	6.88	259.21	390.39	56.84
J-204	6.88	257.42	388.9	56.97
J-685	6.88	258.35	390.38	57.21
J-203	6.88	256.62	388.91	57.32
HH142	6.88	256.53	390.57	58.08
J-671	0	257.89	392.3	58.24
J-670	0	257.78	392.3	58.29
J-183	6.88	252.87	387.58	58.37
J-674	0	258.06	393.33	58.61
J-651	6.88	254.23	389.63	58.67
J-630	6.88	250.26	386.48	59.02
J-184	6.88	251.13	387.38	59.04
J-629	6.88	250.05	386.49	59.12
J-139	6.88	251.43	388.1	59.22
J-613	6.88	249.78	386.5	59.24
J-182	6.88	251.04	387.83	59.27
J-179	6.88	249.74	386.55	59.28
J-673	0	258.06	394.93	59.3
110	6.88	252.68	389.6	59.33
J-622	6.88	249.5	386.48	59.35
J-623	6.88	249.23	386.48	59.47
J-620	6.88	249.18	386.48	59.49
J-111	6.88	253.74	391.08	59.51
J-402	6.88	249.14	386.54	59.54
J-579	0	254.57	392.16	59.62
J-225	6.88	249.45	387.2	59.69
108	6.88	251.72	389.64	59.76
J-180	6.88	248.9	386.81	59.76
J-208	6.88	250.95	388.89	59.77
J-401	6.88	248.59	386.54	59.78
J-611	6.88	248.29	386.5	59.89
J-105	6.88	249.84	388.33	60.01
J-609	6.88	247.99	386.5	60.02
J-621	6.88	247.8	386.48	60.09
HH136	6.88	250.98	389.68	60.1
J-615	6.88	247.59	386.51	60.2
J-170	6.88	247.35	386.33	60.22
J-300	6.88	247.45	386.49	60.25
60	6.88	249.73	389.15	60.41
J-181	6.88	247.63	387.04	60.41
J-89	6.88	246.84	386.37	60.46
J-110	6.88	252.1	391.66	60.47

2018 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
94	6.88	249.41	389.21	60.58
J-83	6.88	246.51	386.39	60.61
J-172	6.88	246.3	386.33	60.67
J-619	6.88	246.26	386.48	60.76
86	6.88	249.1	389.34	60.77
J-616	6.88	246.24	386.49	60.77
74	6.88	249.78	390.12	60.81
J-176	6.88	245.99	386.41	60.85
J-80	6.88	245.92	386.39	60.87
J-650	6.88	249.03	389.62	60.92
J-618	6.88	245.81	386.48	60.95
76	6.88	249.02	389.82	61.01
J-173	6.88	245.52	386.33	61.01
88	6.88	248.45	389.35	61.05
J-171	6.88	245.31	386.33	61.1
J-87	6.88	245.37	386.37	61.1
J-606	6.88	245.47	386.51	61.11
98	6.88	248.69	389.83	61.16
J-165	6.88	245.04	386.32	61.21
J-603	6.88	245.22	386.49	61.21
J-573	6.88	248.49	389.83	61.24
J-88	6.88	245.03	386.37	61.24
100	6.88	248.4	389.76	61.25
J-168	6.88	244.84	386.32	61.3
J-202	6.88	247.4	388.92	61.32
J-634	6.88	244.94	386.47	61.33
J-177	6.88	244.85	386.45	61.36
78	6.88	248.1	389.74	61.37
J-224	6.88	247.49	389.14	61.38
J-590	6.88	249.52	391.22	61.4
HH40	6.88	253.04	394.81	61.43
J-169	6.88	244.52	386.32	61.44
J-90	6.88	244.59	386.37	61.44
J-192	6.88	247.3	389.15	61.46
J-605	6.88	244.68	386.52	61.46
J-642	6.88	244.47	386.43	61.51
J-315	6.88	244.52	386.53	61.53
J-191	6.88	247.11	389.12	61.54
J-166	6.88	244.27	386.32	61.55
J-174	6.88	244.28	386.35	61.56
J-576	6.88	248.15	390.27	61.58
J-693	6.88	244.15	386.32	61.6
68	6.88	247.12	389.4	61.65
J-645	6.88	243.97	386.39	61.71
92	6.88	246.85	389.28	61.72
J-624	6.88	244.05	386.49	61.72
J-164	6.88	243.85	386.32	61.73
J-77	6.88	243.87	386.4	61.76
J-572	6.88	243.76	386.33	61.78

2018 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-628	6.88	243.89	386.49	61.79
J-76	6.88	243.7	386.41	61.84
J-641	6.88	243.7	386.47	61.86
J-399	6.88	243.72	386.5	61.87
J-81	6.88	243.58	386.39	61.88
J-82	6.88	243.53	386.39	61.9
J-163	6.88	243.39	386.33	61.93
102	6.88	246.74	389.69	61.94
J-646	6.88	243.45	386.39	61.94
J-84	6.88	243.42	386.4	61.95
PH_5	6.88	246.5	389.48	61.95
J-167	6.88	243.32	386.32	61.96
J-45	6.88	246.56	389.55	61.96
J-610	6.88	243.47	386.51	61.98
J-223	6.88	246.75	389.82	61.99
J-78	6.88	243.34	386.39	61.99
90	6.88	246.38	389.49	62.01
J-632	6.88	243.3	386.47	62.04
J-682	6.88	245.31	388.58	62.08
J-197	6.88	245.26	388.59	62.1
J-627	6.88	243.17	386.49	62.1
FH_6	6.88	243	386.37	62.12
J-75	6.88	243.11	386.47	62.12
80	6.88	246.21	389.67	62.16
J-235	6.88	246.26	389.71	62.16
J-652	6.88	247.39	390.92	62.19
PH_6	6.88	242.83	386.38	62.2
J-85	6.88	242.83	386.4	62.21
J-636	6.88	242.87	386.47	62.22
J-79	6.88	242.8	386.39	62.22
J-608	6.88	242.83	386.51	62.26
J-162	6.88	242.49	386.33	62.33
J-643	6.88	242.56	386.43	62.34
J-175	6.88	242.47	386.38	62.36
J-649	6.88	245.53	389.45	62.36
J-607	6.88	242.52	386.51	62.39
J-626	6.88	242.5	386.48	62.39
J-617	6.88	242.46	386.49	62.41
J-656	6.88	245.48	389.55	62.42
J-198	6.88	244.46	388.62	62.46
J-316	6.88	242.34	386.52	62.47
82	6.88	245.23	389.64	62.57
J-73	6.88	241.96	386.47	62.62
96	6.88	244.55	389.16	62.66
J-201	6.88	243.99	388.65	62.68
J-625	6.88	241.82	386.49	62.68
84	6.88	244.68	389.42	62.71
J-200	6.88	244.18	388.91	62.71
J-631	6.88	241.74	386.48	62.71

2018 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-185	6.88	244.06	388.93	62.77
J-74	6.88	241.58	386.47	62.78
J-639	6.88	241.56	386.47	62.79
J-657	6.88	242.97	387.93	62.81
J-199	6.88	243.71	388.79	62.86
J-640	6.88	241.33	386.47	62.89
J-194	6.88	243.54	388.79	62.94
J-648	6.88	244.13	389.45	62.96
J-187	6.88	243.43	388.77	62.97
J-694	6.88	242.56	387.93	62.99
J-195	6.88	243.24	388.74	63.05
26	6.88	242.32	387.93	63.09
J-186	6.88	243.09	388.77	63.12
HH134	6.88	243.87	389.65	63.17
J-597	6.88	240.65	386.49	63.19
J-604	6.88	240.56	386.49	63.23
J-86	6.88	240.43	386.37	63.24
J-189	6.88	242.8	388.77	63.25
J-647	6.88	243.5	389.49	63.26
J-178	6.88	240.42	386.49	63.29
J-635	6.88	240.35	386.47	63.32
J-633	6.88	240.28	386.47	63.34
J-209	6.88	242.65	388.88	63.36
J-637	6.88	239.99	386.47	63.47
J-100	6.88	242.25	388.99	63.58
J-644	6.88	239.74	386.49	63.58
J-600	6.88	239.68	386.49	63.61
J-295	6.88	239.65	386.5	63.63
J-190	6.88	241.89	388.77	63.64
J-196	6.88	241.74	388.7	63.68
J-598	6.88	239.5	386.49	63.69
62	6.88	241.63	388.66	63.7
J-400	6.88	239.45	386.49	63.71
J-691	6.88	239.27	386.32	63.72
J-570	6.88	239.23	386.32	63.73
J-596	6.88	239.41	386.49	63.73
18	6.88	241	388.11	63.74
162	6.88	239.15	386.49	63.84
34	6.88	240.39	387.93	63.93
FH_5	6.88	242.08	389.69	63.96
J-697	6.88	242.02	389.68	63.98
J-695	6.88	241.99	389.69	64
J-154	6.88	238.58	386.32	64.01
J-239	6.88	242.64	390.49	64.07
J-575	6.88	242.05	389.94	64.08
J-160	6.88	238.37	386.35	64.12
J-571	6.88	238.35	386.32	64.12
J-638	6.88	238.49	386.47	64.12
J-236	6.88	241.61	389.7	64.17

2018 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
FH_7	6.88	238.84	386.97	64.18
J-599	6.88	238.3	386.48	64.21
J-218	6.88	242.05	390.27	64.22
22	6.88	239.68	388.05	64.29
J-318	6.88	239.79	388.31	64.35
J-296	6.88	237.82	386.42	64.39
160	6.88	238.3	386.96	64.42
16	6.88	239.28	388.12	64.49
J-317	6.88	238.39	387.31	64.52
J-219	6.88	241.01	389.94	64.53
HH174	6.88	237.99	386.96	64.55
J-221	6.88	240.79	389.8	64.57
J-696	6.88	240.68	389.78	64.61
210	6.88	237.77	386.96	64.65
58	6.88	239.65	389.1	64.76
24	6.88	238.38	387.94	64.81
J-222	6.88	240.12	389.8	64.85
HH176	6.88	237.27	386.99	64.87
J-246	6.88	236.56	386.27	64.87
198	6.88	237.43	387.25	64.92
156	6.88	236.99	386.99	64.99
HH20	6.88	244.78	394.8	65.01
HH8	6.88	240.76	390.89	65.05
152	6.88	236.67	387.07	65.17
J-683	6.88	236.82	387.3	65.21
J-594	6.88	237.05	387.59	65.23
J-574	6.88	239.08	389.85	65.33
J-101	6.88	238.98	389.92	65.41
J-220	6.88	238.47	389.86	65.6
RM12	6.88	242.85	394.78	65.83
14	6.88	236.05	388.14	65.9
HH10	6.88	238.69	390.89	65.95
J-161	6.88	233.78	386.37	66.12
104	6.88	237.41	390.03	66.13
158	6.88	234.31	386.95	66.14
HH36	6.88	242.17	394.8	66.14
J-155	6.88	233.68	386.32	66.14
J-519	6.88	236.44	389.1	66.15
J-243	6.88	233.37	386.27	66.25
PH_7	6.88	234.02	386.96	66.27
HH132	6.88	236.58	389.55	66.28
J-261	6.88	233.39	386.59	66.38
J-153	6.88	232.83	386.31	66.5
J-114	6.88	235.51	389.1	66.55
154	6.88	233.28	386.95	66.59
J-684	6.88	235.35	389.1	66.62
HH28	6.88	240.87	394.8	66.7
J-297	6.88	232.17	386.38	66.82
36	6.88	233.34	388.42	67.2

2018 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
RM10	6.88	239.66	394.78	67.21
J-350	6.88	231.48	386.94	67.36
J-115	6.88	233.34	389.1	67.49
J-290	6.88	229.99	386.27	67.72
J-294	6.88	229.98	386.27	67.72
HH2	6.88	234.4	390.89	67.81
J-159	6.88	229.69	386.32	67.87
J-247	6.88	229.44	386.26	67.95
J-94	6.88	229.46	386.31	67.96
J-156	6.88	229.39	386.32	68
20	6.88	230.94	388.23	68.15
J-578	6.88	233.3	390.91	68.29
J-308	6.88	228.42	386.29	68.4
J-347	6.88	228.85	386.82	68.45
J-536	6.88	229.41	387.5	68.5
J-244	6.88	227.98	386.25	68.58
J-258	6.88	227.78	386.29	68.68
J-692	6.88	227.79	386.3	68.68
J-113	6.88	230.42	389.11	68.76
J-293	6.88	227.49	386.27	68.8
HH6	6.88	232.02	390.89	68.84
J-345	6.88	227.78	386.79	68.9
J-291	6.88	227.06	386.27	68.99
J-158	6.88	227.04	386.31	69.01
J-292	6.88	226.94	386.27	69.04
PH_10	6.88	235.38	394.8	69.08
J-346	6.88	227.2	386.81	69.16
J-248	6.88	226.51	386.25	69.22
J-149	6.88	226.35	386.28	69.3
J-242	6.88	226.3	386.27	69.31
J-245	6.88	226.29	386.25	69.31
J-255	6.88	226.04	386.29	69.43
J-353	6.88	226.6	386.84	69.43
J-543	6.88	226.31	386.61	69.46
J-289	6.88	225.96	386.28	69.47
J-288	6.88	225.88	386.27	69.5
J-307	6.88	225.55	386.29	69.65
J-525	6.88	226.32	387.17	69.7
J-523	6.88	226.16	387.11	69.74
J-26	0	258.05	419.18	69.82
J-537	6.88	226.01	387.2	69.85
J-144	6.88	225.01	386.3	69.89
J-319	6.88	226.91	388.22	69.89
J-306	6.88	224.94	386.3	69.92
J-147	6.88	224.87	386.29	69.94
J-397	6.88	227.65	389.08	69.94
J-524	6.88	225.69	387.14	69.96
J-249	6.88	224.71	386.28	70.01
J-577	6.88	229.32	390.98	70.05

2018 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-120	6.88	225.19	386.92	70.08
J-544	6.88	224.85	386.6	70.09
J-238	6.88	229.12	391.03	70.16
J-254	6.88	224.33	386.29	70.17
212	6.88	227.54	389.53	70.19
106	6.88	224.81	386.84	70.21
J-152	6.88	224.26	386.3	70.21
J-99	6.88	224.19	386.27	70.23
J-540	6.88	224.59	386.73	70.26
J-117	6.88	225	387.2	70.28
196	6.88	224.39	386.69	70.32
J-157	6.88	223.99	386.31	70.33
J-680	6.88	224.28	386.61	70.34
J-569	6.88	223.99	386.37	70.36
J-309	6.88	223.73	386.29	70.44
J-241	6.88	223.62	386.27	70.48
J-403	6.88	224.53	387.2	70.49
118	6.88	224.13	386.86	70.51
HH182	6.88	223.93	386.67	70.51
186	6.88	223.81	386.58	70.53
148	6.88	223.62	386.41	70.54
J-151	6.88	223.5	386.29	70.54
J-541	6.88	223.81	386.64	70.55
140	6.88	223.53	386.42	70.58
J-121	6.88	223.94	386.86	70.59
J-253	6.88	223.33	386.29	70.61
J-143	6.88	223.3	386.3	70.63
J-116	6.88	224.53	387.58	70.65
J-259	6.88	223.24	386.29	70.65
114	6.88	223.73	386.9	70.7
HH186	6.88	223.43	386.61	70.71
HH180	6.88	223.69	386.96	70.74
J-260	6.88	222.96	386.3	70.77
J-250	6.88	222.91	386.27	70.78
J-539	6.88	223.26	386.7	70.82
J-675	6.88	223.92	387.54	70.89
HH184	6.88	222.98	386.65	70.92
J1020	6.88	222.55	386.28	70.95
J-526	6.88	223.4	387.2	70.98
J-343	6.88	222.44	386.28	70.99
J-521	6.88	225.24	389.1	71
J-150	6.88	222.37	386.29	71.02
J-557	6.88	222.55	386.48	71.03
J-305	6.88	222.3	386.29	71.06
J-527	6.88	223.25	387.24	71.06
J-556	6.88	222.47	386.48	71.07
J-148	6.88	222.23	386.28	71.08
J-118	6.88	223.15	387.2	71.09
146	6.88	222.31	386.42	71.11

2018 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-534	6.88	223.34	387.48	71.12
28	6.88	224.04	388.21	71.13
J-97	6.88	222.13	386.29	71.13
178	6.88	222.68	386.91	71.16
116	6.88	222.66	386.92	71.17
142	6.88	222.17	386.43	71.17
J-535	6.88	223.25	387.5	71.17
J-547	6.88	222.1	386.39	71.19
J-128	6.88	221.99	386.32	71.21
144	6.88	222.06	386.43	71.22
188	6.88	222.53	386.91	71.23
J-127	6.88	222.03	386.43	71.23
138	6.88	221.96	386.43	71.27
J-145	6.88	221.74	386.32	71.31
HH30	6.88	230.19	394.8	71.33
J1030	6.88	222.54	387.22	71.36
J-546	6.88	221.61	386.39	71.4
J-257	6.88	221.41	386.29	71.44
J-512	6.88	221.48	386.36	71.44
J-533	6.88	222.51	387.39	71.44
J-529	6.88	222.35	387.39	71.51
J-352	6.88	221.76	386.84	71.53
J-552	6.88	221.15	386.39	71.59
J-126	6.88	221.2	386.45	71.6
J-542	6.88	221.37	386.62	71.6
J1012	6.88	221.03	386.28	71.61
J-545	6.88	221.1	386.39	71.62
J-299	6.88	221.05	386.38	71.63
J-551	6.88	221.03	386.39	71.65
176	6.88	221.11	386.49	71.66
J-142	6.88	220.91	386.3	71.66
J-528	6.88	221.9	387.32	71.68
J1004	6.88	220.84	386.29	71.69
J-548	6.88	220.93	386.41	71.7
HH178	6.88	221.45	387	71.73
J-96	6.88	220.76	386.3	71.73
J-301	6.88	220.74	386.3	71.74
J-98	6.88	220.71	386.28	71.74
J-530	6.88	221.71	387.33	71.76
J-531	6.88	221.67	387.29	71.76
J-268	6.88	220.83	386.48	71.78
J-549	6.88	220.74	386.39	71.78
J-555	6.88	220.7	386.4	71.8
HH188	6.88	220.63	386.37	71.82
J-134	6.88	220.82	386.58	71.82
J-284	6.88	220.52	386.28	71.82
12	6.88	222.44	388.21	71.83
194	6.88	220.92	386.69	71.83
J-251	6.88	220.49	386.27	71.83

2018 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-554	6.88	220.56	386.39	71.85
J-514	6.88	220.51	386.36	71.86
J-349	6.88	220.96	386.84	71.88
J-553	6.88	220.51	386.39	71.88
J-550	6.88	220.44	386.38	71.9
J-538	6.88	220.7	386.67	71.92
J-304	6.88	220.23	386.29	71.95
184	6.88	220.63	386.7	71.96
J-285	6.88	220.2	386.27	71.96
J-125	6.88	220.42	386.52	71.97
J-532	6.88	221.13	387.25	71.98
J-37	6.88	219.92	386.3	72.09
HH148	6.88	223.06	389.52	72.12
J-404	6.88	221.34	387.81	72.13
32	6.88	220.9	387.42	72.15
J-513	6.88	219.8	386.36	72.17
J-515	6.88	219.8	386.36	72.17
HH146	6.88	222.89	389.52	72.2
J-240	6.88	219.54	386.27	72.24
HH4	6.88	224.03	390.89	72.3
J-568	6.88	219.59	386.49	72.32
J-124	6.88	219.63	386.6	72.35
J-92	6.88	219.2	386.31	72.41
J-138	6.88	219.21	386.34	72.42
J-122	6.88	219.48	386.75	72.48
J-131	6.88	219.55	386.84	72.49
J-146	6.88	218.96	386.35	72.53
J-237	6.88	223.86	391.33	72.56
190	6.88	219.71	387.24	72.59
J-511	6.88	218.76	386.36	72.62
J-6	6.88	219.02	386.64	72.63
J-95	6.88	218.66	386.31	72.64
J1026	6.88	218.59	386.28	72.66
J-66	6.88	218.49	386.31	72.72
J-4	6.88	218.97	386.82	72.73
J-123	6.88	218.79	386.67	72.74
HH166	6.88	219.39	387.28	72.75
J-509	6.88	218.41	386.36	72.77
PH_2	6.88	218.79	386.83	72.81
J-686	6.88	218.1	386.31	72.89
J-275	6.88	218.01	386.25	72.9
J-141	6.88	218.05	386.31	72.91
180	6.88	218.7	387.07	72.95
J-135	6.88	218.14	386.49	72.95
HH238	6.88	217.9	386.34	72.99
J-283	6.88	217.82	386.27	72.99
FH_1	6.88	217.82	386.28	73
J1024	6.88	217.78	386.28	73.01
166	6.88	217.76	386.38	73.07

2018 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-252	6.88	217.62	386.27	73.08
J-507	6.88	217.68	386.36	73.09
FH_2	6.88	218.16	386.87	73.1
J-561	6.88	217.51	386.31	73.14
J-130	6.88	217.92	386.79	73.17
J-274	6.88	217.36	386.25	73.18
172	6.88	217.45	386.36	73.19
J-562	6.88	217.37	386.31	73.2
J1006	6.88	217.34	386.29	73.2
J-91	6.88	217.35	386.31	73.21
182	6.88	218.2	387.17	73.22
J-256	6.88	217.29	386.27	73.22
J-298	6.88	217.36	386.36	73.23
J-510	6.88	217.37	386.36	73.23
J-559	6.88	217.29	386.31	73.24
HH222	6.88	217.17	386.25	73.26
J-560	6.88	217.23	386.31	73.26
J-286	6.88	217.12	386.27	73.29
J-508	6.88	217.11	386.36	73.33
PH_1	6.88	216.99	386.28	73.36
J-119	6.88	217.81	387.16	73.38
J-137	6.88	217.02	386.36	73.38
J-500	6.88	216.96	386.35	73.4
J-503	6.88	216.95	386.35	73.4
J1028	6.88	216.87	386.28	73.41
J1022	6.88	216.84	386.28	73.42
J-558	6.88	216.79	386.31	73.45
HH240	6.88	216.71	386.36	73.51
164	6.88	216.66	386.36	73.53
J-133	6.88	216.91	386.68	73.56
HH170	6.88	217.45	387.28	73.59
J-501	6.88	216.49	386.35	73.6
J-522	6.88	217.17	387.08	73.62
54	6.88	219.11	389.04	73.63
J-567	6.88	216.34	386.31	73.65
PH_8	6.88	219.54	389.53	73.66
HH144	6.88	219.49	389.52	73.67
J-140	6.88	216.28	386.32	73.68
J-287	6.88	216.21	386.27	73.69
J-504	6.88	216.22	386.35	73.72
HH164	6.88	217.16	387.33	73.73
J-311	6.88	216.15	386.36	73.75
130	6.88	219.29	389.52	73.76
J-302	6.88	215.99	386.3	73.79
J-505	6.88	216.01	386.35	73.81
J-93	6.88	215.94	386.31	73.82
J-273	6.88	215.81	386.25	73.85
HH154	6.88	218.99	389.52	73.89
170	6.88	215.81	386.35	73.9

2018 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
HH212	6.88	215.69	386.24	73.9
J-314	6.88	215.76	386.36	73.92
J-506	6.88	215.74	386.36	73.93
J-312	6.88	215.63	386.36	73.98
J-69	6.88	215.54	386.29	73.99
J-303	6.88	215.45	386.3	74.03
J-132	6.88	215.99	386.89	74.05
J-516	6.88	215.44	386.36	74.06
J-502	6.88	215.38	386.35	74.08
J-136	6.88	215.3	386.42	74.15
J1010	6.88	215.06	386.29	74.19
HH218	6.88	214.98	386.24	74.21
174	6.88	214.98	386.36	74.26
HH230	6.88	214.76	386.24	74.31
HH226	6.88	214.61	386.25	74.37
J-351	6.88	215.26	386.91	74.38
J-313	6.88	214.66	386.36	74.4
J-226	6.88	219.78	391.77	74.52
168	6.88	214.22	386.35	74.58
J-59	6.88	213.98	386.29	74.66
J-272	6.88	213.86	386.25	74.7
HH224	6.88	213.68	386.25	74.77
J-564	6.88	213.61	386.31	74.83
J-690	6.88	213.51	386.36	74.9
HH220	6.88	213.25	386.25	74.96
HH210	6.88	212.99	386.24	75.07
HH234	6.88	213	386.25	75.07
HH208	6.88	212.89	386.24	75.12
J-563	6.88	212.9	386.31	75.14
J-566	6.88	212.89	386.31	75.14
HH168	6.88	213.83	387.32	75.18
HH206	6.88	212.7	386.24	75.2
J-70	6.88	212.72	386.28	75.2
J-565	6.88	212.46	386.31	75.33
HH22	6.88	220.56	394.8	75.5
J-270	6.88	211.78	386.25	75.6
HH150	6.88	215.02	389.52	75.61
J-687	6.88	211.76	386.25	75.61
J-129	6.88	211.66	386.25	75.65
30	6.88	213.16	388.21	75.85
10	6.88	213.07	388.21	75.89
J-68	6.88	211.13	386.3	75.9
J-688	6.88	210.98	386.26	75.95
HH236	6.88	210.68	386.25	76.07
FH_8	6.88	213.9	389.53	76.1
HH204	6.88	210.52	386.25	76.14
J-266	6.88	210.41	386.25	76.19
J-271	6.88	210.3	386.25	76.24
HH232	6.88	210.26	386.25	76.26

2018 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-71	6.88	210.27	386.27	76.26
128	6.88	213.5	389.53	76.27
HH228	6.88	210.22	386.25	76.27
J-263	6.88	210.16	386.26	76.3
HH216	6.88	210.13	386.24	76.31
J-267	6.88	210.05	386.25	76.35
J-62	6.88	209.67	386.25	76.52
J-67	6.88	209.69	386.31	76.53
HH162	6.88	212.49	389.25	76.59
J-264	6.88	209.3	386.25	76.67
FH_3	6.88	209.17	386.25	76.73
HH172	6.88	210.2	387.36	76.76
HH190	6.88	209.04	386.24	76.78
J-265	6.88	209.02	386.25	76.79
56	6.88	211.68	389.06	76.86
192	6.88	209.91	387.36	76.89
52	6.88	211.48	388.96	76.9
HH160	6.88	211.85	389.35	76.91
HH214	6.88	208.71	386.24	76.93
HH198	6.88	208.68	386.24	76.94
HH200	6.88	208.63	386.24	76.96
HH196	6.88	208.59	386.25	76.98
J-689	6.88	208.24	386.26	77.14
126	6.88	211.26	389.53	77.24
HH158	6.88	210.9	389.27	77.29
38	6.88	210.15	388.68	77.36
J-72	6.88	207.63	386.27	77.41
HH202	6.88	207.46	386.25	77.47
PH_3	6.88	207.36	386.25	77.52
HH156	6.88	209.81	389.3	77.77
50	6.88	209.29	388.96	77.85
J-262	6.88	206.37	386.26	77.95
42	6.88	208.37	388.73	78.15
48	6.88	208.18	388.86	78.29
46	6.88	207.61	388.86	78.54
44	6.88	206.38	388.78	79.03
40	6.88	205.77	388.73	79.28
132	6.88	205.74	388.73	79.29
FH_10	6.88	209.94	394.8	80.1
HH26	6.88	207.8	394.8	81.02
RM6	6.88	206.49	394.78	81.58
HH140	0	380.31	568.96	81.74
HH34	6.88	197.47	394.8	85.5
HH38	6.88	193.45	394.8	87.24
J-666	6.88	360.72	568.11	89.86
J-664	6.88	359.94	568.11	90.2
HH58	6.88	359.88	568.1	90.22
HH24	6.88	183.01	394.8	91.77
HH60	6.88	349.39	567.95	94.7

2018 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
HH118	6.88	346.5	567.93	95.95
HH62	6.88	345.99	567.9	96.15
HH32	6.88	172.14	394.8	96.48
HH68	6.88	345.13	567.9	96.53
HH70	6.88	342.67	567.89	97.59
HH72	6.88	341.28	567.86	98.18
HH76	6.88	337.62	567.84	99.75
HH74	6.88	337.38	567.84	99.86
HH78	6.88	335.92	567.83	100.49
HH64	6.88	334.76	567.86	101
HH116	6.88	334.79	567.92	101.02
HH80	6.88	333.85	567.83	101.39
HH86	6.88	331.93	567.83	102.21
HH92	6.88	331.88	567.83	102.24
HH84	6.88	330.67	567.83	102.76
HH114	6.88	328.16	567.87	103.87
HH82	6.88	324.36	567.83	105.5
HH66	6.88	322.94	567.84	106.12
HH128	6.88	322.58	567.83	106.27
HH88	6.88	320.95	567.83	106.97
RM8	6.88	145.14	394.78	108.17
PH_9	6.88	318.1	567.84	108.21
HH96	6.88	317.79	567.84	108.35
HH124	6.88	317.55	567.83	108.45
HH94	6.88	316.64	567.83	108.84
HH90	6.88	316.62	567.83	108.85
HH126	6.88	315.66	567.83	109.27
HH122	6.88	313.18	567.83	110.34
HH98	6.88	311.49	567.83	111.07
FH_9	6.88	309.15	567.83	112.08
HH100	6.88	308.36	567.83	112.43
HH102	6.88	306.46	567.82	113.25
HH120	6.88	305.86	567.83	113.51
HH130	6.88	305.13	567.84	113.83
HH112	6.88	301.38	567.83	115.46
J-595	6.88	294.47	567.82	118.44
HH104	6.88	290.75	567.82	120.05
HH106	6.88	271.51	567.82	128.39
HH108	6.88	257.32	567.81	134.54
HH110	6.88	252.77	567.81	136.51

2028 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-662	0	263.07	267.69	2
J-589	0	263.16	267.82	2.02
J-586	0	262.97	267.82	2.1
J-663	0	257.33	263.86	2.83
J-672	0	257.02	264.56	3.27
J-584	0	258.41	267.82	4.08
J-585	0	258.36	267.82	4.1
J-583	0	258.34	267.82	4.11
J-582	0	258.26	267.82	4.14
J-587	0	257.91	267.82	4.29
J-588	0	257.38	267.82	4.52
J-668	0	257.02	267.49	4.54
J-1	0	256.9	267.82	4.73
J-659	0	380.49	395.35	6.44
J-323	0	380.32	395.23	6.46
J-667	0	379.99	395.17	6.58
J-660	0	379.72	395.26	6.73
J-661	0	379.67	395.35	6.79
J-665	0	360.56	393.47	14.26
J-324	0	359.78	393.47	14.6
J-658	0	360.68	395.35	15.02
HH16	0	327.5	393.34	28.53
RM4	8.74	305.16	393.24	38.17
RM2	8.74	296.14	393.24	42.08
J-322	8.74	288.64	385.77	42.09
HH12	8.74	284.17	385.44	43.88
66	8.74	282.78	384.43	44.04
J-393	8.74	282.82	385.25	44.38
J-104	8.74	276.85	380.18	44.77
72	8.74	281.15	384.54	44.8
J-591	8.74	276.78	380.25	44.83
J-592	8.74	276.78	380.24	44.83
PH_4	8.74	275.95	380.19	45.17
J-103	8.74	275.4	379.86	45.26
64	8.74	278.75	383.3	45.3
J-655	8.74	280.17	385.4	45.59
112	8.74	278	383.74	45.82
J-106	8.74	273.67	380.64	46.35
J-518	8.74	272.92	379.89	46.35
J-593	8.74	273.44	380.66	46.46
J-112	8.74	270.75	379.98	47.33
J-107	8.74	270.19	381.15	48.08
70	8.74	272.04	383.29	48.21
HH14	0	283.47	395.35	48.48
J-653	8.74	270.79	385.36	49.64
J-108	8.74	266.26	381.34	49.86
J-206	8.74	262.08	377.73	50.11
J-517	8.74	263.81	379.65	50.19
122	0	281.94	398.05	50.31

2028 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-205	8.74	261	377.73	50.58
FH_4	8.74	261.34	379.78	51.32
J-654	8.74	265.5	385.25	51.89
J-207	8.74	257.8	377.73	51.97
J-109	8.74	261.3	381.51	52.08
J-102	8.74	259.21	379.5	52.12
J-204	8.74	257.42	377.74	52.13
HH138	8.74	262.06	382.91	52.36
J-203	8.74	256.62	377.74	52.48
J-685	8.74	258.35	379.48	52.49
HH142	8.74	256.53	379.71	53.37
J-183	8.74	252.87	376.45	53.55
J-671	0	257.89	381.81	53.7
J-670	0	257.78	381.81	53.74
J-674	0	258.06	383.07	54.17
J-184	8.74	251.13	376.27	54.22
J-630	8.74	250.26	375.48	54.26
J-629	8.74	250.05	375.48	54.35
J-139	8.74	251.43	376.94	54.39
J-182	8.74	251.04	376.69	54.45
J-179	8.74	249.74	375.53	54.5
J-613	8.74	249.78	375.55	54.5
J-622	8.74	249.5	375.48	54.58
J-623	8.74	249.23	375.48	54.7
J-620	8.74	249.18	375.48	54.72
J-402	8.74	249.14	375.52	54.76
J-111	8.74	253.74	380.33	54.85
J-225	8.74	249.45	376.11	54.88
J-208	8.74	250.95	377.72	54.93
J-180	8.74	248.9	375.76	54.97
J-401	8.74	248.59	375.52	55
J-673	0	258.06	385.05	55.02
J-579	0	254.57	381.63	55.05
J-611	8.74	248.29	375.55	55.14
J-105	8.74	249.84	377.16	55.17
J-609	8.74	247.99	375.55	55.27
J-621	8.74	247.8	375.48	55.32
J-170	8.74	247.35	375.19	55.39
J-615	8.74	247.59	375.58	55.46
J-300	8.74	247.45	375.52	55.49
J-181	8.74	247.63	375.96	55.61
J-651	8.74	254.23	382.61	55.63
J-89	8.74	246.84	375.28	55.65
94	8.74	249.41	377.99	55.71
J-83	8.74	246.51	375.32	55.81
J-172	8.74	246.3	375.2	55.85
J-110	8.74	252.1	381.03	55.87
86	8.74	249.1	378.12	55.9
J-619	8.74	246.26	375.48	55.99

2028 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
74	8.74	249.78	379.03	56
J-616	8.74	246.24	375.51	56.01
J-176	8.74	245.99	375.35	56.05
J-80	8.74	245.92	375.32	56.07
HH18	8.74	263.81	393.27	56.09
76	8.74	249.02	378.66	56.17
88	8.74	248.45	378.13	56.19
J-173	8.74	245.52	375.19	56.19
J-618	8.74	245.81	375.48	56.19
110	8.74	252.68	382.56	56.28
J-171	8.74	245.31	375.19	56.28
J-87	8.74	245.37	375.28	56.29
98	8.74	248.69	378.66	56.32
J-606	8.74	245.47	375.5	56.34
J-165	8.74	245.04	375.17	56.38
J-573	8.74	248.49	378.66	56.4
100	8.74	248.4	378.58	56.41
J-603	8.74	245.22	375.47	56.44
J-88	8.74	245.03	375.28	56.44
J-168	8.74	244.84	375.18	56.47
J-202	8.74	247.4	377.76	56.48
J-224	8.74	247.49	377.92	56.52
78	8.74	248.1	378.56	56.53
J-634	8.74	244.94	375.46	56.56
J-177	8.74	244.85	375.42	56.58
J-192	8.74	247.3	377.93	56.6
J-169	8.74	244.52	375.18	56.61
J-90	8.74	244.59	375.28	56.63
J-191	8.74	247.11	377.9	56.67
J-605	8.74	244.68	375.5	56.69
J-166	8.74	244.27	375.17	56.72
J-642	8.74	244.47	375.38	56.72
108	8.74	251.72	382.65	56.73
J-174	8.74	244.28	375.24	56.75
J-590	8.74	249.52	380.49	56.75
J-693	8.74	244.15	375.17	56.77
J-576	8.74	248.15	379.21	56.79
J-315	8.74	244.52	375.61	56.8
92	8.74	246.85	378.06	56.85
J-164	8.74	243.85	375.18	56.9
J-645	8.74	243.97	375.32	56.91
J-572	8.74	243.76	375.18	56.95
J-624	8.74	244.05	375.48	56.95
J-77	8.74	243.87	375.33	56.96
J-628	8.74	243.89	375.48	57.02
J-76	8.74	243.7	375.35	57.05
J-81	8.74	243.58	375.32	57.08
102	8.74	246.74	378.5	57.09
HH136	8.74	250.98	382.73	57.09

2028 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-641	8.74	243.7	375.46	57.09
PH_5	8.74	246.5	378.27	57.09
J-163	8.74	243.39	375.18	57.1
J-399	8.74	243.72	375.52	57.11
J-82	8.74	243.53	375.32	57.11
60	8.74	249.73	381.59	57.13
J-167	8.74	243.32	375.18	57.14
J-646	8.74	243.45	375.32	57.14
90	8.74	246.38	378.27	57.15
J-223	8.74	246.75	378.64	57.15
J-84	8.74	243.42	375.33	57.16
J-78	8.74	243.34	375.32	57.19
J-682	8.74	245.31	377.4	57.24
J-610	8.74	243.47	375.58	57.25
J-197	8.74	245.26	377.41	57.26
J-632	8.74	243.3	375.46	57.27
80	8.74	246.21	378.47	57.31
FH_6	8.74	243	375.27	57.31
J-235	8.74	246.26	378.52	57.31
J-627	8.74	243.17	375.48	57.33
J-75	8.74	243.11	375.47	57.35
PH_6	8.74	242.83	375.28	57.39
J-79	8.74	242.8	375.32	57.42
J-85	8.74	242.83	375.34	57.42
J-636	8.74	242.87	375.47	57.45
J-608	8.74	242.83	375.5	57.49
J-162	8.74	242.49	375.19	57.5
J-649	8.74	245.53	378.23	57.5
J-175	8.74	242.47	375.3	57.55
J-643	8.74	242.56	375.39	57.56
J-198	8.74	244.46	377.44	57.62
J-607	8.74	242.52	375.5	57.62
J-626	8.74	242.5	375.48	57.62
J-617	8.74	242.46	375.49	57.64
82	8.74	245.23	378.44	57.72
J-316	8.74	242.34	375.59	57.74
96	8.74	244.55	377.93	57.79
J-201	8.74	243.99	377.46	57.83
J-73	8.74	241.96	375.45	57.84
84	8.74	244.68	378.2	57.85
J-200	8.74	244.18	377.75	57.87
J-650	8.74	249.03	382.61	57.88
J-625	8.74	241.82	375.48	57.92
J-185	8.74	244.06	377.77	57.94
J-631	8.74	241.74	375.47	57.94
J-199	8.74	243.71	377.6	58.01
J-74	8.74	241.58	375.46	58.01
J-639	8.74	241.56	375.46	58.02
J-194	8.74	243.54	377.6	58.09

2028 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-648	8.74	244.13	378.23	58.1
J-640	8.74	241.33	375.46	58.12
J-187	8.74	243.43	377.59	58.13
J-195	8.74	243.24	377.55	58.2
J-186	8.74	243.09	377.59	58.28
J-647	8.74	243.5	378.27	58.39
J-189	8.74	242.8	377.59	58.4
J-597	8.74	240.65	375.47	58.42
J-86	8.74	240.43	375.28	58.43
J-604	8.74	240.56	375.47	58.45
68	8.74	247.12	382.13	58.5
J-178	8.74	240.42	375.47	58.52
J-209	8.74	242.65	377.71	58.52
J-635	8.74	240.35	375.46	58.55
J-633	8.74	240.28	375.46	58.57
J-637	8.74	239.99	375.46	58.7
J-100	8.74	242.25	377.83	58.75
J-190	8.74	241.89	377.59	58.8
J-196	8.74	241.74	377.51	58.83
J-644	8.74	239.74	375.5	58.83
J-600	8.74	239.68	375.47	58.84
J-295	8.74	239.65	375.54	58.88
J-45	8.74	246.56	382.45	58.88
J-691	8.74	239.27	375.16	58.88
J-570	8.74	239.23	375.17	58.9
J-598	8.74	239.5	375.47	58.91
J-657	8.74	242.97	378.92	58.91
J-400	8.74	239.45	375.47	58.94
J-596	8.74	239.41	375.49	58.96
162	8.74	239.15	375.49	59.08
J-694	8.74	242.56	378.92	59.08
FH_5	8.74	242.08	378.5	59.11
J-697	8.74	242.02	378.48	59.13
J-695	8.74	241.99	378.5	59.15
J-154	8.74	238.58	375.16	59.18
26	8.74	242.32	378.92	59.19
J-575	8.74	242.05	378.8	59.25
J-571	8.74	238.35	375.17	59.28
J-160	8.74	238.37	375.23	59.3
J-239	8.74	242.64	379.5	59.3
J-236	8.74	241.61	378.5	59.32
J-638	8.74	238.49	375.46	59.35
J-656	8.74	245.48	382.45	59.35
J-218	8.74	242.05	379.21	59.43
J-599	8.74	238.3	375.47	59.44
J-296	8.74	237.82	375.37	59.6
J-219	8.74	241.01	378.8	59.7
J-221	8.74	240.79	378.62	59.72
FH_7	8.74	238.84	376.74	59.75

2028 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-652	8.74	247.39	385.3	59.76
J-696	8.74	240.68	378.6	59.76
18	8.74	241	379.37	59.95
160	8.74	238.3	376.74	59.99
J-246	8.74	236.56	375.03	60
J-222	8.74	240.12	378.62	60.01
34	8.74	240.39	378.92	60.02
HH174	8.74	237.99	376.74	60.12
HH134	8.74	243.87	382.67	60.15
62	8.74	241.63	380.52	60.18
210	8.74	237.77	376.74	60.22
J-317	8.74	238.39	377.51	60.28
HH176	8.74	237.27	376.78	60.45
22	8.74	239.68	379.22	60.47
J-574	8.74	239.08	378.67	60.49
156	8.74	236.99	376.78	60.57
198	8.74	237.43	377.39	60.64
J-101	8.74	238.98	378.95	60.65
J-318	8.74	239.79	379.76	60.65
16	8.74	239.28	379.39	60.71
HH40	8.74	253.04	393.26	60.76
J-220	8.74	238.47	378.7	60.76
152	8.74	236.67	376.96	60.79
24	8.74	238.38	378.96	60.91
J-683	8.74	236.82	377.51	60.96
J-594	8.74	237.05	378.16	61.15
J-155	8.74	233.68	375.16	61.3
104	8.74	237.41	378.91	61.31
J-161	8.74	233.78	375.27	61.31
J-519	8.74	236.44	377.96	61.32
J-243	8.74	233.37	375.03	61.38
58	8.74	239.65	381.49	61.46
J-153	8.74	232.83	375.14	61.66
158	8.74	234.31	376.7	61.7
J-261	8.74	233.39	375.78	61.7
J-114	8.74	235.51	377.96	61.72
J-684	8.74	235.35	377.96	61.79
PH_7	8.74	234.02	376.72	61.83
J-297	8.74	232.17	375.29	62.01
14	8.74	236.05	379.44	62.13
154	8.74	233.28	376.7	62.14
HH8	8.74	240.76	385.26	62.61
J-115	8.74	233.34	377.96	62.66
J-290	8.74	229.99	375.01	62.84
J-294	8.74	229.98	375.02	62.85
J-350	8.74	231.48	376.65	62.9
J-159	8.74	229.69	375.17	63.04
J-247	8.74	229.44	375.02	63.08
J-94	8.74	229.46	375.13	63.12

2028 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-156	8.74	229.39	375.16	63.16
HH132	8.74	236.58	382.45	63.21
HH10	8.74	238.69	385.26	63.51
J-308	8.74	228.42	375.05	63.53
J-536	8.74	229.41	376.08	63.55
36	8.74	233.34	380.03	63.56
J-578	8.74	233.3	380.03	63.58
J-244	8.74	227.98	375.02	63.71
J-692	8.74	227.79	375.03	63.8
J-258	8.74	227.78	375.05	63.81
J-347	8.74	228.85	376.36	63.92
J-293	8.74	227.49	375.02	63.93
J-113	8.74	230.42	377.98	63.94
J-291	8.74	227.06	375.03	64.11
J-292	8.74	226.94	375.02	64.16
J-158	8.74	227.04	375.15	64.17
HH20	8.74	244.78	393.25	64.34
J-248	8.74	226.51	375.02	64.35
J-345	8.74	227.78	376.29	64.35
20	8.74	230.94	379.61	64.42
J-149	8.74	226.35	375.04	64.43
J-245	8.74	226.29	375.02	64.44
J-543	8.74	226.31	375.02	64.44
J-242	8.74	226.3	375.03	64.45
J-255	8.74	226.04	375.04	64.56
J-289	8.74	225.96	375.02	64.59
J-288	8.74	225.88	375.02	64.62
J-346	8.74	227.2	376.34	64.62
J-525	8.74	226.32	375.7	64.72
J-523	8.74	226.16	375.62	64.76
J-307	8.74	225.55	375.04	64.78
J-537	8.74	226.01	375.73	64.88
J-353	8.74	226.6	376.43	64.92
J-524	8.74	225.69	375.66	64.98
J-144	8.74	225.01	375.03	65.01
J-306	8.74	224.94	375.09	65.06
J-147	8.74	224.87	375.03	65.07
J-544	8.74	224.85	375.01	65.07
J-120	8.74	225.19	375.42	65.09
J-249	8.74	224.71	375.03	65.14
RM12	8.74	242.85	393.21	65.15
J-540	8.74	224.59	375.18	65.25
J-254	8.74	224.33	375.05	65.3
J-117	8.74	225	375.73	65.31
J-577	8.74	229.32	380.11	65.34
HH2	8.74	234.4	385.26	65.36
J-152	8.74	224.26	375.1	65.36
J-99	8.74	224.19	375.04	65.36
J-238	8.74	229.12	380.17	65.45

2028 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
HH36	8.74	242.17	393.25	65.46
J-157	8.74	223.99	375.15	65.49
148	8.74	223.62	374.8	65.5
J-403	8.74	224.53	375.73	65.52
J-541	8.74	223.81	375.06	65.54
140	8.74	223.53	374.81	65.55
J-569	8.74	223.99	375.27	65.55
J-309	8.74	223.73	375.07	65.57
J-121	8.74	223.94	375.34	65.6
J-241	8.74	223.62	375.04	65.61
J-151	8.74	223.5	375.08	65.68
J-680	8.74	224.28	375.88	65.69
106	8.74	224.81	376.43	65.7
J-116	8.74	224.53	376.17	65.71
J-143	8.74	223.3	374.93	65.71
196	8.74	224.39	376.07	65.72
J-253	8.74	223.33	375.03	65.73
J-259	8.74	223.24	375.07	65.79
J-539	8.74	223.26	375.14	65.81
186	8.74	223.81	375.79	65.85
HH182	8.74	223.93	376.02	65.9
J-250	8.74	222.91	375.02	65.91
J-260	8.74	222.96	375.09	65.92
J-675	8.74	223.92	376.12	65.95
J-526	8.74	223.4	375.73	66
J-557	8.74	222.55	374.87	66
J1020	8.74	222.55	374.87	66
118	8.74	224.13	376.47	66.01
HH28	8.74	240.87	393.24	66.03
J-556	8.74	222.47	374.87	66.04
HH186	8.74	223.43	375.88	66.06
146	8.74	222.31	374.81	66.08
J-527	8.74	223.25	375.78	66.09
J-118	8.74	223.15	375.73	66.12
J-343	8.74	222.44	375.03	66.12
142	8.74	222.17	374.81	66.14
J-547	8.74	222.1	374.75	66.14
J-150	8.74	222.37	375.06	66.16
J-319	8.74	226.91	379.6	66.16
J-521	8.74	225.24	377.96	66.17
J-534	8.74	223.34	376.05	66.17
J-128	8.74	221.99	374.73	66.18
144	8.74	222.06	374.81	66.19
J-127	8.74	222.03	374.81	66.2
J-148	8.74	222.23	375.03	66.21
J-305	8.74	222.3	375.09	66.21
114	8.74	223.73	376.56	66.22
J-535	8.74	223.25	376.08	66.22
138	8.74	221.96	374.82	66.23

2028 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-97	8.74	222.13	375.09	66.27
HH184	8.74	222.98	375.97	66.29
HH180	8.74	223.69	376.71	66.3
J-546	8.74	221.61	374.75	66.36
J1030	8.74	222.54	375.75	66.39
HH6	8.74	232.02	385.26	66.4
J-512	8.74	221.48	374.82	66.44
J-145	8.74	221.74	375.11	66.45
J-533	8.74	222.51	375.95	66.48
RM10	8.74	239.66	393.22	66.54
J-529	8.74	222.35	375.94	66.55
J-552	8.74	221.15	374.74	66.55
J-126	8.74	221.2	374.83	66.57
J-257	8.74	221.41	375.06	66.57
J-545	8.74	221.1	374.75	66.57
J-542	8.74	221.37	375.04	66.58
J-551	8.74	221.03	374.74	66.6
J-397	8.74	227.65	381.44	66.64
J-548	8.74	220.93	374.77	66.66
J1012	8.74	221.03	374.87	66.66
178	8.74	222.68	376.6	66.69
116	8.74	222.66	376.61	66.71
J-528	8.74	221.9	375.87	66.71
J-142	8.74	220.91	374.89	66.72
J-549	8.74	220.74	374.74	66.73
J-268	8.74	220.83	374.87	66.75
J-555	8.74	220.7	374.75	66.75
J1004	8.74	220.84	374.88	66.75
188	8.74	222.53	376.59	66.76
J-530	8.74	221.71	375.88	66.8
J-531	8.74	221.67	375.83	66.8
J-554	8.74	220.56	374.74	66.81
J-299	8.74	221.05	375.28	66.83
J-553	8.74	220.51	374.74	66.83
J-134	8.74	220.82	375.07	66.84
J-550	8.74	220.44	374.74	66.86
J-514	8.74	220.51	374.82	66.87
J-301	8.74	220.74	375.09	66.88
J-96	8.74	220.76	375.11	66.88
J-98	8.74	220.71	375.05	66.88
J-538	8.74	220.7	375.09	66.9
176	8.74	221.11	375.57	66.92
J-125	8.74	220.42	374.92	66.95
J-284	8.74	220.52	375.04	66.95
J-251	8.74	220.49	375.02	66.96
HH188	8.74	220.63	375.27	67
J-532	8.74	221.13	375.79	67.01
J-352	8.74	221.76	376.43	67.02
J-285	8.74	220.2	375.02	67.08

2028 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-304	8.74	220.23	375.09	67.1
212	8.74	227.54	382.42	67.11
J-37	8.74	219.92	374.86	67.14
J-513	8.74	219.8	374.82	67.17
J-515	8.74	219.8	374.82	67.17
J-404	8.74	221.34	376.44	67.2
194	8.74	220.92	376.07	67.23
HH178	8.74	221.45	376.81	67.32
J-124	8.74	219.63	375.01	67.33
J-568	8.74	219.59	374.98	67.33
184	8.74	220.63	376.08	67.36
J-349	8.74	220.96	376.43	67.37
J-240	8.74	219.54	375.04	67.38
28	8.74	224.04	379.59	67.4
J-138	8.74	219.21	374.85	67.44
J-122	8.74	219.48	375.2	67.47
J-131	8.74	219.55	375.33	67.5
J-92	8.74	219.2	375.14	67.57
J-6	8.74	219.02	375.07	67.61
J-511	8.74	218.76	374.84	67.63
J-146	8.74	218.96	375.2	67.7
J1026	8.74	218.59	374.87	67.72
J-123	8.74	218.79	375.1	67.73
J-4	8.74	218.97	375.32	67.74
J-66	8.74	218.49	374.82	67.74
J-509	8.74	218.41	374.84	67.78
J-95	8.74	218.66	375.14	67.8
PH_2	8.74	218.79	375.32	67.82
J-275	8.74	218.01	374.67	67.88
J-237	8.74	223.86	380.56	67.9
J-686	8.74	218.1	374.82	67.91
J-141	8.74	218.05	374.84	67.94
J-135	8.74	218.14	374.98	67.96
32	8.74	220.9	377.79	67.98
J-26	0	258.05	414.96	67.99
HH238	8.74	217.9	374.84	68
FH_1	8.74	217.82	374.87	68.05
166	8.74	217.76	374.86	68.07
J1024	8.74	217.78	374.87	68.07
12	8.74	222.44	379.59	68.09
J-507	8.74	217.68	374.84	68.1
J-283	8.74	217.82	375.02	68.11
FH_2	8.74	218.16	375.36	68.12
J-274	8.74	217.36	374.67	68.16
J-561	8.74	217.51	374.82	68.16
J-130	8.74	217.92	375.29	68.19
172	8.74	217.45	374.84	68.2
J-252	8.74	217.62	375.02	68.2
J-562	8.74	217.37	374.82	68.22

2028 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-510	8.74	217.37	374.84	68.23
HH222	8.74	217.17	374.66	68.24
J-559	8.74	217.29	374.82	68.26
J1006	8.74	217.34	374.88	68.26
J-560	8.74	217.23	374.82	68.28
190	8.74	219.71	377.37	68.31
J-256	8.74	217.29	375.02	68.34
J-508	8.74	217.11	374.84	68.34
J-91	8.74	217.35	375.14	68.37
J-137	8.74	217.02	374.86	68.39
PH_10	8.74	235.38	393.24	68.4
J-119	8.74	217.81	375.69	68.41
J-500	8.74	216.96	374.83	68.41
J-503	8.74	216.95	374.83	68.41
PH_1	8.74	216.99	374.87	68.41
J-286	8.74	217.12	375.02	68.42
J-298	8.74	217.36	375.26	68.42
J1028	8.74	216.87	374.87	68.46
J-558	8.74	216.79	374.82	68.47
J1022	8.74	216.84	374.87	68.48
HH166	8.74	219.39	377.46	68.49
HH240	8.74	216.71	374.86	68.53
164	8.74	216.66	374.84	68.54
180	8.74	218.7	376.96	68.57
J-133	8.74	216.91	375.17	68.58
J-501	8.74	216.49	374.83	68.61
J-522	8.74	217.17	375.59	68.64
J-567	8.74	216.34	374.82	68.67
J-140	8.74	216.28	374.84	68.7
J-504	8.74	216.22	374.83	68.72
J-287	8.74	216.21	375.01	68.81
J-505	8.74	216.01	374.83	68.82
J-273	8.74	215.81	374.67	68.83
HH212	8.74	215.69	374.66	68.88
182	8.74	218.2	377.21	68.9
170	8.74	215.81	374.83	68.91
J-506	8.74	215.74	374.83	68.93
J-302	8.74	215.99	375.09	68.94
J-311	8.74	216.15	375.26	68.94
J-93	8.74	215.94	375.14	68.98
J-69	8.74	215.54	374.76	68.99
HH148	8.74	223.06	382.4	69.04
J-132	8.74	215.99	375.38	69.06
J-516	8.74	215.44	374.83	69.06
J-502	8.74	215.38	374.83	69.09
J-314	8.74	215.76	375.25	69.11
HH146	8.74	222.89	382.4	69.12
J-136	8.74	215.3	374.92	69.16
J-303	8.74	215.45	375.09	69.17

2028 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-312	8.74	215.63	375.25	69.17
HH218	8.74	214.98	374.66	69.19
J1010	8.74	215.06	374.87	69.25
174	8.74	214.98	374.83	69.26
HH230	8.74	214.76	374.66	69.29
HH170	8.74	217.45	377.46	69.33
HH226	8.74	214.61	374.66	69.35
HH164	8.74	217.16	377.58	69.51
J-313	8.74	214.66	375.25	69.58
168	8.74	214.22	374.83	69.59
J-59	8.74	213.98	374.77	69.67
J-272	8.74	213.86	374.67	69.68
HH224	8.74	213.68	374.66	69.76
HH4	8.74	224.03	385.26	69.86
J-564	8.74	213.61	374.84	69.86
J-226	8.74	219.78	381.12	69.91
J-351	8.74	215.26	376.6	69.91
HH220	8.74	213.25	374.66	69.94
HH210	8.74	212.99	374.66	70.05
HH234	8.74	213	374.67	70.05
J-690	8.74	213.51	375.25	70.08
HH208	8.74	212.89	374.66	70.1
J-563	8.74	212.9	374.83	70.16
J-566	8.74	212.89	374.84	70.17
HH206	8.74	212.7	374.66	70.18
J-70	8.74	212.72	374.74	70.2
54	8.74	219.11	381.38	70.31
J-565	8.74	212.46	374.82	70.35
PH_8	8.74	219.54	382.41	70.57
J-270	8.74	211.78	374.67	70.58
HH144	8.74	219.49	382.4	70.59
J-687	8.74	211.76	374.67	70.59
J-129	8.74	211.66	374.67	70.63
HH30	8.74	230.19	393.24	70.65
130	8.74	219.29	382.4	70.67
HH154	8.74	218.99	382.4	70.81
J-68	8.74	211.13	374.79	70.92
J-688	8.74	210.98	374.67	70.93
HH168	8.74	213.83	377.57	70.95
HH236	8.74	210.68	374.67	71.05
HH204	8.74	210.52	374.67	71.12
J-266	8.74	210.41	374.67	71.17
J-271	8.74	210.3	374.67	71.22
HH232	8.74	210.26	374.67	71.24
HH228	8.74	210.22	374.67	71.25
J-71	8.74	210.27	374.73	71.26
HH216	8.74	210.13	374.66	71.29
J-263	8.74	210.16	374.68	71.29
J-267	8.74	210.05	374.67	71.33

2028 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-62	8.74	209.67	374.68	71.5
J-67	8.74	209.69	374.81	71.55
J-264	8.74	209.3	374.68	71.66
FH_3	8.74	209.17	374.68	71.72
HH190	8.74	209.04	374.66	71.76
J-265	8.74	209.02	374.67	71.78
HH214	8.74	208.71	374.66	71.91
HH198	8.74	208.68	374.66	71.92
HH200	8.74	208.63	374.66	71.94
HH196	8.74	208.59	374.67	71.96
30	8.74	213.16	379.59	72.11
J-689	8.74	208.24	374.67	72.12
10	8.74	213.07	379.59	72.15
J-72	8.74	207.63	374.71	72.4
HH202	8.74	207.46	374.67	72.45
PH_3	8.74	207.36	374.68	72.5
HH150	8.74	215.02	382.4	72.53
HH172	8.74	210.2	377.65	72.56
192	8.74	209.91	377.65	72.68
J-262	8.74	206.37	374.7	72.94
FH_8	8.74	213.9	382.41	73.01
128	8.74	213.5	382.41	73.19
HH162	8.74	212.49	381.83	73.37
52	8.74	211.48	381.21	73.54
56	8.74	211.68	381.42	73.55
HH160	8.74	211.85	382.05	73.75
38	8.74	210.15	380.61	73.86
HH158	8.74	210.9	381.87	74.08
126	8.74	211.26	382.41	74.16
50	8.74	209.29	381.21	74.49
HH156	8.74	209.81	381.94	74.58
42	8.74	208.37	380.73	74.68
HH22	8.74	220.56	393.25	74.83
48	8.74	208.18	381	74.88
46	8.74	207.61	381	75.13
44	8.74	206.38	380.83	75.59
40	8.74	205.77	380.72	75.81
132	8.74	205.74	380.72	75.82
FH_10	8.74	209.94	393.24	79.42
HH26	8.74	207.8	393.24	80.35
RM6	8.74	206.49	393.21	80.91
HH140	0	380.31	567.76	81.22
HH34	8.74	197.47	393.25	84.83
HH38	8.74	193.45	393.25	86.57
J-666	8.74	360.72	566.42	89.13
J-664	8.74	359.94	566.43	89.48
HH58	8.74	359.88	566.42	89.49
HH24	8.74	183.01	393.24	91.09
HH60	8.74	349.39	566.18	93.94

2028 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
HH118	8.74	346.5	566.15	95.18
HH62	8.74	345.99	566.1	95.37
HH68	8.74	345.13	566.1	95.75
HH32	8.74	172.14	393.24	95.8
HH70	8.74	342.67	566.09	96.81
HH72	8.74	341.28	566.05	97.39
HH76	8.74	337.62	566.01	98.96
HH74	8.74	337.38	566	99.06
HH78	8.74	335.92	565.99	99.69
HH64	8.74	334.76	566.05	100.22
HH116	8.74	334.79	566.13	100.24
HH80	8.74	333.85	565.99	100.59
HH86	8.74	331.93	565.99	101.42
HH92	8.74	331.88	566	101.44
HH84	8.74	330.67	565.99	101.96
HH114	8.74	328.16	566.05	103.08
HH82	8.74	324.36	565.99	104.7
HH66	8.74	322.94	566.01	105.32
HH128	8.74	322.58	565.99	105.47
HH88	8.74	320.95	565.99	106.18
PH_9	8.74	318.1	566.01	107.42
RM8	8.74	145.14	393.21	107.49
HH96	8.74	317.79	566.01	107.55
HH124	8.74	317.55	565.99	107.65
HH94	8.74	316.64	565.99	108.04
HH90	8.74	316.62	565.99	108.05
HH126	8.74	315.66	565.99	108.47
HH122	8.74	313.18	565.99	109.54
HH98	8.74	311.49	566	110.28
FH_9	8.74	309.15	565.99	111.29
HH100	8.74	308.36	565.99	111.63
HH102	8.74	306.46	565.98	112.45
HH120	8.74	305.86	565.99	112.72
HH130	8.74	305.13	566	113.03
HH112	8.74	301.38	566	114.66
J-595	8.74	294.47	565.97	117.64
HH104	8.74	290.75	565.97	119.25
HH106	8.74	271.51	565.97	127.59
HH108	8.74	257.32	565.97	133.74
HH110	8.74	252.77	565.97	135.71

2038 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-662	0	263.07	266.35	1.42
J-589	0	263.16	266.52	1.45
J-586	0	262.97	266.52	1.54
J-663	0	257.33	261.29	1.71
J-672	0	257.02	262.21	2.25
J-584	0	258.41	266.52	3.51
J-583	0	258.34	266.52	3.54
J-585	0	258.36	266.52	3.54
J-582	0	258.26	266.52	3.58
J-587	0	257.91	266.52	3.73
J-668	0	257.02	266.08	3.93
J-588	0	257.38	266.52	3.96
J-1	0	256.9	266.52	4.17
J-323	0	380.32	393.66	5.78
J-659	0	380.49	393.86	5.79
J-667	0	379.99	393.56	5.88
J-660	0	379.72	393.7	6.06
J-661	0	379.67	393.86	6.15
J-665	0	360.56	390.39	12.93
J-324	0	359.78	390.39	13.27
J-658	0	360.68	393.86	14.38
HH16	0	327.5	390.18	27.16
J-104	11.21	276.85	360.93	36.43
J-591	11.21	276.78	361.01	36.5
J-592	11.21	276.78	361.01	36.5
RM4	11.21	305.16	390.02	36.77
PH_4	11.21	275.95	360.93	36.83
J-103	11.21	275.4	360.52	36.88
J-322	11.21	288.64	375.97	37.84
J-518	11.21	272.92	360.55	37.97
J-106	11.21	273.67	361.53	38.07
J-593	11.21	273.44	361.56	38.18
J-112	11.21	270.75	360.66	38.96
66	11.21	282.78	373.44	39.28
HH12	11.21	284.17	375.35	39.51
J-107	11.21	270.19	362.2	39.87
J-393	11.21	282.82	375.01	39.95
72	11.21	281.15	373.64	40.08
64	11.21	278.75	371.31	40.11
RM2	11.21	296.14	390.02	40.68
112	11.21	278	372.13	40.79
J-655	11.21	280.17	375.28	41.21
J-206	11.21	262.08	357.86	41.5
J-108	11.21	266.26	362.44	41.67
J-517	11.21	263.81	360.23	41.78
J-205	11.21	261	357.86	41.97
FH_4	11.21	261.34	360.41	42.93
70	11.21	272.04	371.29	43.01
J-207	11.21	257.8	357.87	43.36

2038 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-204	11.21	257.42	357.87	43.52
J-102	11.21	259.21	360.05	43.7
J-203	11.21	256.62	357.88	43.88
J-109	11.21	261.3	362.66	43.92
J-685	11.21	258.35	360.03	44.06
J-183	11.21	252.87	356.64	44.96
HH142	11.21	256.53	360.31	44.97
J-653	11.21	270.79	375.22	45.25
J-671	0	257.89	363.06	45.57
J-670	0	257.78	363.06	45.62
J-184	11.21	251.13	356.48	45.65
J-630	11.21	250.26	355.81	45.73
J-139	11.21	251.43	357.09	45.78
J-629	11.21	250.05	355.81	45.83
J-182	11.21	251.04	356.86	45.85
J-179	11.21	249.74	355.84	45.97
J-613	11.21	249.78	355.99	46.02
J-622	11.21	249.5	355.81	46.06
J-623	11.21	249.23	355.81	46.18
J-620	11.21	249.18	355.81	46.2
J-674	0	258.06	364.73	46.22
J-402	11.21	249.14	355.83	46.23
J-225	11.21	249.45	356.34	46.31
J-208	11.21	250.95	357.85	46.32
J-180	11.21	248.9	356.04	46.42
J-401	11.21	248.59	355.84	46.47
J-111	11.21	253.74	361.11	46.53
J-105	11.21	249.84	357.29	46.56
J-611	11.21	248.29	355.99	46.66
J-170	11.21	247.35	355.33	46.79
J-609	11.21	247.99	355.98	46.79
J-621	11.21	247.8	355.81	46.8
J-579	0	254.57	362.81	46.9
J-300	11.21	247.45	355.91	47
J-615	11.21	247.59	356.07	47
HH138	11.21	262.06	370.56	47.01
J-181	11.21	247.63	356.2	47.05
J-89	11.21	246.84	355.48	47.07
94	11.21	249.41	358.06	47.08
J-172	11.21	246.3	355.34	47.24
J-83	11.21	246.51	355.55	47.25
86	11.21	249.1	358.21	47.28
J-673	0	258.06	367.34	47.35
J-654	11.21	265.5	375.01	47.45
74	11.21	249.78	359.33	47.47
J-619	11.21	246.26	355.81	47.47
J-176	11.21	245.99	355.6	47.49
J-616	11.21	246.24	355.89	47.51
J-80	11.21	245.92	355.56	47.51

2038 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
88	11.21	248.45	358.21	47.56
J-173	11.21	245.52	355.34	47.58
76	11.21	249.02	358.84	47.59
J-110	11.21	252.1	362.04	47.64
J-618	11.21	245.81	355.81	47.66
J-171	11.21	245.31	355.33	47.67
J-87	11.21	245.37	355.48	47.71
98	11.21	248.69	358.84	47.73
J-165	11.21	245.04	355.3	47.77
100	11.21	248.4	358.74	47.81
J-573	11.21	248.49	358.83	47.81
J-606	11.21	245.47	355.82	47.82
HH14	0	283.47	393.86	47.83
J-168	11.21	244.84	355.31	47.86
J-88	11.21	245.03	355.48	47.86
J-202	11.21	247.4	357.89	47.88
J-224	11.21	247.49	358	47.88
J-603	11.21	245.22	355.78	47.91
78	11.21	248.1	358.71	47.93
J-192	11.21	247.3	358.01	47.97
J-169	11.21	244.52	355.31	48
J-177	11.21	244.85	355.7	48.03
J-191	11.21	247.11	357.99	48.04
J-634	11.21	244.94	355.8	48.04
J-90	11.21	244.59	355.48	48.05
J-166	11.21	244.27	355.29	48.11
J-174	11.21	244.28	355.41	48.15
J-605	11.21	244.68	355.83	48.16
J-693	11.21	244.15	355.29	48.16
J-642	11.21	244.47	355.66	48.18
92	11.21	246.85	358.14	48.22
J-576	11.21	248.15	359.55	48.27
J-164	11.21	243.85	355.3	48.29
J-572	11.21	243.76	355.31	48.34
J-645	11.21	243.97	355.56	48.35
J-315	11.21	244.52	356.13	48.36
J-77	11.21	243.87	355.57	48.4
J-624	11.21	244.05	355.81	48.43
J-590	11.21	249.52	361.33	48.45
PH_5	11.21	246.5	358.36	48.47
102	11.21	246.74	358.64	48.49
J-163	11.21	243.39	355.31	48.49
J-628	11.21	243.89	355.81	48.49
J-76	11.21	243.7	355.62	48.5
J-81	11.21	243.58	355.55	48.52
90	11.21	246.38	358.37	48.53
J-167	11.21	243.32	355.31	48.53
J-82	11.21	243.53	355.55	48.54
J-223	11.21	246.75	358.81	48.56

2038 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-641	11.21	243.7	355.8	48.57
J-646	11.21	243.45	355.56	48.57
J-84	11.21	243.42	355.58	48.6
J-399	11.21	243.72	355.93	48.62
J-682	11.21	245.31	357.52	48.62
J-78	11.21	243.34	355.56	48.62
J-197	11.21	245.26	357.52	48.64
80	11.21	246.21	358.61	48.7
J-235	11.21	246.26	358.66	48.71
FH_6	11.21	243	355.46	48.73
J-632	11.21	243.3	355.8	48.75
J-610	11.21	243.47	356.06	48.79
J-627	11.21	243.17	355.81	48.81
PH_6	11.21	242.83	355.49	48.82
J-75	11.21	243.11	355.8	48.83
J-79	11.21	242.8	355.55	48.86
J-85	11.21	242.83	355.59	48.86
J-649	11.21	245.53	358.32	48.87
J-162	11.21	242.49	355.33	48.89
J-636	11.21	242.87	355.8	48.93
J-608	11.21	242.83	355.82	48.96
J-175	11.21	242.47	355.51	48.98
J-198	11.21	244.46	357.55	49
J-643	11.21	242.56	355.68	49.02
J-607	11.21	242.52	355.82	49.1
J-626	11.21	242.5	355.81	49.1
82	11.21	245.23	358.57	49.11
J-617	11.21	242.46	355.84	49.12
96	11.21	244.55	358.01	49.16
J-201	11.21	243.99	357.58	49.22
84	11.21	244.68	358.29	49.23
J-200	11.21	244.18	357.88	49.27
J-316	11.21	242.34	356.09	49.29
J-73	11.21	241.96	355.76	49.31
J-185	11.21	244.06	357.91	49.33
J-199	11.21	243.71	357.71	49.39
J-625	11.21	241.82	355.81	49.39
J-631	11.21	241.74	355.8	49.42
J-194	11.21	243.54	357.71	49.47
J-648	11.21	244.13	358.33	49.48
J-74	11.21	241.58	355.78	49.48
J-639	11.21	241.56	355.8	49.5
J-187	11.21	243.43	357.7	49.51
J-195	11.21	243.24	357.66	49.58
J-640	11.21	241.33	355.8	49.6
J-186	11.21	243.09	357.7	49.66
J-647	11.21	243.5	358.37	49.77
J-189	11.21	242.8	357.7	49.78
J-86	11.21	240.43	355.49	49.86

2038 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-597	11.21	240.65	355.78	49.89
J-209	11.21	242.65	357.84	49.91
J-604	11.21	240.56	355.78	49.92
J-178	11.21	240.42	355.78	49.99
J-635	11.21	240.35	355.8	50.03
J-633	11.21	240.28	355.8	50.05
J-100	11.21	242.25	357.99	50.15
J-651	11.21	254.23	370	50.16
J-190	11.21	241.89	357.7	50.18
J-637	11.21	239.99	355.8	50.18
J-196	11.21	241.74	357.61	50.21
J-691	11.21	239.27	355.27	50.26
J-570	11.21	239.23	355.29	50.29
J-600	11.21	239.68	355.78	50.3
122	0	281.94	398.05	50.31
J-644	11.21	239.74	355.89	50.33
J-598	11.21	239.5	355.78	50.38
J-295	11.21	239.65	355.97	50.4
J-400	11.21	239.45	355.79	50.41
J-596	11.21	239.41	355.82	50.44
FH_5	11.21	242.08	358.63	50.5
J-697	11.21	242.02	358.61	50.52
J-695	11.21	241.99	358.63	50.54
162	11.21	239.15	355.82	50.56
J-154	11.21	238.58	355.27	50.56
J-571	11.21	238.35	355.28	50.67
J-575	11.21	242.05	359.01	50.68
J-160	11.21	238.37	355.4	50.71
J-236	11.21	241.61	358.64	50.71
110	11.21	252.68	369.9	50.79
J-239	11.21	242.64	359.94	50.83
J-638	11.21	238.49	355.8	50.83
J-218	11.21	242.05	359.55	50.91
J-599	11.21	238.3	355.78	50.91
J-296	11.21	237.82	355.66	51.06
J-221	11.21	240.79	358.78	51.12
J-219	11.21	241.01	359.01	51.13
J-696	11.21	240.68	358.75	51.16
60	11.21	249.73	368.02	51.26
108	11.21	251.72	370.07	51.28
J-246	11.21	236.56	355.01	51.33
J-222	11.21	240.12	358.78	51.41
HH136	11.21	250.98	370.22	51.67
FH_7	11.21	238.84	358.52	51.86
J-574	11.21	239.08	358.85	51.89
J-657	11.21	242.97	362.84	51.94
160	11.21	238.3	358.51	52.09
J-694	11.21	242.56	362.83	52.11
J-101	11.21	238.98	359.33	52.15

2038 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-220	11.21	238.47	358.88	52.17
26	11.21	242.32	362.83	52.22
HH174	11.21	237.99	358.51	52.22
210	11.21	237.77	358.51	52.32
J-650	11.21	249.03	370	52.41
HH176	11.21	237.27	358.6	52.57
156	11.21	236.99	358.6	52.69
J-155	11.21	233.68	355.27	52.69
J-519	11.21	236.44	358.03	52.69
J-243	11.21	233.37	355.01	52.7
J-317	11.21	238.39	360.04	52.71
J-161	11.21	233.78	355.48	52.73
104	11.21	237.41	359.16	52.76
68	11.21	247.12	369.08	52.85
152	11.21	236.67	358.94	52.98
198	11.21	237.43	359.8	53.02
J-153	11.21	232.83	355.22	53.03
34	11.21	240.39	362.83	53.05
J-114	11.21	235.51	358.03	53.09
J-684	11.21	235.35	358.03	53.16
18	11.21	241	363.76	53.19
J-261	11.21	233.39	356.48	53.33
J-45	11.21	246.56	369.71	53.36
J-683	11.21	236.82	360.03	53.39
J-297	11.21	232.17	355.5	53.44
22	11.21	239.68	363.47	53.64
158	11.21	234.31	358.43	53.78
J-656	11.21	245.48	369.7	53.82
J-594	11.21	237.05	361.33	53.85
62	11.21	241.63	365.96	53.87
PH_7	11.21	234.02	358.47	53.93
16	11.21	239.28	363.81	53.95
24	11.21	238.38	362.91	53.96
J-115	11.21	233.34	358.03	54.03
J-318	11.21	239.79	364.49	54.03
J-290	11.21	229.99	354.94	54.14
J-294	11.21	229.98	354.97	54.16
154	11.21	233.28	358.42	54.22
J-247	11.21	229.44	354.98	54.4
J-159	11.21	229.69	355.28	54.42
J-94	11.21	229.46	355.21	54.49
J-156	11.21	229.39	355.27	54.54
J-536	11.21	229.41	355.59	54.67
HH134	11.21	243.87	370.13	54.71
HH18	11.21	263.81	390.07	54.71
J-308	11.21	228.42	355.01	54.85
J-350	11.21	231.48	358.31	54.96
J-244	11.21	227.98	354.98	55.03
J-692	11.21	227.79	354.94	55.09

2038 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-258	11.21	227.78	355.02	55.13
J-578	11.21	233.3	360.65	55.18
J-293	11.21	227.49	354.97	55.24
J-113	11.21	230.42	358.06	55.31
J-652	11.21	247.39	375.12	55.34
14	11.21	236.05	363.9	55.4
J-543	11.21	226.31	354.2	55.42
J-291	11.21	227.06	354.98	55.43
J-292	11.21	226.94	354.96	55.47
58	11.21	239.65	367.84	55.54
J-158	11.21	227.04	355.24	55.55
J-248	11.21	226.51	354.98	55.67
J-149	11.21	226.35	355	55.75
J-245	11.21	226.29	354.98	55.76
J-242	11.21	226.3	355.01	55.77
J-525	11.21	226.32	355.09	55.79
J-347	11.21	228.85	357.71	55.83
J-523	11.21	226.16	355	55.83
J-255	11.21	226.04	355	55.87
J-289	11.21	225.96	354.94	55.89
J-288	11.21	225.88	354.94	55.92
J-537	11.21	226.01	355.14	55.95
J-544	11.21	224.85	354.19	56.04
J-524	11.21	225.69	355.04	56.05
J-307	11.21	225.55	355	56.09
J-120	11.21	225.19	354.74	56.13
J-345	11.21	227.78	357.57	56.24
J-540	11.21	224.59	354.41	56.25
J-144	11.21	225.01	354.94	56.3
J-147	11.21	224.87	354.96	56.37
J-117	11.21	225	355.14	56.39
J-306	11.21	224.94	355.13	56.41
J-249	11.21	224.71	354.97	56.44
148	11.21	223.62	353.91	56.45
140	11.21	223.53	353.92	56.5
J-541	11.21	223.81	354.25	56.52
J-346	11.21	227.2	357.66	56.53
J-403	11.21	224.53	355.14	56.59
J-254	11.21	224.33	355.01	56.62
J-121	11.21	223.94	354.64	56.63
J-99	11.21	224.19	355.01	56.68
J-152	11.21	224.26	355.14	56.71
J-539	11.21	223.26	354.35	56.8
J-116	11.21	224.53	355.71	56.84
J-157	11.21	223.99	355.24	56.87
J-353	11.21	226.6	357.86	56.88
J-143	11.21	223.3	354.61	56.9
J-309	11.21	223.73	355.06	56.9
J-241	11.21	223.62	355.01	56.93

2038 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-557	11.21	222.55	354	56.96
J-577	11.21	229.32	360.77	56.96
J-569	11.21	223.99	355.48	56.97
J-556	11.21	222.47	354	56.99
J-151	11.21	223.5	355.1	57.02
146	11.21	222.31	353.92	57.03
J-253	11.21	223.33	354.94	57.03
36	11.21	233.34	365.02	57.06
J-547	11.21	222.1	353.82	57.07
J-675	11.21	223.92	355.64	57.07
J-238	11.21	229.12	360.85	57.08
J-526	11.21	223.4	355.14	57.08
142	11.21	222.17	353.93	57.09
J-128	11.21	221.99	353.84	57.13
J-259	11.21	223.24	355.08	57.13
144	11.21	222.06	353.92	57.14
J1020	11.21	222.55	354.42	57.14
J-127	11.21	222.03	353.93	57.15
J-527	11.21	223.25	355.19	57.17
138	11.21	221.96	353.93	57.18
J-118	11.21	223.15	355.14	57.19
J-250	11.21	222.91	354.96	57.22
J-260	11.21	222.96	355.12	57.26
J-546	11.21	221.61	353.81	57.28
J-534	11.21	223.34	355.55	57.29
J-535	11.21	223.25	355.59	57.34
J-680	11.21	224.28	356.75	57.4
J-343	11.21	222.44	354.96	57.42
J-512	11.21	221.48	354.04	57.44
J-552	11.21	221.15	353.8	57.47
J1030	11.21	222.54	355.16	57.47
J-150	11.21	222.37	355.04	57.49
J-545	11.21	221.1	353.81	57.5
J-148	11.21	222.23	354.97	57.51
186	11.21	223.81	356.57	57.52
196	11.21	224.39	357.14	57.52
J-126	11.21	221.2	353.95	57.52
J-551	11.21	221.03	353.8	57.53
J-521	11.21	225.24	358.03	57.54
J-305	11.21	222.3	355.12	57.55
J-542	11.21	221.37	354.22	57.56
J-533	11.21	222.51	355.41	57.59
J-548	11.21	220.93	353.86	57.6
J-97	11.21	222.13	355.11	57.62
106	11.21	224.81	357.86	57.65
J-529	11.21	222.35	355.4	57.65
J-549	11.21	220.74	353.8	57.66
HH132	11.21	236.58	369.7	57.68
HH182	11.21	223.93	357.05	57.68

2038 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-555	11.21	220.7	353.82	57.68
J-268	11.21	220.83	354	57.7
J-554	11.21	220.56	353.8	57.73
20	11.21	230.94	364.22	57.75
J-553	11.21	220.51	353.8	57.76
HH186	11.21	223.43	356.75	57.77
J-550	11.21	220.44	353.8	57.78
J-145	11.21	221.74	355.12	57.79
J-528	11.21	221.9	355.31	57.8
J1012	11.21	221.03	354.42	57.8
J-134	11.21	220.82	354.35	57.86
J-142	11.21	220.91	354.45	57.86
J-514	11.21	220.51	354.04	57.86
J-531	11.21	221.67	355.26	57.88
J-530	11.21	221.71	355.32	57.89
J-538	11.21	220.7	354.29	57.89
J1004	11.21	220.84	354.43	57.89
J-257	11.21	221.41	355.03	57.9
J-125	11.21	220.42	354.06	57.91
118	11.21	224.13	357.94	57.98
HH184	11.21	222.98	356.94	58.05
J-532	11.21	221.13	355.2	58.09
J-513	11.21	219.8	354.04	58.17
J-515	11.21	219.8	354.04	58.17
HH8	11.21	240.76	375.03	58.18
J-98	11.21	220.71	355.04	58.21
J-37	11.21	219.92	354.29	58.22
114	11.21	223.73	358.13	58.23
J-301	11.21	220.74	355.12	58.23
J-96	11.21	220.76	355.16	58.24
J-299	11.21	221.05	355.5	58.25
J-251	11.21	220.49	354.96	58.26
J-284	11.21	220.52	355.01	58.27
J-124	11.21	219.63	354.19	58.3
J-568	11.21	219.59	354.26	58.35
J-404	11.21	221.34	356.06	58.37
HH180	11.21	223.69	358.43	58.38
J-285	11.21	220.2	354.94	58.39
HH188	11.21	220.63	355.47	58.43
J-304	11.21	220.23	355.11	58.44
J-138	11.21	219.21	354.13	58.46
J-122	11.21	219.48	354.44	58.48
176	11.21	221.11	356.09	58.49
J-131	11.21	219.55	354.64	58.53
J-6	11.21	219.02	354.26	58.6
J-511	11.21	218.76	354.07	58.63
J-240	11.21	219.54	355.01	58.7
178	11.21	222.68	358.2	58.72
J-123	11.21	218.79	354.31	58.72

2038 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
116	11.21	222.66	358.23	58.74
J-66	11.21	218.49	354.09	58.76
J-4	11.21	218.97	354.63	58.78
J-509	11.21	218.41	354.07	58.78
188	11.21	222.53	358.2	58.79
J-275	11.21	218.01	353.78	58.83
J1026	11.21	218.59	354.42	58.85
PH_2	11.21	218.79	354.63	58.86
J-686	11.21	218.1	354.1	58.93
J-92	11.21	219.2	355.22	58.93
J-352	11.21	221.76	357.86	58.97
J-135	11.21	218.14	354.26	58.98
J-141	11.21	218.05	354.18	58.99
194	11.21	220.92	357.14	59.02
HH238	11.21	217.9	354.11	59.02
166	11.21	217.76	354.1	59.08
HH10	11.21	238.69	375.04	59.08
J-146	11.21	218.96	355.31	59.08
J-507	11.21	217.68	354.08	59.1
J-274	11.21	217.36	353.78	59.11
FH_2	11.21	218.16	354.68	59.15
184	11.21	220.63	357.17	59.16
J-95	11.21	218.66	355.22	59.17
J-561	11.21	217.51	354.09	59.18
FH_1	11.21	217.82	354.42	59.19
HH222	11.21	217.17	353.78	59.19
172	11.21	217.45	354.07	59.2
J1024	11.21	217.78	354.42	59.21
J-130	11.21	217.92	354.59	59.22
J-510	11.21	217.37	354.07	59.23
J-562	11.21	217.37	354.09	59.24
J-559	11.21	217.29	354.09	59.28
J-560	11.21	217.23	354.09	59.3
J-349	11.21	220.96	357.87	59.32
J-508	11.21	217.11	354.07	59.34
HH40	11.21	253.04	390.05	59.37
J1006	11.21	217.34	354.43	59.4
J-137	11.21	217.02	354.14	59.41
J-500	11.21	216.96	354.06	59.41
J-503	11.21	216.95	354.06	59.41
J-283	11.21	217.82	354.94	59.42
HH178	11.21	221.45	358.64	59.44
J-119	11.21	217.81	355.08	59.48
J-319	11.21	226.91	364.2	59.49
J-558	11.21	216.79	354.09	59.49
J-252	11.21	217.62	354.95	59.5
164	11.21	216.66	354.08	59.55
HH240	11.21	216.71	354.14	59.55
PH_1	11.21	216.99	354.42	59.55

2038 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-237	11.21	223.86	361.37	59.58
J1028	11.21	216.87	354.42	59.6
J-133	11.21	216.91	354.47	59.61
J-501	11.21	216.49	354.06	59.61
J1022	11.21	216.84	354.42	59.61
J-256	11.21	217.29	354.95	59.65
J-567	11.21	216.34	354.09	59.69
J-522	11.21	217.17	354.96	59.7
J-286	11.21	217.12	354.94	59.72
J-140	11.21	216.28	354.12	59.73
J-504	11.21	216.22	354.06	59.73
J-91	11.21	217.35	355.22	59.74
J-273	11.21	215.81	353.78	59.78
J-505	11.21	216.01	354.06	59.82
HH212	11.21	215.69	353.78	59.83
J-298	11.21	217.36	355.45	59.83
170	11.21	215.81	354.06	59.91
J-506	11.21	215.74	354.06	59.93
J-69	11.21	215.54	353.97	59.98
J-516	11.21	215.44	354.06	60.06
J-502	11.21	215.38	354.06	60.09
J-132	11.21	215.99	354.7	60.1
J-287	11.21	216.21	354.94	60.11
HH218	11.21	214.98	353.78	60.14
J-136	11.21	215.3	354.19	60.18
HH230	11.21	214.76	353.78	60.24
174	11.21	214.98	354.06	60.26
J-302	11.21	215.99	355.13	60.29
HH226	11.21	214.61	353.78	60.3
J-93	11.21	215.94	355.22	60.35
J-311	11.21	216.15	355.45	60.36
J1010	11.21	215.06	354.43	60.39
J-303	11.21	215.45	355.12	60.52
32	11.21	220.9	360.61	60.53
J-314	11.21	215.76	355.45	60.53
J-312	11.21	215.63	355.45	60.58
168	11.21	214.22	354.07	60.59
J-272	11.21	213.86	353.78	60.63
J-59	11.21	213.98	354	60.67
190	11.21	219.71	359.76	60.68
J-397	11.21	227.65	367.75	60.7
HH224	11.21	213.68	353.78	60.71
28	11.21	224.04	364.19	60.72
180	11.21	218.7	358.95	60.77
HH220	11.21	213.25	353.78	60.89
HH166	11.21	219.39	359.94	60.9
J-564	11.21	213.61	354.16	60.9
HH2	11.21	234.4	375.03	60.93
HH210	11.21	212.99	353.78	61

2038 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
HH234	11.21	213	353.78	61
J-313	11.21	214.66	355.44	61
HH208	11.21	212.89	353.78	61.05
HH206	11.21	212.7	353.78	61.13
J-563	11.21	212.9	354.12	61.19
J-70	11.21	212.72	353.93	61.19
182	11.21	218.2	359.45	61.2
J-566	11.21	212.89	354.16	61.22
J-565	11.21	212.46	354.1	61.37
12	11.21	222.44	364.19	61.42
J-690	11.21	213.51	355.44	61.5
J-270	11.21	211.78	353.79	61.53
J-687	11.21	211.76	353.79	61.54
212	11.21	227.54	369.65	61.57
J-129	11.21	211.66	353.79	61.59
J-226	11.21	219.78	362.13	61.68
HH170	11.21	217.45	359.94	61.74
J-688	11.21	210.98	353.79	61.88
J-68	11.21	211.13	354.03	61.92
J-351	11.21	215.26	358.2	61.94
HH6	11.21	232.02	375.03	61.97
HH164	11.21	217.16	360.2	61.98
HH236	11.21	210.68	353.79	62.01
HH204	11.21	210.52	353.79	62.08
J-266	11.21	210.41	353.79	62.13
J-271	11.21	210.3	353.79	62.17
HH232	11.21	210.26	353.79	62.19
HH228	11.21	210.22	353.79	62.21
HH216	11.21	210.13	353.78	62.24
J-71	11.21	210.27	353.9	62.24
J-263	11.21	210.16	353.82	62.25
J-267	11.21	210.05	353.79	62.28
J-62	11.21	209.67	353.82	62.46
J-67	11.21	209.69	354.06	62.56
J-264	11.21	209.3	353.81	62.62
FH_3	11.21	209.17	353.81	62.67
HH190	11.21	209.04	353.78	62.72
J-265	11.21	209.02	353.8	62.73
HH214	11.21	208.71	353.78	62.86
HH198	11.21	208.68	353.78	62.87
HH200	11.21	208.63	353.78	62.89
HH196	11.21	208.59	353.79	62.92
HH20	11.21	244.78	390.04	62.94
J-689	11.21	208.24	353.79	63.07
J-72	11.21	207.63	353.88	63.37
HH168	11.21	213.83	360.17	63.41
HH202	11.21	207.46	353.79	63.41
PH_3	11.21	207.36	353.8	63.46
HH148	11.21	223.06	369.61	63.5

2038 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
HH146	11.21	222.89	369.61	63.57
RM12	11.21	242.85	389.98	63.75
J-262	11.21	206.37	353.85	63.9
HH36	11.21	242.17	390.03	64.07
54	11.21	219.11	367.64	64.36
J-26	0	258.05	406.89	64.49
HH28	11.21	240.87	390.03	64.63
PH_8	11.21	219.54	369.63	65.03
HH144	11.21	219.49	369.61	65.04
HH172	11.21	210.2	360.33	65.05
130	11.21	219.29	369.6	65.13
RM10	11.21	239.66	389.99	65.14
192	11.21	209.91	360.33	65.18
HH154	11.21	218.99	369.6	65.26
HH4	11.21	224.03	375.03	65.43
30	11.21	213.16	364.18	65.44
10	11.21	213.07	364.19	65.48
HH150	11.21	215.02	369.61	66.99
PH_10	11.21	235.38	390.03	67.01
FH_8	11.21	213.9	369.62	67.47
52	11.21	211.48	367.33	67.53
38	11.21	210.15	366.18	67.61
HH162	11.21	212.49	368.51	67.61
56	11.21	211.68	367.74	67.62
128	11.21	213.5	369.62	67.65
HH160	11.21	211.85	368.95	68.07
HH158	11.21	210.9	368.59	68.33
42	11.21	208.37	366.41	68.48
50	11.21	209.29	367.33	68.48
126	11.21	211.26	369.63	68.62
48	11.21	208.18	366.93	68.79
HH156	11.21	209.81	368.73	68.86
46	11.21	207.61	366.92	69.03
HH30	11.21	230.19	390.02	69.26
44	11.21	206.38	366.6	69.43
40	11.21	205.77	366.39	69.6
132	11.21	205.74	366.39	69.61
HH22	11.21	220.56	390.04	73.43
FH_10	11.21	209.94	390.02	78.03
HH26	11.21	207.8	390.02	78.96
RM6	11.21	206.49	389.98	79.51
HH140	0	380.31	564.58	79.84
HH34	11.21	197.47	390.03	83.44
HH38	11.21	193.45	390.03	85.18
J-666	11.21	360.72	562.47	87.42
J-664	11.21	359.94	562.49	87.77
HH58	11.21	359.88	562.46	87.78
HH24	11.21	183.01	390.03	89.7
HH60	11.21	349.39	562.09	92.16

2038 Peak Hour Demand

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
HH118	11.21	346.5	562.04	93.39
HH62	11.21	345.99	561.95	93.58
HH68	11.21	345.13	561.97	93.95
HH32	11.21	172.14	390.03	94.41
HH70	11.21	342.67	561.95	95.02
HH72	11.21	341.28	561.87	95.58
HH76	11.21	337.62	561.81	97.14
HH74	11.21	337.38	561.81	97.24
HH78	11.21	335.92	561.79	97.87
HH64	11.21	334.76	561.87	98.41
HH116	11.21	334.79	562.01	98.46
HH80	11.21	333.85	561.79	98.77
HH86	11.21	331.93	561.78	99.59
HH92	11.21	331.88	561.8	99.62
HH84	11.21	330.67	561.78	100.14
HH114	11.21	328.16	561.89	101.27
HH82	11.21	324.36	561.78	102.88
HH66	11.21	322.94	561.82	103.51
HH128	11.21	322.58	561.79	103.65
HH88	11.21	320.95	561.78	104.35
PH_9	11.21	318.1	561.81	105.6
HH96	11.21	317.79	561.81	105.73
HH124	11.21	317.55	561.79	105.83
RM8	11.21	145.14	389.98	106.09
HH94	11.21	316.64	561.78	106.22
HH90	11.21	316.62	561.78	106.23
HH126	11.21	315.66	561.79	106.65
HH122	11.21	313.18	561.79	107.72
HH98	11.21	311.49	561.8	108.46
FH_9	11.21	309.15	561.78	109.47
HH100	11.21	308.36	561.79	109.81
HH102	11.21	306.46	561.77	110.63
HH120	11.21	305.86	561.79	110.9
HH130	11.21	305.13	561.8	111.22
HH112	11.21	301.38	561.8	112.84
J-595	11.21	294.47	561.75	115.81
HH104	11.21	290.75	561.75	117.42
HH106	11.21	271.51	561.75	125.76
HH108	11.21	257.32	561.75	131.91
HH110	11.21	252.77	561.75	133.88

2018 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
10	1,004.21	2,637.89	12	15.94	259.23	2,531.51
12	1,004.21	2,072.66	12	20	268.6	2,072.66
14	1,004.21	3,096.05	14	20	282.21	3,096.04
16	1,004.21	2,864.61	16	20	285.44	2,864.61
18	1,004.21	2,766.67	18	20	287.16	2,766.66
20	1,004.21	4,692.32	20	20	277.1	4,692.11
22	1,004.21	2,492.59	22	20	285.83	2,492.59
24	2,504.21	3,684.43	24	20	284.54	3,684.43
26	2,504.21	7,789.82	J-104	17.3	316.77	7,405.60
28	1,004.21	2,361.67	28	20	270.2	2,361.67
30	1,004.21	2,098.28	30	20	259.32	2,098.28
32	2,504.21	6,134.29	32	20	267.06	6,134.27
34	2,504.21	6,788.91	34	20	286.55	6,789.03
36	1,004.21	5,080.40	36	20	279.49	5,080.16
38	1,004.21	6,010.03	38	20	256.31	6,009.66
40	1,004.21	5,449.46	40	20	251.92	5,449.29
42	1,004.21	5,807.45	42	20	254.53	5,807.18
44	1,004.21	5,897.35	44	20	252.53	5,897.07
46	1,004.21	6,472.62	46	20	253.76	6,472.07
48	1,004.21	6,369.53	48	20	254.34	6,369.03
50	1,004.21	6,895.94	50	20	255.44	6,895.49
52	1,004.21	7,000.24	52	20	257.64	6,999.64
54	1,004.21	7,626.91	64	18.15	320.63	7,341.75
56	1,004.21	7,260.35	56	20	257.83	7,260.52
58	1,004.21	5,899.10	58	20	285.81	5,899.11
60	1,004.21	6,132.72	60	20	295.89	6,132.73
62	1,004.21	8,249.86	64	14.39	311.97	7,398.99
64	1,004.21	5,479.23	64	20	324.91	5,479.24
66	1,004.21	5,930.43	66	20	328.94	5,930.44
68	1,004.21	8,491.62	64	11.97	306.38	7,313.41
70	1,004.21	5,951.50	70	20	318.19	5,951.51
72	1,004.21	7,357.05	66	19.63	328.07	7,294.18
74	1,004.21	3,626.35	74	20	295.94	3,626.35
76	1,004.21	3,783.00	76	20	295.18	3,783.00
78	1,004.21	3,412.07	78	20	294.26	3,411.79
80	1,004.21	3,512.65	80	20	292.37	3,512.34
82	1,004.21	3,730.82	82	20	291.38	3,730.82
84	1,004.21	3,731.36	84	20	290.84	3,731.36
86	1,004.21	3,865.96	86	20	295.26	3,865.96
88	1,004.21	3,751.50	88	20	294.61	3,751.50
90	1,004.21	3,568.52	90	20	292.54	3,568.19
92	1,004.21	3,419.37	92	20	293.01	3,419.14
94	1,004.21	3,293.21	94	20	295.57	3,293.03
96	1,004.21	3,593.22	96	20	290.71	3,592.94
98	1,004.21	3,755.05	98	20	294.85	3,755.05
100	1,004.21	3,935.06	100	20	294.55	3,935.06

2018 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
102	1,004.21	3,543.36	102	20	292.9	3,543.04
104	1,004.21	4,089.87	J-575	19.31	286.61	4,053.68
106	1,004.21	3,318.81	106	20	270.97	3,318.80
108	1,004.21	8,431.16	64	12.53	307.66	7,326.80
110	1,004.21	7,035.31	110	20	298.83	7,035.31
112	1,004.21	7,260.95	112	20	324.15	7,260.95
114	1,004.21	5,984.78	114	20	269.89	5,985.31
116	1,004.21	7,580.40	J-104	13.4	307.78	6,750.15
118	2,504.21	7,701.32	J-104	12.14	304.88	6,724.14
126	2,504.21	9,382.61	64	5.45	291.32	7,321.69
128	2,504.21	8,637.57	64	11	304.15	7,321.69
130	2,504.21	4,411.93	130	20	265.45	4,411.93
132	1,004.21	4,475.46	132	20	251.9	4,475.44
138	4,004.21	5,172.44	140	19.67	268.92	5,153.88
140	4,004.21	5,114.55	140	20	269.69	5,114.56
142	4,004.21	5,045.53	142	20	268.32	5,045.53
144	4,004.21	5,001.02	144	20	268.22	5,001.03
146	4,004.21	4,999.85	146	20	268.46	4,999.85
148	4,004.21	5,088.50	148	20	269.78	5,088.50
152	1,004.21	7,369.38	J-104	16.05	313.89	6,854.89
154	1,004.21	5,563.90	154	20	279.44	5,563.90
156	1,004.21	5,402.31	HH176	19.88	283.15	5,394.12
158	1,004.21	4,339.65	158	20	280.47	4,339.44
160	1,004.21	4,250.71	160	20	284.46	4,250.49
162	2,504.21	6,344.22	J-630	16.6	288.56	6,044.65
164	2,504.21	5,190.87	164	20	262.82	5,190.84
166	2,504.21	5,163.58	J-512	18.99	265.3	5,107.28
168	2,504.21	4,098.77	168	20	260.38	4,098.77
170	2,504.21	4,871.05	170	20	261.97	4,871.09
172	2,504.21	4,811.19	172	20	263.61	4,811.19
174	2,504.21	3,912.56	J-512	19.75	267.07	3,902.05
176	1,004.21	7,125.21	J-104	14.53	310.39	6,462.03
178	2,504.21	7,565.87	J-104	13.8	308.69	6,780.41
180	1,004.21	7,716.92	J-104	13.45	307.89	6,876.92
182	1,004.21	7,766.22	J-104	13.6	308.24	6,937.56
184	1,004.21	7,173.76	J-104	15.74	313.19	6,638.20
186	1,004.21	7,013.68	J-104	16.22	314.3	6,543.34
188	2,504.21	6,313.41	188	20	268.68	6,313.36
190	1,004.21	7,957.17	J-104	12.3	305.25	6,964.73
192	1,004.21	5,658.78	HH172	19.88	256.07	5,651.30
194	1,004.21	6,935.43	J-104	17.6	317.48	6,629.97
196	1,004.21	6,235.69	196	20	270.55	6,235.49
198	1,004.21	7,522.17	J-104	15.67	313.03	6,952.54
210	1,004.21	3,883.08	210	20	283.92	3,883.00
212	2,504.21	9,132.29	64	7.35	295.72	7,321.44
FH_1	2,504.21	4,549.66	FH_1	20	263.97	4,549.64

2018 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
FH_10	2,504.21	3,992.68	RM4	4.64	315.86	2,799.63
FH_2	4,004.21	4,554.49	FH_2	20	264.32	4,554.25
FH_3	4,004.21	5,784.10	J-104	18.21	318.88	5,592.22
FH_4	1,004.21	4,456.72	FH_4	20	307.49	4,456.72
FH_5	1,004.21	3,914.27	FH_5	20	288.24	3,914.27
FH_6	2,504.21	6,177.43	FH_6	20	289.15	6,177.10
FH_7	1,004.21	4,303.10	FH_7	20	285	4,302.87
FH_8	2,504.21	8,692.09	64	10.61	303.23	7,321.69
FH_9	1,004.21	2,722.91	HH62	12.99	375.97	2,592.11
HH10	1,004.21	3,588.22	HH8	19.22	285.12	3,553.98
HH100	1,004.21	2,749.84	HH62	11.59	372.75	2,593.18
HH102	1,004.21	2,684.41	HH62	14.79	380.13	2,587.28
HH104	1,004.21	2,648.95	HH62	16.7	384.54	2,587.28
HH106	1,004.21	2,720.24	HH62	12.85	375.65	2,587.28
HH108	1,004.21	2,618.56	HH62	18.33	388.3	2,587.28
HH110	1,004.21	2,613.88	HH62	18.58	388.87	2,587.28
HH112	1,004.21	2,756.48	J-666	12.15	388.76	2,596.85
HH114	1,004.21	2,654.86	J-666	17.15	400.3	2,596.51
HH116	1,004.21	2,648.45	J-666	17.43	400.94	2,595.82
HH118	1,004.21	2,551.92	HH118	20	392.65	2,551.91
HH12	1,004.21	5,213.93	HH12	20	330.33	5,213.62
HH120	1,004.21	2,621.12	HH128	14.54	356.13	2,534.09
HH122	1,004.21	2,533.17	HH128	18.23	364.66	2,505.38
HH124	1,004.21	2,512.12	HH128	19.32	367.16	2,501.43
HH126	1,004.21	2,511.02	HH128	19.35	367.24	2,500.89
HH128	1,004.21	2,470.03	HH128	20	368.74	2,470.07
HH130	1,004.21	2,595.99	HH128	15.54	358.45	2,525.27
HH132	1,004.21	8,515.68	64	11.89	306.19	7,323.29
HH134	1,004.21	5,524.73	HH134	20	290.02	5,524.38
HH136	1,004.21	5,414.77	HH136	20	297.13	5,414.38
HH138	1,004.21	7,929.94	64	16.12	315.96	7,340.46
HH142	1,004.21	4,668.54	FH_4	19.77	306.96	4,651.96
HH144	2,504.21	5,265.29	HH148	18.45	265.65	5,179.16
HH146	2,504.21	4,898.41	HH148	19.92	269.04	4,894.38
HH148	2,504.21	4,214.20	HH148	20	269.22	4,214.20
HH150	2,504.21	6,514.70	HH148	16.51	261.18	6,277.76
HH154	2,504.21	4,552.76	130	19.87	265.14	4,546.53
HH156	2,504.21	6,455.39	HH156	20	255.97	6,455.35
HH158	2,504.21	6,253.64	HH158	20	257.06	6,253.61
HH160	2,504.21	7,223.43	HH160	20	258.01	7,223.40
HH162	2,504.21	6,825.03	HH162	20	258.65	6,824.95
HH164	1,004.21	6,300.70	HH164	20	263.32	6,301.18
HH166	1,004.21	6,706.18	HH166	20	265.54	6,705.80
HH168	2,504.21	6,217.76	HH168	20	259.99	6,217.95
HH170	2,504.21	6,397.67	HH170	20	263.6	6,397.71
HH172	1,004.21	4,460.32	HH172	20	256.35	4,460.23

2018 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
HH174	1,004.21	3,883.27	HH174	20	284.14	3,883.20
HH176	1,004.21	4,711.63	HH176	20	283.42	4,711.22
HH178	2,504.21	7,488.15	J-104	14.93	311.31	6,836.05
HH18	2,504.21	4,163.32	RM4	2.08	309.96	2,799.63
HH180	2,504.21	7,418.54	J-104	15.31	312.19	6,815.45
HH182	1,004.21	6,650.00	J-104	19.74	322.42	6,616.99
HH184	1,004.21	6,562.29	HH184	20	269.13	6,562.29
HH186	1,004.21	6,575.60	J-680	19.63	269.59	6,548.09
HH188	1,004.21	7,283.18	J-104	11.89	304.29	6,334.80
HH190	4,004.21	4,828.27	HH190	20	255.2	4,828.00
HH196	4,004.21	5,480.56	HH212	18.22	257.73	5,380.05
HH198	4,004.21	5,416.06	HH212	18.54	258.49	5,334.90
HH2	1,004.21	3,668.51	HH8	19.4	285.52	3,641.23
HH20	2,504.21	4,344.26	RM4	-0.73	303.48	2,799.63
HH200	4,004.21	5,424.50	HH212	17.76	256.67	5,300.93
HH202	4,004.21	5,533.78	HH212	17.46	255.99	5,390.96
HH204	4,004.21	5,413.79	HH208	19.26	257.34	5,372.87
HH206	4,004.21	4,666.13	HH208	19.92	258.85	4,662.03
HH208	4,004.21	3,887.89	HH208	20	259.05	3,887.88
HH210	4,004.21	4,265.61	HH210	20	259.15	4,265.54
HH212	4,004.21	4,350.27	HH212	20	261.85	4,350.15
HH214	4,004.21	5,413.62	HH212	18.65	258.74	5,338.29
HH216	4,004.21	5,388.41	HH218	18.32	257.26	5,296.47
HH218	4,004.21	5,279.72	HH218	20	261.13	5,279.78
HH22	2,504.21	4,607.10	RM4	-4.98	293.67	2,799.63
HH220	4,004.21	5,520.10	HH222	18.8	260.55	5,450.53
HH222	4,004.21	5,409.11	HH222	20	263.33	5,408.61
HH224	4,004.21	5,473.05	HH222	19.87	263.02	5,465.21
HH226	4,004.21	5,338.60	HH226	20	260.77	5,338.42
HH228	4,004.21	5,535.58	HH222	19.34	261.82	5,497.25
HH230	4,004.21	4,883.56	HH230	20	260.91	4,883.56
HH232	4,004.21	5,583.81	J-275	18.87	261.56	5,517.08
HH234	4,004.21	5,532.32	J-275	17.83	259.16	5,406.98
HH236	4,004.21	5,602.17	J-275	16.98	257.21	5,428.39
HH238	4,004.21	5,974.19	J-104	16.69	315.37	5,620.50
HH24	2,504.21	5,107.45	RM4	-13.65	273.66	2,799.63
HH240	4,004.21	6,299.15	J-104	13.38	307.74	5,611.58
HH26	2,504.21	4,050.84	RM4	3.78	313.88	2,799.63
HH28	2,504.21	3,686.79	RM4	9	325.93	2,799.63
HH30	1,004.21	3,617.39	RM4	9.95	328.12	2,799.65
HH32	1,004.21	5,040.83	RM4	-12.45	276.43	2,799.65
HH34	1,004.21	4,331.40	RM4	-0.52	303.95	2,799.65
HH36	2,504.21	3,874.09	RM4	6.36	319.85	2,799.63
HH38	2,504.21	4,958.11	RM4	-10.98	279.81	2,799.63
HH4	1,004.21	3,175.80	HH4	20	270.19	3,175.80
HH40	2,504.21	4,281.18	RM4	0.26	305.77	2,799.63

2018 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
HH58	1,004.21	2,597.56	HH58	20	406.04	2,597.56
HH6	1,004.21	3,027.90	HH6	20	278.18	3,027.90
HH60	1,004.21	2,535.92	HH60	20	395.55	2,535.92
HH62	1,004.21	2,518.57	HH62	20	392.15	2,518.57
HH64	1,004.21	2,594.00	HH62	18.09	387.74	2,558.81
HH66	1,004.21	2,654.72	HH62	15.63	382.05	2,573.68
HH68	1,004.21	2,538.17	HH68	20	391.29	2,538.16
HH70	1,004.21	2,561.93	HH70	20	388.82	2,561.93
HH72	1,004.21	2,555.30	HH72	20	387.44	2,555.30
HH74	1,004.21	2,547.28	HH74	20	383.54	2,547.28
HH76	1,004.21	2,577.52	HH76	20	383.78	2,577.52
HH78	1,004.21	2,523.89	HH78	20	382.08	2,523.89
HH8	1,004.21	3,335.51	HH8	20	286.92	3,335.50
HH80	1,004.21	2,548.66	HH80	20	380	2,548.66
HH82	1,004.21	2,603.55	HH78	17.5	376.31	2,559.96
HH84	1,004.21	2,529.71	HH84	20	376.83	2,529.95
HH86	1,004.21	2,518.45	HH86	20	378.09	2,518.66
HH88	1,004.21	2,575.12	HH86	18.61	374.88	2,551.44
HH90	1,004.21	2,663.10	HH78	14.7	369.86	2,570.49
HH92	1,004.21	2,585.16	HH62	19.98	392.09	2,584.71
HH94	1,004.21	2,681.32	HH62	14.8	380.14	2,584.44
HH96	1,004.21	2,689.76	HH62	14.79	380.13	2,592.38
HH98	1,004.21	2,738.35	HH62	12.06	373.81	2,590.46
J-100	2,504.21	5,451.35	J-206	12.47	290.85	4,882.46
J1004	2,504.21	5,673.71	J1020	19.26	267	5,627.35
J1006	2,504.21	5,598.40	J1020	17.91	263.88	5,472.54
J-101	2,504.21	6,435.96	J-104	5.68	289.96	5,134.90
J1010	2,504.21	5,339.20	J1020	16.93	261.61	5,166.76
J1012	2,504.21	5,082.64	J1020	19.34	267.19	5,046.38
J-102	1,004.21	5,712.51	J-104	13.38	307.74	5,088.26
J1020	2,504.21	4,990.30	J1020	20	268.71	4,990.29
J1022	2,504.21	4,696.31	J1022	20	263	4,696.29
J1024	2,504.21	4,528.24	J1024	20	263.93	4,528.22
J1026	2,504.21	4,467.07	J1026	20	264.75	4,467.06
J1028	2,504.21	4,493.93	J1028	20	263.03	4,493.92
J-103	1,004.21	5,070.77	J-104	19.86	322.68	5,056.17
J1030	4,004.21	5,503.78	J-104	19.61	322.11	5,462.61
J-104	1,004.21	5,025.07	J-104	20	323.01	5,024.90
J-105	2,504.21	5,089.63	J-105	20	296	5,089.63
J-106	1,004.21	5,176.14	J-104	18.9	320.47	5,067.81
J-107	1,004.21	5,350.18	J-104	17.56	317.37	5,110.88
J-108	1,004.21	5,526.35	J-104	15.83	313.39	5,125.03
J-109	1,004.21	5,743.44	J-104	13.65	308.37	5,139.80
J-110	1,004.21	5,135.56	J-104	19.91	322.79	5,125.85
J-111	1,004.21	4,688.71	J-111	20	299.89	4,688.71
J-112	1,004.21	4,258.98	J-112	20	316.9	4,258.98

2018 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
J-113	4,004.21	6,495.09	J-104	6.56	292	5,248.24
J-114	4,004.21	3,571.91	J-519	19.6	281.67	3,554.68
J-115	4,004.21	2,805.81	J-115	20	279.5	2,805.81
J-116	4,004.21	6,340.09	J-104	10.74	301.65	5,431.99
J-117	4,004.21	6,247.47	J-104	12.26	305.16	5,474.72
J-118	4,004.21	5,534.71	J-104	19.33	321.47	5,464.63
J-119	4,004.21	4,335.70	J-119	20	263.97	4,335.60
J-120	4,004.21	6,186.65	J-104	13.3	307.54	5,507.95
J-121	4,004.21	6,005.98	J-104	15.28	312.13	5,520.22
J-122	4,004.21	5,836.81	J-104	17.09	316.3	5,531.83
J-123	4,004.21	5,647.00	J-543	18.24	268.39	5,535.34
J-124	4,004.21	5,513.60	J-544	17.98	266.35	5,390.92
J-125	4,004.21	5,354.13	J-557	19.53	267.63	5,326.49
J-126	4,004.21	5,229.77	J-547	19.6	267.34	5,207.19
J-127	4,004.21	5,149.66	140	19.77	269.15	5,136.27
J-128	4,004.21	5,088.44	J-128	20	268.15	5,088.45
J-129	4,004.21	5,656.26	J-275	17.46	258.3	5,507.13
J-130	4,004.21	6,328.92	J-104	12.17	304.94	5,535.78
J-131	4,004.21	4,796.61	J-131	20	265.71	4,797.05
J-132	4,004.21	4,515.80	J-132	20	262.15	4,515.53
J-133	4,004.21	6,303.92	J-104	12.59	305.92	5,549.25
J-134	4,004.21	6,164.32	J-104	14.19	309.61	5,564.98
J-135	4,004.21	6,236.68	J-104	13.64	308.33	5,579.96
J-136	4,004.21	6,303.24	J-104	13.16	307.23	5,596.33
J-137	4,004.21	6,289.81	J-104	13.48	307.97	5,611.89
J-138	4,004.21	6,213.05	J-104	14.4	310.08	5,624.63
J-139	2,504.21	4,985.06	J-139	20	297.59	4,985.18
J-140	2,504.21	6,330.93	J-104	13.34	307.65	5,634.65
J-141	2,504.21	6,287.11	J-104	14.51	310.34	5,696.66
J-142	2,504.21	6,387.99	J-104	15.08	311.66	5,836.99
J-143	1,004.21	6,447.95	J-104	15.12	311.76	5,901.07
J-144	1,004.21	6,837.12	J-104	13.64	308.33	6,112.73
J-145	1,004.21	6,813.03	J-104	14.7	310.78	6,197.17
J-146	1,004.21	7,016.57	J-104	13.61	308.27	6,270.70
J-147	1,004.21	6,727.47	J-104	15.61	312.88	6,212.93
J-148	1,004.21	6,670.79	J-104	16.34	314.56	6,237.28
J-149	2,504.21	6,511.19	J-104	17.96	318.3	6,265.38
J-150	2,504.21	6,809.15	J-104	15.54	312.72	6,280.97
J-151	1,004.21	6,793.62	J-104	15.82	313.37	6,296.12
J-152	1,004.21	6,836.69	J-104	15.57	312.79	6,309.27
J-153	1,004.21	6,518.75	J-104	18.45	319.42	6,329.03
J-154	1,004.21	6,370.52	J-170	19.39	292.1	6,315.16
J-155	1,004.21	5,742.36	J-155	20	279.84	5,742.76
J-156	1,004.21	5,909.03	J-156	20	275.55	5,908.98
J-157	1,004.21	5,853.87	J-158	18.68	270.15	5,766.66
J-158	1,004.21	3,136.43	J-158	20	273.2	3,136.42

2018 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
J-159	1,004.21	5,924.47	J-159	20	275.85	5,924.38
J-160	2,504.21	6,137.74	J-160	20	284.53	6,137.47
J-161	2,504.21	6,228.50	J-161	20	279.94	6,228.23
J-162	1,004.21	6,246.57	J-170	19.53	292.42	6,204.42
J-163	1,004.21	5,657.09	J-572	19.86	289.6	5,646.71
J-164	1,004.21	4,346.76	J-165	19.48	290.01	4,316.20
J-165	1,004.21	3,240.12	J-165	20	291.2	3,240.12
J-166	1,004.21	2,864.18	J-166	20	290.42	2,864.17
J-167	1,004.21	4,331.62	J-168	19.51	289.87	4,302.86
J-168	1,004.21	3,778.11	J-168	20	291	3,777.98
J-169	1,004.21	4,302.38	J-169	20	290.68	4,302.39
J-170	1,004.21	4,438.99	J-170	20	293.51	4,438.99
J-171	1,004.21	3,928.19	J-171	20	291.47	3,927.97
J-172	1,004.21	4,555.42	J-172	20	292.46	4,555.42
J-173	1,004.21	3,969.99	J-173	20	291.68	3,969.75
J-174	2,504.21	6,189.62	J-170	19.16	291.58	6,116.15
J-175	2,504.21	6,252.26	J-175	20	288.63	6,251.88
J-176	2,504.21	6,122.06	J-176	20	292.15	6,121.77
J-177	2,504.21	6,178.43	J-177	20	291	6,178.08
J-178	2,504.21	6,437.94	J-402	17.98	290.64	6,254.42
J-179	2,504.21	6,032.72	J-179	20	295.9	6,032.42
J-180	2,504.21	5,567.18	J-180	20	295.06	5,567.14
J-181	2,504.21	5,370.46	J-181	20	293.79	5,370.48
J-182	2,504.21	4,977.52	J-182	20	297.19	4,977.70
J-183	2,504.21	4,946.99	J-183	20	299.03	4,947.01
J-184	2,504.21	5,056.33	J-184	20	297.29	5,056.53
J-185	2,504.21	5,391.96	J-206	12.61	291.18	4,839.29
J-186	2,504.21	5,352.75	J-206	15.44	297.71	4,993.56
J-187	2,504.21	5,419.98	J-206	14.39	295.3	4,981.82
J-189	2,504.21	5,458.11	J-206	13.85	294.03	4,978.80
J-190	2,504.21	5,075.22	J-206	19.64	307.41	5,046.09
J-191	1,004.21	4,102.23	J-191	20	293.27	4,102.23
J-192	1,004.21	3,997.06	J-192	20	293.45	3,997.06
J-194	2,504.21	4,699.96	J-194	20	289.7	4,700.11
J-195	2,504.21	4,643.28	J-195	20	289.39	4,643.27
J-196	2,504.21	4,616.68	J-196	20	287.9	4,616.69
J-197	2,504.21	5,183.51	J-206	19.06	306.06	5,105.75
J-198	2,504.21	5,355.16	J-206	16.72	300.66	5,088.84
J-199	2,504.21	4,870.98	J-199	20	289.87	4,871.01
J-200	2,504.21	5,337.36	J-206	13.38	292.96	4,840.27
J-201	2,504.21	5,370.80	J-206	16.26	299.61	5,069.72
J-202	2,504.21	5,211.72	J-206	14.26	294.99	4,784.75
J-203	2,504.21	4,833.92	J-206	18.44	304.64	4,717.54
J-204	2,504.21	4,792.33	J-206	18.5	304.76	4,680.74
J-205	2,504.21	3,631.86	J-205	20	307.16	3,631.85
J-206	2,504.21	3,448.48	J-206	20	308.23	3,448.48

2018 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
J-207	2,504.21	4,771.63	J-206	18.96	305.84	4,694.30
J-208	2,504.21	5,075.51	J-206	15.62	298.12	4,749.88
J-209	2,504.21	5,436.76	J-206	11.99	289.76	4,839.54
J-218	1,004.21	4,111.10	J-576	17.36	288.21	3,968.95
J-219	1,004.21	3,488.89	J-575	19.55	287.17	3,468.83
J-220	1,004.21	3,442.07	J-220	20	284.63	3,441.86
J-221	1,004.21	3,728.09	J-221	20	286.95	3,727.74
J-222	1,004.21	3,788.01	J-221	19.91	286.74	3,783.59
J-223	1,004.21	3,553.96	J-223	20	292.9	3,553.64
J-224	1,004.21	3,700.82	J-224	20	293.64	3,700.82
J-225	2,504.21	5,193.10	J-225	20	295.61	5,193.20
J-226	1,004.21	6,038.13	J-104	11.2	302.7	5,200.09
J-235	1,004.21	3,773.81	J-235	20	292.42	3,773.81
J-236	1,004.21	3,866.53	J-236	20	287.76	3,866.53
J-237	1,004.21	5,435.32	74	12.52	278.67	4,941.22
J-238	1,004.21	5,068.89	74	14.27	282.71	4,706.73
J-239	1,004.21	4,449.44	J-576	18.37	290.54	4,354.52
J-240	2,504.21	5,591.31	J-240	20	265.7	5,591.39
J-241	1,004.21	4,638.36	J-242	19.75	271.88	4,624.67
J-242	1,004.21	4,441.22	J-242	20	272.46	4,440.91
J-243	1,004.21	4,067.35	J-243	20	279.53	4,067.15
J-244	1,004.21	2,471.14	J-244	20	274.14	2,471.14
J-245	1,004.21	2,435.73	J-245	20	272.45	2,435.73
J-246	1,004.21	4,005.35	J-246	20	282.71	4,005.13
J-247	1,004.21	2,596.06	J-247	20	275.59	2,596.05
J-248	1,004.21	2,491.99	J-248	20	272.67	2,491.99
J-249	2,504.21	6,604.20	J-104	17.01	316.12	6,248.10
J-250	2,504.21	5,070.89	J-250	20	269.07	5,070.84
J-251	2,504.21	5,771.33	J-251	20	266.65	5,771.30
J-252	1,004.21	5,346.43	J-252	20	263.78	5,345.98
J-253	1,004.21	6,804.69	J-104	14.35	309.98	6,154.56
J-254	1,004.21	4,551.50	J-254	20	270.49	4,551.21
J-255	1,004.21	5,591.19	J-255	20	272.2	5,591.74
J-256	1,004.21	3,586.11	J-256	20	263.45	3,586.09
J-257	1,004.21	5,462.32	J-257	20	267.57	5,462.81
J-258	1,004.21	4,818.51	J-258	20	273.93	4,818.51
J-259	1,004.21	5,646.54	J-259	20	269.4	5,646.99
J-260	1,004.21	6,601.02	J-104	17.42	317.06	6,290.33
J-261	2,504.21	7,097.49	J-104	15.11	311.71	6,498.46
J-262	4,004.21	5,984.71	J-104	16.34	314.56	5,596.77
J-263	4,004.21	5,834.35	J-104	17.75	317.83	5,594.06
J-264	4,004.21	5,777.47	J-104	18.27	319.02	5,592.10
J-265	4,004.21	5,742.82	J-275	16.96	257.15	5,562.59
J-266	4,004.21	5,701.30	J-275	17.17	257.63	5,534.33
J-267	4,004.21	5,709.72	J-275	16.91	257.04	5,528.20
J-268	4,004.21	5,286.98	J-557	19.26	266.99	5,244.22

2018 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
J-270	4,004.21	5,605.42	J-275	17.6	258.62	5,465.60
J-271	4,004.21	5,621.58	J-275	16.89	256.99	5,442.00
J-272	4,004.21	5,500.35	J-275	18.2	260.02	5,396.50
J-273	4,004.21	5,346.27	J-275	19.05	261.97	5,292.55
J-274	4,004.21	5,208.59	J-275	19.72	263.52	5,193.36
J-275	4,004.21	5,132.19	J-275	20	264.17	5,132.20
J-283	1,004.21	5,112.08	J-283	20	263.97	5,112.09
J-284	2,504.21	6,086.15	J-294	19.83	275.74	6,073.31
J-285	1,004.21	5,069.04	J-285	20	266.35	5,069.04
J-286	1,004.21	5,002.78	J-290	19.97	276.08	5,000.82
J-287	1,004.21	3,693.87	J-287	20	262.37	3,693.83
J-288	1,004.21	5,227.94	J-288	20	272.04	5,227.51
J-289	1,004.21	5,432.59	J-290	19.02	273.89	5,370.31
J-290	1,004.21	3,118.60	J-290	20	276.15	3,118.61
J-291	2,504.21	5,000.41	J-291	20	273.22	5,000.36
J-292	2,504.21	4,792.94	J-292	20	273.1	4,792.91
J-293	2,504.21	4,841.07	J-294	18.92	273.64	4,779.90
J-294	2,504.21	2,911.11	J-294	20	276.14	2,911.03
J-295	2,504.21	6,812.49	J-104	16.8	315.62	6,419.99
J-296	2,504.21	6,710.84	J-104	17.28	316.74	6,379.03
J-297	2,504.21	6,696.34	J-104	17.19	316.52	6,354.48
J-298	2,504.21	7,172.93	J-104	12.84	306.49	6,332.90
J-299	1,004.21	7,283.26	J-104	11.96	304.45	6,341.99
J-300	2,504.21	6,135.90	J-300	20	293.61	6,135.63
J-301	1,004.21	6,204.64	J-301	20	266.9	6,204.64
J-302	1,004.21	6,321.91	J-104	19.82	322.6	6,300.30
J-303	1,004.21	6,287.89	J-303	20	261.61	6,287.89
J-304	1,004.21	6,260.04	J-304	20	266.39	6,260.04
J-305	1,004.21	4,858.04	J-305	20	268.45	4,857.60
J-306	1,004.21	4,970.90	J-306	20	271.09	4,970.90
J-307	1,004.21	5,369.96	J-307	20	271.7	5,369.96
J-308	1,004.21	5,049.69	J-308	20	274.58	5,049.69
J-309	1,004.21	5,893.20	J-309	20	269.89	5,893.11
J-311	2,504.21	5,015.91	J-311	20	262.3	5,015.88
J-312	2,504.21	5,119.57	J-312	20	261.79	5,119.53
J-313	2,504.21	3,165.27	J-313	20	260.82	3,165.15
J-314	2,504.21	6,117.63	J-314	20	261.92	6,117.51
J-315	2,504.21	5,333.93	J-315	20	290.68	5,333.97
J-316	2,504.21	4,772.44	J-316	20	288.5	4,772.40
J-317	1,004.21	7,571.63	J-104	15.64	312.95	6,993.56
J-318	1,004.21	8,112.40	64	15.92	315.49	7,478.18
J-319	1,004.21	3,417.93	J-319	20	273.07	3,417.92
J-322	1,004.21	7,259.44	J-322	20	334.8	7,259.44
J-343	2,504.21	5,906.53	J-343	20	268.59	5,906.42
J-345	2,504.21	7,476.48	J-104	13.5	308	6,667.63
J-346	2,504.21	6,405.83	J-346	20	273.35	6,405.65

2018 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
J-347	2,504.21	7,469.26	J-104	13.76	308.61	6,689.30
J-349	1,004.21	5,029.57	J-353	17.56	267.11	4,893.85
J-350	1,004.21	7,518.11	J-104	14.18	309.57	6,778.87
J-351	1,004.21	7,687.27	J-104	12.44	305.55	6,742.33
J-352	1,004.21	3,821.45	J-353	17.9	267.92	3,734.97
J-353	1,004.21	3,232.45	J-353	20	272.75	3,232.44
J-37	2,504.21	6,271.80	J-104	15.39	312.37	5,758.69
J-393	1,004.21	4,812.69	J-393	20	328.97	4,812.38
J-397	1,004.21	9,263.53	64	6.42	293.57	7,326.82
J-399	2,504.21	6,253.70	J-399	20	289.87	6,253.34
J-4	4,004.21	6,310.11	J-104	12.29	305.23	5,530.37
J-400	2,504.21	5,552.82	J-400	20	285.61	5,553.06
J-401	2,504.21	6,021.35	J-401	20	294.75	6,021.08
J-402	2,504.21	6,041.99	J-402	20	295.3	6,041.69
J-403	4,004.21	5,766.71	J-104	17.14	316.41	5,470.86
J-404	4,004.21	6,481.79	J-104	8.88	297.35	5,407.30
J-45	1,004.21	8,645.94	64	10.93	303.98	7,320.57
J-500	2,504.21	4,539.71	J-500	20	263.12	4,539.69
J-501	2,504.21	4,432.49	J-501	20	262.65	4,432.47
J-502	2,504.21	4,319.74	J-502	20	261.54	4,319.73
J-503	2,504.21	4,536.24	J-503	20	263.11	4,536.21
J-504	2,504.21	4,662.58	J-504	20	262.38	4,662.61
J-505	2,504.21	4,449.53	J-505	20	262.17	4,449.51
J-506	2,504.21	4,825.87	J-506	20	261.9	4,825.85
J-507	2,504.21	4,895.15	J-507	20	263.84	4,895.27
J-508	2,504.21	4,950.45	J-508	20	263.27	4,950.53
J-509	1,004.21	4,724.23	J-509	20	264.57	4,723.99
J-510	1,004.21	4,275.73	J-510	20	263.52	4,275.43
J-511	2,504.21	4,401.35	J-511	20	264.92	4,401.34
J-512	1,004.21	3,099.80	J-512	20	267.64	3,099.77
J-513	1,004.21	2,895.58	J-513	20	265.95	2,895.57
J-514	1,004.21	2,982.72	J-514	20	266.66	2,982.70
J-515	1,004.21	2,850.07	J-515	20	265.96	2,850.07
J-516	2,504.21	3,911.67	J-512	17.38	261.6	3,804.51
J-517	1,004.21	4,131.75	J-517	20	309.97	4,131.75
J-518	1,004.21	4,413.01	J-518	20	319.07	4,412.97
J-519	4,004.21	3,280.90	J-519	20	282.6	3,280.58
J-521	1,004.21	2,177.54	J-521	20	271.4	2,177.54
J-522	4,004.21	4,622.97	J-522	20	263.33	4,622.93
J-523	4,004.21	4,199.12	J-523	20	272.31	4,199.08
J-524	4,004.21	4,291.66	J-524	20	271.85	4,291.57
J-525	4,004.21	4,663.38	J-525	20	272.48	4,663.28
J-526	4,004.21	5,533.73	J-104	19.34	321.5	5,465.11
J-527	4,004.21	5,175.39	J-527	20	269.41	5,175.73
J-528	4,004.21	5,036.73	J-528	20	268.06	5,036.74
J-529	4,004.21	5,577.57	J-104	18.81	320.26	5,453.27

2018 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
J-530	4,004.21	4,753.03	J-530	20	267.87	4,753.48
J-531	4,004.21	4,576.84	J-531	20	267.83	4,576.86
J-532	4,004.21	4,771.30	J-532	20	267.29	4,771.30
J-533	4,004.21	5,757.56	J-104	17.04	316.18	5,452.91
J-534	4,004.21	6,357.35	J-104	10.71	301.56	5,443.55
J-535	4,004.21	6,364.87	J-104	10.59	301.29	5,440.72
J-536	4,004.21	5,893.17	J-104	15.54	312.71	5,440.72
J-537	4,004.21	4,975.69	J-537	20	272.17	4,975.70
J-538	4,004.21	3,846.11	J-538	20	266.85	3,846.09
J-539	4,004.21	4,131.10	J-539	20	269.42	4,131.09
J-540	4,004.21	4,844.36	J-540	20	270.74	4,844.35
J-541	4,004.21	3,700.12	J-541	20	269.97	3,700.06
J-542	4,004.21	3,826.05	J-542	20	267.53	3,826.02
J-543	4,004.21	4,044.28	J-543	20	272.47	4,044.28
J-544	4,004.21	4,869.86	J-544	20	271.01	4,869.86
J-545	4,004.21	2,325.11	J-545	20	267.26	2,325.11
J-546	4,004.21	2,618.82	J-546	20	267.76	2,618.82
J-547	4,004.21	2,835.72	J-547	20	268.26	2,835.72
J-548	4,004.21	3,737.75	J-547	19.49	267.08	3,717.05
J-549	4,004.21	2,880.72	J-549	20	266.89	2,880.72
J-550	4,004.21	2,659.80	J-550	20	266.6	2,659.80
J-551	4,004.21	2,759.72	J-551	20	267.19	2,759.72
J-552	4,004.21	2,744.71	J-552	20	267.31	2,744.72
J-553	4,004.21	2,848.21	J-553	20	266.66	2,848.21
J-554	4,004.21	3,021.30	J-552	19.74	266.72	3,013.04
J-555	4,004.21	3,411.58	J-547	19.39	266.85	3,388.95
J-556	4,004.21	4,908.79	J-557	19.97	268.62	4,906.93
J-557	4,004.21	3,479.67	J-557	20	268.7	3,479.49
J-558	2,504.21	6,117.10	J-104	15.53	312.7	5,641.39
J-559	2,504.21	5,944.53	J-104	17.22	316.61	5,644.55
J-560	2,504.21	5,739.47	J-104	19.16	321.07	5,647.35
J-561	2,504.21	5,584.58	J-561	20	263.67	5,584.49
J-562	2,504.21	5,446.00	J-562	20	263.53	5,445.94
J-563	2,504.21	5,805.56	J-104	18.71	320.03	5,663.55
J-564	2,504.21	6,078.45	J-104	16.32	314.53	5,679.32
J-565	2,504.21	5,339.19	J-565	20	258.62	5,339.15
J-566	2,504.21	5,752.59	J-104	19.34	321.49	5,679.32
J-567	2,504.21	5,203.04	J-567	20	262.49	5,203.02
J-568	4,004.21	5,619.67	J-104	19.63	322.16	5,579.96
J-569	2,504.21	6,850.80	J-104	15.8	313.31	6,346.34
J-570	1,004.21	4,528.79	J-570	20	285.39	4,528.79
J-571	1,004.21	4,539.74	J-571	20	284.5	4,539.29
J-572	1,004.21	5,615.47	J-572	20	289.91	5,615.48
J-573	1,004.21	3,696.75	J-573	20	294.65	3,696.75
J-574	1,004.21	3,462.41	J-574	20	285.24	3,462.19
J-575	1,004.21	2,519.36	J-575	20	288.2	2,519.36

2018 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
J-576	1,004.21	2,869.46	J-576	20	294.31	2,869.42
J-577	1,004.21	5,032.84	74	14.27	282.71	4,673.30
J-578	1,004.21	4,890.46	74	15.73	286.09	4,624.39
J-59	4,004.21	6,124.47	J-104	15.16	311.83	5,614.24
J-590	1,004.21	5,185.81	J-112	18.48	313.41	5,051.23
J-591	1,004.21	5,033.88	J-104	20	323.01	5,033.64
J-592	1,004.21	5,033.67	J-104	20	323.01	5,033.17
J-593	1,004.21	5,186.28	J-104	18.81	320.28	5,069.81
J-594	2,504.21	7,775.43	J-104	15.59	312.83	7,175.01
J-595	1,004.21	2,520.29	J-595	20	340.63	2,520.38
J-596	2,504.21	6,366.83	J-629	16.09	287.18	6,025.76
J-597	2,504.21	6,343.11	J-603	18.06	286.9	6,176.72
J-598	2,504.21	5,760.48	J-598	20	285.66	5,760.51
J-599	2,504.21	5,952.65	J-599	20	284.45	5,952.53
J-6	4,004.21	5,590.82	J-543	18.3	268.54	5,484.23
J-600	2,504.21	5,767.48	J-600	20	285.84	5,767.49
J-603	2,504.21	4,465.80	J-603	20	291.38	4,465.77
J-604	2,504.21	6,165.63	J-603	17.98	286.72	5,998.66
J-605	2,504.21	6,094.78	J-605	20	290.84	6,094.49
J-606	2,504.21	4,390.85	J-606	20	291.62	4,390.83
J-607	2,504.21	6,178.20	J-606	18.72	288.67	6,070.15
J-608	2,504.21	5,710.71	J-608	20	288.99	5,710.77
J-609	2,504.21	5,413.70	J-613	19.59	294.98	5,381.27
J-610	2,504.21	4,568.01	J-610	20	289.62	4,567.98
J-611	2,504.21	5,109.99	J-611	20	294.45	5,109.88
J-613	2,504.21	5,150.90	J-613	20	295.93	5,150.77
J-615	2,504.21	4,882.10	J-615	20	293.75	4,882.04
J-616	2,504.21	6,162.47	J-616	20	292.39	6,162.17
J-617	2,504.21	6,306.38	J-630	17.4	290.41	6,075.03
J-618	2,504.21	5,430.33	J-620	18.73	292.4	5,331.92
J-619	2,504.21	4,879.69	J-619	20	292.41	4,879.63
J-62	4,004.21	5,829.33	J-104	17.8	317.92	5,593.56
J-620	2,504.21	4,623.46	J-620	20	295.34	4,623.42
J-621	2,504.21	5,225.85	J-621	20	293.96	5,225.75
J-622	2,504.21	4,892.61	J-622	20	295.66	4,892.53
J-623	2,504.21	4,888.17	J-630	19.55	295.39	4,856.13
J-624	2,504.21	5,457.50	J-630	19.59	295.48	5,424.67
J-625	2,504.21	5,655.42	J-630	18.9	293.88	5,567.04
J-626	2,504.21	5,360.41	J-626	20	288.65	5,360.40
J-627	2,504.21	5,157.32	J-627	20	289.32	5,157.21
J-628	2,504.21	5,049.17	J-629	17.33	290.05	4,861.73
J-629	2,504.21	3,738.75	J-629	20	296.2	3,738.75
J-630	2,504.21	4,356.97	J-630	20	296.42	4,356.95
J-631	2,504.21	5,519.85	J-634	19.31	289.5	5,468.33
J-632	2,504.21	5,079.42	J-634	19.29	289.45	5,029.73
J-633	2,504.21	4,727.66	J-633	20	286.44	4,727.63

2018 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
J-634	2,504.21	4,767.81	J-634	20	291.1	4,767.76
J-635	2,504.21	5,051.07	J-635	20	286.5	5,051.00
J-636	2,504.21	5,198.87	J-634	19.45	289.84	5,159.56
J-637	2,504.21	4,764.74	J-637	20	286.15	4,764.70
J-638	2,504.21	4,699.26	J-638	20	284.65	4,699.23
J-639	2,504.21	4,852.36	J-639	20	287.72	4,852.31
J-640	2,504.21	5,463.93	J-640	20	287.48	5,463.88
J-641	2,504.21	4,931.16	J-634	19.46	289.86	4,894.80
J-642	2,504.21	4,840.35	J-642	20	290.63	4,840.29
J-643	2,504.21	5,755.65	J-643	20	288.72	5,755.74
J-644	2,504.21	6,599.21	J-104	18.33	319.16	6,393.33
J-645	2,504.21	4,406.92	J-645	20	290.13	4,406.90
J-646	2,504.21	4,373.02	J-646	20	289.61	4,373.00
J-647	1,004.21	2,077.03	J-647	20	289.66	2,077.02
J-648	1,004.21	3,701.24	J-649	19.39	290.29	3,671.42
J-649	1,004.21	2,984.68	J-649	20	291.69	2,984.62
J-650	1,004.21	4,133.56	J-650	20	295.19	4,133.53
J-651	1,004.21	6,649.91	J-651	20	300.39	6,649.91
J-652	1,004.21	3,559.80	J-652	20	293.55	3,559.80
J-653	2,504.21	3,532.89	J-653	20	316.95	3,532.90
J-654	2,504.21	3,557.05	J-654	20	311.66	3,557.06
J-655	2,504.21	3,820.67	J-655	20	326.33	3,820.67
J-656	1,004.21	8,590.81	64	11.33	304.91	7,321.34
J-657	2,504.21	6,752.59	J-657	20	289.13	6,752.70
J-66	2,504.21	6,219.66	J-104	14.42	310.13	5,632.04
J-664	1,004.21	2,608.37	J-666	19.66	406.09	2,601.35
J-666	1,004.21	2,573.96	J-666	20	406.88	2,573.96
J-67	4,004.21	6,395.24	J-104	12.55	305.81	5,622.29
J-675	4,004.21	6,350.30	J-104	10.7	301.54	5,437.01
J-68	4,004.21	6,291.33	J-104	13.55	308.13	5,618.89
J-680	1,004.21	4,520.91	J-680	20	270.44	4,520.70
J-682	2,504.21	5,333.43	J-206	17.32	302.05	5,113.97
J-683	1,004.21	7,611.00	J-104	15.28	312.13	6,988.24
J-684	4,004.21	3,475.42	J-519	19.53	281.51	3,455.77
J-685	1,004.21	5,745.23	J-104	13.04	306.95	5,090.04
J-686	2,504.21	6,236.51	J-104	14.26	309.76	5,632.49
J-687	4,004.21	5,652.49	J-275	17.53	258.48	5,507.76
J-688	4,004.21	5,630.71	J-275	18.35	260.36	5,532.96
J-689	4,004.21	5,507.95	J-689	20	254.39	5,507.95
J-69	4,004.21	6,002.54	J-104	16.31	314.49	5,610.07
J-690	2,504.21	2,791.98	J-690	20	259.67	2,791.95
J-691	1,004.21	6,258.72	J-691	20	285.42	6,258.73
J-692	1,004.21	6,640.90	J-104	15.42	312.44	6,112.73
J-693	1,004.21	3,039.48	J-693	20	290.31	3,039.45
J-694	2,504.21	7,605.05	J-104	18.57	319.71	7,399.96
J-695	1,004.21	3,894.60	J-695	20	288.15	3,894.60

2018 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
J-696	1,004.21	3,746.98	J-696	20	286.84	3,746.62
J-697	1,004.21	3,872.47	J-697	20	288.18	3,872.47
J-70	4,004.21	6,006.82	J-104	16.22	314.3	5,606.32
J-71	4,004.21	6,004.76	J-104	16.21	314.26	5,602.88
J-72	4,004.21	6,012.86	J-104	16.09	314	5,599.81
J-73	2,504.21	6,421.92	J-104	19.28	321.34	6,333.41
J-74	2,504.21	6,397.87	J-104	19.62	322.14	6,351.21
J-75	2,504.21	6,463.17	J-104	19.29	321.38	6,375.87
J-76	2,504.21	5,821.54	J-76	20	289.85	5,821.56
J-77	2,504.21	4,965.67	J-77	20	290.02	4,965.60
J-78	2,504.21	4,371.01	J-78	20	289.5	4,371.00
J-79	2,504.21	2,139.91	J-79	20	288.95	2,139.88
J-80	2,504.21	4,905.98	J-80	20	292.07	4,905.91
J-81	2,504.21	6,284.85	J-81	20	289.74	6,284.44
J-82	2,504.21	6,326.01	J-176	19.84	291.78	6,311.23
J-83	2,504.21	6,166.41	J-83	20	292.67	6,166.07
J-84	2,504.21	6,280.68	J-84	20	289.58	6,280.28
J-85	2,504.21	6,408.63	J-104	19.68	322.27	6,368.87
J-86	2,504.21	5,730.39	J-86	20	286.58	5,730.49
J-87	2,504.21	5,031.66	J-87	20	291.53	5,031.57
J-88	2,504.21	4,392.93	J-88	20	291.19	4,392.91
J-89	2,504.21	4,994.61	J-89	20	293	4,994.52
J-90	2,504.21	5,736.30	J-90	20	290.74	5,736.42
J-91	1,004.21	6,278.75	J-91	20	263.51	6,278.75
J-92	1,004.21	6,182.02	J-92	20	265.36	6,182.02
J-93	1,004.21	6,362.01	J-104	19.7	322.33	6,325.73
J-94	1,004.21	6,662.93	J-104	17.2	316.55	6,324.50
J-95	1,004.21	6,841.18	J-104	15.6	312.86	6,316.49
J-96	1,004.21	6,225.72	J-96	20	266.92	6,225.72
J-97	1,004.21	3,925.50	J-97	20	268.29	3,925.41
J-98	1,004.21	5,287.78	J-246	14.93	271.02	4,973.66
J-99	1,004.21	5,002.51	J-243	19.19	277.66	4,953.10
PH_1	2,504.21	4,655.02	PH_1	20	263.15	4,655.00
PH_10	1,004.21	3,578.03	RM4	10.48	329.35	2,799.65
PH_2	4,004.21	4,995.56	PH_2	20	264.94	4,995.56
PH_3	4,004.21	5,801.78	J-104	18.03	318.47	5,590.91
PH_4	1,004.21	4,626.10	PH_4	20	322.1	4,626.11
PH_5	1,004.21	3,566.86	PH_5	20	292.66	3,566.53
PH_6	2,504.21	6,205.66	PH_6	20	288.98	6,205.31
PH_7	1,004.21	4,012.61	PH_7	20	280.18	4,012.52
PH_8	2,504.21	9,384.92	64	5.43	291.28	7,321.69
PH_9	1,004.21	2,676.83	HH62	15.57	381.91	2,593.74
RM10	1,004.21	2,307.26	RM4	12.1	333.09	1,871.18
RM12	1,004.21	1,778.04	RM12	20	289.01	1,777.99
RM2	1,004.21	2,096.55	RM4	16.09	342.29	1,871.18
RM4	1,004.21	1,567.34	RM4	20	351.32	1,567.24

2018 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
RM6	1,004.21	2,345.96	RM4	11.34	331.33	1,871.18
RM8	1,004.21	2,441.40	RM4	9.4	326.86	1,871.18

2028 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
10	1,005.37	2,553.53	12	15.94	259.23	2,445.90
12	1,005.37	2,009.00	12	20	268.6	2,009.00
14	1,005.37	2,966.86	14	20	282.21	2,966.85
16	1,005.37	2,745.88	16	20	285.44	2,745.86
18	1,005.37	2,652.03	18	20	287.16	2,652.01
20	1,005.37	4,458.83	20	20	277.1	4,458.83
22	1,005.37	2,396.18	22	20	285.83	2,396.17
24	2,505.37	3,511.32	24	20	284.54	3,511.32
26	2,505.37	7,167.93	J-104	15.58	312.81	6,547.53
28	1,005.37	2,283.28	28	20	270.2	2,283.27
30	1,005.37	2,038.04	30	20	259.32	2,038.04
32	2,505.37	5,781.58	32	20	267.06	5,781.49
34	2,505.37	6,314.44	34	20	286.55	6,313.82
36	1,005.37	4,831.64	36	20	279.49	4,831.64
38	1,005.37	5,749.13	36	19.52	278.39	5,713.63
40	1,005.37	5,234.67	40	20	251.92	5,234.67
42	1,005.37	5,565.16	42	20	254.53	5,565.17
44	1,005.37	5,653.75	44	20	252.53	5,653.76
46	1,005.37	6,187.00	46	20	253.76	6,187.02
48	1,005.37	6,090.81	48	20	254.34	6,090.81
50	1,005.37	6,573.39	50	20	255.44	6,573.40
52	1,005.37	6,662.32	52	20	257.64	6,662.33
54	1,005.37	7,213.90	64	16.53	316.89	6,681.48
56	1,005.37	6,905.55	64	18.54	321.54	6,678.91
58	1,005.37	5,586.95	58	20	285.81	5,586.95
60	1,005.37	5,774.75	60	20	295.89	5,774.75
62	1,005.37	7,632.72	64	14.19	311.49	6,745.43
64	1,005.37	5,078.07	64	20	324.91	5,078.06
66	1,005.37	5,471.34	66	20	328.94	5,471.32
68	1,005.37	7,875.85	64	11.77	305.92	6,659.52
70	1,005.37	5,529.30	70	20	318.19	5,529.29
72	1,005.37	6,714.39	66	19.53	327.85	6,634.28
74	1,005.37	3,389.03	74	20	295.94	3,389.03
76	1,005.37	3,528.87	76	20	295.18	3,528.87
78	1,005.37	3,198.03	78	20	294.26	3,198.03
80	1,005.37	3,292.39	80	20	292.37	3,292.39
82	1,005.37	3,490.59	82	20	291.38	3,490.59
84	1,005.37	3,492.78	84	20	290.84	3,492.78
86	1,005.37	3,602.12	86	20	295.26	3,602.12
88	1,005.37	3,501.19	88	20	294.61	3,501.19
90	1,005.37	3,341.45	90	20	292.54	3,341.45
92	1,005.37	3,208.06	92	20	293.01	3,208.06
94	1,005.37	3,088.96	94	20	295.57	3,088.96
96	1,005.37	3,370.63	96	20	290.71	3,370.63
98	1,005.37	3,503.59	98	20	294.85	3,503.59
100	1,005.37	3,664.66	100	20	294.55	3,664.67

2028 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
102	1,005.37	3,318.88	102	20	292.9	3,318.88
104	1,005.37	3,833.31	98	19.11	292.79	3,782.69
106	1,005.37	3,169.36	106	20	270.97	3,169.28
108	1,005.37	7,813.60	64	12.31	307.15	6,671.81
110	1,005.37	6,583.73	64	19.64	324.07	6,527.49
112	1,005.37	6,629.47	112	20	324.15	6,629.47
114	1,005.37	5,606.26	114	20	269.89	5,606.26
116	1,005.37	7,018.73	J-104	11.51	303.41	5,959.74
118	2,505.37	7,113.56	J-104	10.44	300.94	5,930.72
126	2,505.37	8,865.54	64	4.48	289.09	6,667.34
128	2,505.37	8,180.31	64	9.64	301	6,667.34
130	2,505.37	4,248.12	130	20	265.45	4,248.12
132	1,005.37	4,316.88	132	20	251.9	4,316.70
138	4,005.37	4,805.85	140	19.62	268.82	4,783.98
140	4,005.37	4,749.83	140	20	269.69	4,749.83
142	4,005.37	4,693.13	142	20	268.32	4,693.13
144	4,005.37	4,654.09	144	20	268.22	4,654.09
146	4,005.37	4,652.32	146	20	268.46	4,652.33
148	4,005.37	4,726.67	148	20	269.78	4,726.67
152	1,005.37	6,772.01	J-104	14.42	310.14	6,052.95
154	1,005.37	5,204.11	154	20	279.44	5,204.12
156	1,005.37	5,049.46	HH176	19.88	283.15	5,041.22
158	1,005.37	4,098.57	158	20	280.47	4,098.57
160	1,005.37	4,006.76	160	20	284.46	4,006.76
162	2,505.37	5,822.32	J-630	16.38	288.06	5,501.79
164	2,505.37	4,842.56	164	20	262.82	4,842.44
166	2,505.37	4,814.88	J-512	18.89	265.08	4,752.40
168	2,505.37	3,871.81	168	20	260.38	3,871.79
170	2,505.37	4,558.03	170	20	261.97	4,557.99
172	2,505.37	4,500.47	J-511	19.94	264.77	4,497.20
174	2,505.37	3,698.34	J-512	19.49	266.46	3,676.37
176	1,005.37	6,597.44	J-104	12.51	305.73	5,696.96
178	2,505.37	7,009.50	J-104	11.85	304.2	5,985.26
180	1,005.37	7,171.62	J-104	11.36	303.07	6,073.92
182	1,005.37	7,223.94	J-104	11.46	303.3	6,129.19
184	1,005.37	6,660.37	J-104	13.48	307.96	5,849.62
186	1,005.37	6,495.96	J-104	14.07	309.32	5,766.38
188	2,505.37	5,907.50	188	20	268.68	5,907.05
190	1,005.37	7,387.56	J-104	10.36	300.76	6,154.50
192	1,005.37	5,378.19	HH172	19.88	256.07	5,371.25
194	1,005.37	6,448.97	J-104	15.17	311.87	5,842.60
196	1,005.37	5,817.82	196	20	270.55	5,817.81
198	1,005.37	6,911.42	J-104	14.09	309.36	6,139.59
210	1,005.37	3,672.09	210	20	283.92	3,672.09
212	2,505.37	8,566.41	64	6.76	294.36	6,667.22
FH_1	2,505.37	4,285.82	FH_1	20	263.97	4,285.81

2028 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
FH_10	2,505.37	3,947.41	RM4	4.16	314.77	2,713.52
FH_2	4,005.37	4,281.72	FH_2	20	264.32	4,281.92
FH_3	4,005.37	5,384.46	J-104	16.2	314.25	4,979.58
FH_4	1,005.37	4,098.27	FH_4	20	307.49	4,098.27
FH_5	1,005.37	3,662.26	FH_5	20	288.24	3,662.27
FH_6	2,505.37	5,653.70	J-104	19.66	322.23	5,611.56
FH_7	1,005.37	4,053.19	FH_7	20	285	4,053.19
FH_8	2,505.37	8,228.40	64	9.29	300.19	6,667.34
FH_9	1,005.37	2,673.25	HH62	12.79	375.5	2,538.64
HH10	1,005.37	3,471.42	HH8	19.21	285.1	3,436.44
HH100	1,005.37	2,699.56	HH62	11.42	372.35	2,539.68
HH102	1,005.37	2,636.18	HH62	14.52	379.5	2,533.96
HH104	1,005.37	2,604.75	HH62	16.21	383.41	2,533.96
HH106	1,005.37	2,677.52	HH62	12.28	374.34	2,533.96
HH108	1,005.37	2,580.58	HH62	17.51	386.4	2,533.96
HH110	1,005.37	2,576.67	HH62	17.72	386.89	2,533.96
HH112	1,005.37	2,707.73	J-666	11.88	388.14	2,542.63
HH114	1,005.37	2,603.57	J-666	17.01	399.97	2,542.30
HH116	1,005.37	2,596.49	J-666	17.32	400.69	2,541.63
HH118	1,005.37	2,500.48	HH118	20	392.65	2,500.47
HH12	1,005.37	4,851.28	HH12	20	330.33	4,851.28
HH120	1,005.37	2,575.21	HH128	14.47	355.98	2,486.85
HH122	1,005.37	2,488.32	HH128	18.16	364.48	2,459.15
HH124	1,005.37	2,466.96	HH128	19.27	367.04	2,455.57
HH126	1,005.37	2,466.32	HH128	19.27	367.06	2,455.06
HH128	1,005.37	2,425.08	HH128	20	368.74	2,425.26
HH130	1,005.37	2,551.12	HH128	15.43	358.19	2,478.34
HH132	1,005.37	7,975.02	64	11.13	304.44	6,668.56
HH134	1,005.37	5,247.99	HH134	20	290.02	5,247.99
HH136	1,005.37	5,125.33	HH136	20	297.13	5,125.33
HH138	1,005.37	7,307.88	64	15.9	315.45	6,685.35
HH142	1,005.37	4,303.41	FH_4	19.51	306.37	4,267.81
HH144	2,505.37	5,051.20	HH148	18.45	265.65	4,964.01
HH146	2,505.37	4,700.83	HH148	19.92	269.04	4,696.73
HH148	2,505.37	4,056.89	HH148	20	269.22	4,056.89
HH150	2,505.37	6,227.93	HH148	16.51	261.18	5,988.73
HH154	2,505.37	4,381.42	130	19.87	265.14	4,375.09
HH156	2,505.37	6,180.67	HH156	20	255.97	6,180.62
HH158	2,505.37	5,990.20	HH158	20	257.06	5,990.07
HH160	2,505.37	6,881.65	64	18.64	321.77	6,670.57
HH162	2,505.37	6,513.21	HH162	20	258.65	6,513.36
HH164	1,005.37	5,937.83	HH164	20	263.32	5,937.83
HH166	1,005.37	6,291.02	J-104	19.67	322.26	6,245.69
HH168	2,505.37	5,871.36	HH168	20	259.99	5,871.19
HH170	2,505.37	6,020.07	HH170	20	263.6	6,019.73
HH172	1,005.37	4,269.06	HH172	20	256.35	4,268.68

2028 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
HH174	1,005.37	3,671.81	HH174	20	284.14	3,671.81
HH176	1,005.37	4,429.55	HH176	20	283.42	4,429.55
HH178	2,505.37	6,953.42	J-104	12.81	306.41	6,036.76
HH18	2,505.37	4,086.67	RM4	2.08	309.96	2,713.52
HH180	2,505.37	6,879.60	J-104	13.23	307.39	6,017.73
HH182	1,005.37	6,184.81	J-104	17.23	316.62	5,831.70
HH184	1,005.37	6,110.69	J-104	17.77	317.87	5,825.88
HH186	1,005.37	6,118.97	J-104	17.56	317.37	5,808.14
HH188	1,005.37	6,722.96	J-104	10.25	300.52	5,589.67
HH190	4,005.37	4,531.63	HH190	20	255.2	4,531.53
HH196	4,005.37	5,116.20	J-104	18.75	320.12	4,979.98
HH198	4,005.37	5,058.39	HH212	18.35	258.05	4,965.90
HH2	1,005.37	3,552.58	HH8	19.27	285.23	3,519.18
HH20	2,505.37	4,276.33	RM4	-0.85	303.19	2,713.52
HH200	4,005.37	5,065.88	HH212	17.66	256.44	4,935.68
HH202	4,005.37	5,166.76	J-104	18.28	319.03	4,980.04
HH204	4,005.37	5,051.38	J-104	19.35	321.5	4,980.03
HH206	4,005.37	4,379.63	HH208	19.92	258.85	4,375.90
HH208	4,005.37	3,678.05	HH208	20	259.05	3,677.90
HH210	4,005.37	4,021.75	HH210	20	259.15	4,021.75
HH212	4,005.37	4,092.54	HH212	20	261.85	4,092.53
HH214	4,005.37	5,055.96	HH212	18.45	258.27	4,968.85
HH216	4,005.37	5,029.48	HH218	18.27	257.15	4,933.90
HH218	4,005.37	4,919.08	HH218	20	261.13	4,919.08
HH22	2,505.37	4,546.41	RM4	-5.21	293.13	2,713.52
HH220	4,005.37	5,137.35	J-104	18.52	319.59	4,976.74
HH222	4,005.37	5,027.14	J-104	19.54	321.94	4,976.47
HH224	4,005.37	5,094.42	J-104	18.92	320.52	4,977.04
HH226	4,005.37	4,972.48	HH226	20	260.77	4,972.48
HH228	4,005.37	5,160.46	J-104	18.3	319.08	4,976.36
HH230	4,005.37	4,567.26	HH230	20	260.91	4,567.07
HH232	4,005.37	5,203.22	J-104	17.89	318.15	4,976.10
HH234	4,005.37	5,148.95	J-104	18.4	319.32	4,975.87
HH236	4,005.37	5,217.88	J-104	17.75	317.83	4,975.74
HH238	4,005.37	5,533.85	J-104	15	311.47	5,002.04
HH24	2,505.37	5,052.16	RM4	-13.97	272.92	2,713.52
HH240	4,005.37	5,822.54	J-104	12.04	304.64	4,995.31
HH26	2,505.37	4,005.28	RM4	3.31	312.79	2,713.52
HH28	2,505.37	3,635.30	RM4	8.62	325.05	2,713.52
HH30	1,005.37	3,571.76	RM4	9.49	327.06	2,713.53
HH32	1,005.37	4,990.17	RM4	-12.85	275.49	2,713.53
HH34	1,005.37	4,285.04	RM4	-0.99	302.88	2,713.53
HH36	2,505.37	3,818.08	RM4	6.05	319.11	2,713.52
HH38	2,505.37	4,901.82	RM4	-11.29	279.11	2,713.52
HH4	1,005.37	3,090.66	HH4	20	270.19	3,090.65
HH40	2,505.37	4,209.56	RM4	0.19	305.6	2,713.52

2028 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
HH58	1,005.37	2,543.40	HH58	20	406.04	2,543.40
HH6	1,005.37	2,942.94	HH6	20	278.18	2,942.94
HH60	1,005.37	2,484.35	HH60	20	395.55	2,484.35
HH62	1,005.37	2,467.69	HH62	20	392.15	2,467.69
HH64	1,005.37	2,543.00	HH62	18.02	387.58	2,506.45
HH66	1,005.37	2,604.27	HH62	15.5	381.76	2,520.83
HH68	1,005.37	2,486.94	HH68	20	391.29	2,486.94
HH70	1,005.37	2,510.39	HH70	20	388.82	2,510.39
HH72	1,005.37	2,503.82	HH72	20	387.44	2,503.82
HH74	1,005.37	2,496.55	HH74	20	383.54	2,496.54
HH76	1,005.37	2,525.77	HH76	20	383.78	2,525.77
HH78	1,005.37	2,474.20	HH78	20	382.08	2,474.20
HH8	1,005.37	3,228.81	HH8	20	286.92	3,228.79
HH80	1,005.37	2,498.67	HH80	20	380	2,498.67
HH82	1,005.37	2,554.05	HH78	17.42	376.12	2,508.99
HH84	1,005.37	2,481.09	HH84	20	376.83	2,481.09
HH86	1,005.37	2,469.86	HH86	20	378.09	2,469.86
HH88	1,005.37	2,527.37	HH86	18.49	374.61	2,501.69
HH90	1,005.37	2,613.52	HH78	14.61	369.63	2,519.15
HH92	1,005.37	2,534.50	HH62	19.84	391.78	2,531.48
HH94	1,005.37	2,631.10	HH62	14.64	379.78	2,531.22
HH96	1,005.37	2,639.44	HH62	14.63	379.75	2,538.89
HH98	1,005.37	2,687.81	HH62	11.9	373.47	2,537.03
J-100	2,505.37	5,031.36	J-206	12.31	290.48	4,442.56
J1004	2,505.37	5,277.04	J-104	19.07	320.86	5,169.52
J1006	2,505.37	5,221.43	J1020	17.88	263.82	5,092.79
J-101	2,505.37	5,911.49	J-104	5.56	289.7	4,589.03
J1010	2,505.37	4,996.70	J1020	16.9	261.56	4,821.11
J1012	2,505.37	4,750.67	J1020	19.34	267.19	4,713.94
J-102	1,005.37	5,183.39	J-104	13.31	307.58	4,547.21
J1020	2,505.37	4,664.37	J1020	20	268.71	4,664.34
J1022	2,505.37	4,419.03	J1022	20	263	4,419.13
J1024	2,505.37	4,266.41	J1024	20	263.93	4,266.40
J1026	2,505.37	4,209.51	J1026	20	264.75	4,209.52
J1028	2,505.37	4,237.50	J1028	20	263.03	4,237.50
J-103	1,005.37	4,536.60	J-104	19.81	322.58	4,518.06
J1030	4,005.37	5,116.62	J-104	17.69	317.67	4,874.59
J-104	1,005.37	4,489.74	J-104	20	323.01	4,489.72
J-105	2,505.37	4,682.55	J-105	20	296	4,682.37
J-106	1,005.37	4,644.13	J-104	18.8	320.25	4,525.49
J-107	1,005.37	4,821.54	J-104	17.4	317.01	4,564.01
J-108	1,005.37	4,998.10	J-104	15.7	313.08	4,578.13
J-109	1,005.37	5,217.18	J-104	13.49	307.99	4,590.43
J-110	1,005.37	4,738.56	J-104	18.4	319.31	4,577.99
J-111	1,005.37	4,336.13	J-111	20	299.89	4,336.13
J-112	1,005.37	3,887.21	J-112	20	316.9	3,887.23

2028 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
J-113	4,005.37	5,986.38	J-104	6.13	291	4,691.04
J-114	4,005.37	3,372.15	J-519	19.6	281.67	3,354.76
J-115	4,005.37	2,668.55	J-115	20	279.5	2,668.55
J-116	4,005.37	5,847.34	J-104	9.87	299.63	4,849.85
J-117	4,005.37	5,757.76	J-104	11.29	302.91	4,885.42
J-118	4,005.37	5,141.50	J-104	17.46	317.15	4,876.27
J-119	4,005.37	4,089.30	J-119	20	263.97	4,089.29
J-120	4,005.37	5,698.96	J-104	12.25	305.13	4,913.10
J-121	4,005.37	5,543.20	J-104	13.97	309.1	4,922.88
J-122	4,005.37	5,407.52	J-104	15.44	312.49	4,931.74
J-123	4,005.37	5,241.19	J-104	17.12	316.37	4,936.17
J-124	4,005.37	5,118.49	J-104	18.32	319.15	4,939.27
J-125	4,005.37	4,973.05	J-557	19.46	267.46	4,941.13
J-126	4,005.37	4,858.94	J-547	19.6	267.32	4,835.52
J-127	4,005.37	4,785.51	140	19.71	269.03	4,768.93
J-128	4,005.37	4,731.68	J-128	20	268.15	4,731.69
J-129	4,005.37	5,262.88	J-104	17.32	316.83	4,975.11
J-130	4,005.37	5,849.85	J-104	10.97	302.18	4,934.55
J-131	4,005.37	4,492.97	J-131	20	265.71	4,492.88
J-132	4,005.37	4,252.31	J-132	20	262.15	4,252.52
J-133	4,005.37	5,830.86	J-104	11.31	302.97	4,945.67
J-134	4,005.37	5,692.33	J-104	12.9	306.62	4,958.88
J-135	4,005.37	5,764.50	J-104	12.31	305.27	4,970.76
J-136	4,005.37	5,832.60	J-104	11.78	304.05	4,983.34
J-137	4,005.37	5,813.16	J-104	12.14	304.87	4,995.55
J-138	4,005.37	5,737.43	J-104	13.03	306.91	5,005.23
J-139	2,505.37	4,586.88	J-139	20	297.59	4,586.78
J-140	2,505.37	5,851.84	J-104	11.98	304.5	5,012.50
J-141	2,505.37	5,811.37	J-104	13	306.85	5,059.46
J-142	2,505.37	5,903.88	J-104	13.38	307.74	5,169.52
J-143	1,005.37	5,952.88	J-104	13.47	307.94	5,226.15
J-144	1,005.37	6,297.48	J-104	12.13	304.85	5,405.09
J-145	1,005.37	6,298.31	J-104	12.86	306.54	5,475.23
J-146	1,005.37	6,493.37	J-104	11.74	303.96	5,535.96
J-147	1,005.37	6,205.72	J-104	13.83	308.76	5,487.86
J-148	1,005.37	6,169.08	J-104	14.36	309.99	5,508.17
J-149	2,505.37	6,013.90	J-104	15.95	313.67	5,532.03
J-150	2,505.37	6,290.94	J-104	13.65	308.36	5,545.48
J-151	1,005.37	6,273.80	J-104	13.93	309.01	5,558.46
J-152	1,005.37	6,308.69	J-104	13.74	308.56	5,569.87
J-153	1,005.37	5,995.68	J-104	16.63	315.23	5,587.43
J-154	1,005.37	5,839.38	J-104	18.01	318.41	5,595.29
J-155	1,005.37	5,317.91	J-155	20	279.84	5,317.90
J-156	1,005.37	5,481.06	J-156	20	275.55	5,481.05
J-157	1,005.37	5,452.14	J-158	18.68	270.15	5,363.77
J-158	1,005.37	2,987.05	J-158	20	273.2	2,986.98

2028 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
J-159	1,005.37	5,494.01	J-159	20	275.85	5,493.99
J-160	2,505.37	5,643.78	J-104	19.69	322.3	5,605.79
J-161	2,505.37	5,746.03	J-104	18.87	320.41	5,607.25
J-162	1,005.37	5,712.79	J-104	19.11	320.95	5,602.63
J-163	1,005.37	5,200.07	J-572	19.86	289.59	5,189.31
J-164	1,005.37	4,051.96	J-165	19.48	290	4,020.95
J-165	1,005.37	3,050.35	J-165	20	291.2	3,050.16
J-166	1,005.37	2,709.58	J-166	20	290.42	2,709.52
J-167	1,005.37	4,040.08	J-168	19.49	289.82	4,009.62
J-168	1,005.37	3,539.67	J-168	20	291	3,539.67
J-169	1,005.37	4,010.43	J-169	20	290.68	4,010.43
J-170	1,005.37	4,123.32	J-170	20	293.51	4,123.32
J-171	1,005.37	3,674.51	J-171	20	291.47	3,674.51
J-172	1,005.37	4,230.37	J-172	20	292.46	4,230.36
J-173	1,005.37	3,711.58	J-173	20	291.68	3,711.58
J-174	2,505.37	5,655.56	J-170	19.07	291.35	5,573.27
J-175	2,505.37	5,721.70	J-104	19.12	320.98	5,613.15
J-176	2,505.37	5,592.49	J-176	20	292.15	5,592.49
J-177	2,505.37	5,648.43	J-104	19.63	322.16	5,602.71
J-178	2,505.37	5,895.64	J-104	17.35	316.89	5,574.42
J-179	2,505.37	5,496.59	J-179	20	295.9	5,496.59
J-180	2,505.37	5,105.49	J-180	20	295.06	5,105.15
J-181	2,505.37	4,942.17	J-181	20	293.79	4,941.95
J-182	2,505.37	4,583.95	J-182	20	297.19	4,583.89
J-183	2,505.37	4,550.65	J-183	20	299.03	4,550.65
J-184	2,505.37	4,653.69	J-184	20	297.29	4,653.64
J-185	2,505.37	4,970.85	J-206	12.55	291.03	4,405.39
J-186	2,505.37	4,938.34	J-206	14.94	296.56	4,535.62
J-187	2,505.37	4,995.58	J-206	14.06	294.52	4,525.69
J-189	2,505.37	5,031.59	J-206	13.55	293.34	4,523.13
J-190	2,505.37	4,699.65	J-206	18.55	304.89	4,580.26
J-191	1,005.37	3,819.87	J-191	20	293.27	3,819.87
J-192	1,005.37	3,726.05	J-192	20	293.45	3,726.07
J-194	2,505.37	4,360.95	J-194	20	289.7	4,360.91
J-195	2,505.37	4,312.82	J-195	20	289.39	4,312.81
J-196	2,505.37	4,295.80	J-196	20	287.9	4,295.80
J-197	2,505.37	4,781.45	J-206	18.18	304.03	4,630.22
J-198	2,505.37	4,934.23	J-206	16.11	299.26	4,616.10
J-199	2,505.37	4,510.91	J-199	20	289.87	4,510.81
J-200	2,505.37	4,922.36	J-206	13.22	292.59	4,406.32
J-201	2,505.37	4,949.91	J-206	15.69	298.3	4,599.92
J-202	2,505.37	4,798.77	J-206	14.17	294.78	4,358.50
J-203	2,505.37	4,428.68	J-206	18.32	304.35	4,300.85
J-204	2,505.37	4,388.86	J-206	18.42	304.58	4,269.62
J-205	2,505.37	3,368.80	J-205	20	307.16	3,368.79
J-206	2,505.37	3,203.02	J-206	20	308.23	3,203.01

2028 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
J-207	2,505.37	4,369.22	J-206	18.84	305.55	4,281.21
J-208	2,505.37	4,664.25	J-206	15.55	297.96	4,328.62
J-209	2,505.37	5,015.22	J-206	11.94	289.62	4,405.28
J-218	1,005.37	3,841.49	J-576	17.36	288.21	3,698.76
J-219	1,005.37	3,282.24	J-575	19.55	287.17	3,262.15
J-220	1,005.37	3,244.33	J-220	20	284.63	3,244.33
J-221	1,005.37	3,498.12	J-221	20	286.95	3,498.12
J-222	1,005.37	3,553.71	J-221	19.89	286.68	3,548.13
J-223	1,005.37	3,328.12	J-223	20	292.9	3,328.12
J-224	1,005.37	3,460.43	J-224	20	293.64	3,460.43
J-225	2,505.37	4,780.00	J-225	20	295.61	4,779.88
J-226	1,005.37	5,644.26	J-104	9.48	298.72	4,640.95
J-235	1,005.37	3,526.01	J-235	20	292.42	3,526.01
J-236	1,005.37	3,620.65	J-236	20	287.76	3,620.65
J-237	1,005.37	5,083.55	74	11.93	277.32	4,547.27
J-238	1,005.37	4,737.32	74	13.78	281.58	4,340.02
J-239	1,005.37	4,138.87	74	18.21	291.82	4,032.08
J-240	2,505.37	5,227.69	J-240	20	265.7	5,227.50
J-241	1,005.37	4,365.76	J-243	19.36	278.05	4,328.93
J-242	1,005.37	4,180.56	J-242	20	272.46	4,180.56
J-243	1,005.37	3,824.81	J-243	20	279.53	3,824.81
J-244	1,005.37	2,363.86	J-244	20	274.14	2,363.84
J-245	1,005.37	2,332.17	J-245	20	272.45	2,332.16
J-246	1,005.37	3,761.29	J-246	20	282.71	3,761.29
J-247	1,005.37	2,478.84	J-247	20	275.59	2,478.83
J-248	1,005.37	2,384.66	J-248	20	272.67	2,384.65
J-249	2,505.37	6,100.60	J-104	15.05	311.6	5,517.38
J-250	2,505.37	4,756.21	J-250	20	269.07	4,756.34
J-251	2,505.37	5,383.81	J-251	20	266.65	5,383.51
J-252	1,005.37	5,012.94	J-252	20	263.78	5,012.94
J-253	1,005.37	6,278.75	J-104	12.67	306.08	5,439.51
J-254	1,005.37	4,289.15	J-254	20	270.49	4,289.15
J-255	1,005.37	5,207.79	J-255	20	272.2	5,207.79
J-256	1,005.37	3,414.62	J-256	20	263.45	3,414.42
J-257	1,005.37	5,108.84	J-257	20	267.57	5,108.84
J-258	1,005.37	4,521.32	J-258	20	273.93	4,521.33
J-259	1,005.37	5,268.64	J-259	20	269.4	5,268.64
J-260	1,005.37	6,110.15	J-104	15.33	312.24	5,554.70
J-261	2,505.37	6,514.93	J-104	13.54	308.1	5,729.78
J-262	4,005.37	5,570.84	J-104	14.41	310.12	4,983.19
J-263	4,005.37	5,425.83	J-104	15.82	313.36	4,981.04
J-264	4,005.37	5,378.20	J-104	16.26	314.39	4,979.49
J-265	4,005.37	5,347.85	J-104	16.53	315.01	4,977.39
J-266	4,005.37	5,306.62	J-104	16.92	315.9	4,976.39
J-267	4,005.37	5,315.11	J-104	16.83	315.7	4,976.18
J-268	4,005.37	4,911.42	J-557	19.26	266.99	4,868.07

2028 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
J-270	4,005.37	5,217.52	J-104	17.75	317.83	4,975.48
J-271	4,005.37	5,236.23	J-104	17.58	317.42	4,975.65
J-272	4,005.37	5,118.05	J-104	18.69	319.98	4,975.87
J-273	4,005.37	4,975.85	J-275	19.05	261.97	4,921.62
J-274	4,005.37	4,849.41	J-275	19.72	263.52	4,833.64
J-275	4,005.37	4,779.87	J-275	20	264.17	4,779.87
J-283	1,005.37	4,804.93	J-283	20	263.97	4,804.79
J-284	2,505.37	5,664.22	J-104	19.04	320.79	5,546.64
J-285	1,005.37	4,760.48	J-285	20	266.35	4,760.39
J-286	1,005.37	4,709.44	J-290	19.37	274.7	4,672.36
J-287	1,005.37	3,515.50	J-287	20	262.37	3,515.26
J-288	1,005.37	4,884.28	J-288	20	272.04	4,884.29
J-289	1,005.37	5,064.43	J-290	18.91	273.65	4,995.35
J-290	1,005.37	2,963.36	J-290	20	276.15	2,963.28
J-291	2,505.37	4,683.18	J-291	20	273.22	4,683.21
J-292	2,505.37	4,498.21	J-292	20	273.1	4,498.20
J-293	2,505.37	4,539.68	J-294	18.92	273.64	4,478.22
J-294	2,505.37	2,772.68	J-294	20	276.14	2,772.59
J-295	2,505.37	6,225.31	J-104	15.38	312.35	5,663.71
J-296	2,505.37	6,143.59	J-104	15.76	313.23	5,630.20
J-297	2,505.37	6,157.98	J-104	15.43	312.47	5,608.62
J-298	2,505.37	6,640.05	J-104	10.99	302.22	5,589.84
J-299	1,005.37	6,721.72	J-104	10.33	300.7	5,595.72
J-300	2,505.37	5,600.47	J-300	20	293.61	5,600.47
J-301	1,005.37	5,772.13	J-104	18.24	318.95	5,557.94
J-302	1,005.37	5,892.89	J-104	17.27	316.71	5,562.61
J-303	1,005.37	5,864.44	J-104	17.51	317.26	5,562.09
J-304	1,005.37	5,822.48	J-104	17.85	318.05	5,561.33
J-305	1,005.37	4,572.62	J-305	20	268.45	4,572.62
J-306	1,005.37	4,666.91	J-306	20	271.09	4,666.91
J-307	1,005.37	5,013.43	J-307	20	271.7	5,013.43
J-308	1,005.37	4,724.40	J-308	20	274.58	4,724.41
J-309	1,005.37	5,484.47	J-309	20	269.89	5,484.46
J-311	2,505.37	4,732.29	J-311	20	262.3	4,732.40
J-312	2,505.37	4,825.35	J-312	20	261.79	4,825.45
J-313	2,505.37	3,028.33	J-313	20	260.82	3,028.33
J-314	2,505.37	5,717.48	J-104	18.99	320.67	5,592.67
J-315	2,505.37	4,930.28	J-315	20	290.68	4,930.49
J-316	2,505.37	4,447.98	J-316	20	288.5	4,447.86
J-317	1,005.37	6,953.35	J-104	14.05	309.29	6,173.02
J-318	1,005.37	7,494.83	J-104	15.04	311.56	6,776.62
J-319	1,005.37	3,278.01	J-319	20	273.07	3,277.95
J-322	1,005.37	6,604.05	J-322	20	334.8	6,603.88
J-343	2,505.37	5,498.04	J-343	20	268.59	5,497.65
J-345	2,505.37	6,892.61	J-104	11.79	304.06	5,878.11
J-346	2,505.37	5,962.80	J-104	19.47	321.79	5,894.06

2028 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
J-347	2,505.37	6,882.99	J-104	12.07	304.7	5,898.09
J-349	1,005.37	4,755.60	J-353	17.55	267.11	4,618.61
J-350	1,005.37	6,921.06	J-104	12.58	305.89	5,985.22
J-351	1,005.37	7,146.53	J-104	10.35	300.74	5,951.56
J-352	1,005.37	3,641.17	J-353	17.9	267.92	3,553.16
J-353	1,005.37	3,086.95	J-353	20	272.75	3,086.89
J-37	2,505.37	5,797.24	J-104	13.73	308.55	5,102.55
J-393	1,005.37	4,499.11	J-393	20	328.97	4,499.11
J-397	1,005.37	8,646.21	64	6.25	293.17	6,673.86
J-399	2,505.37	5,723.90	J-104	19.41	321.66	5,650.84
J-4	4,005.37	5,829.85	J-104	11.13	302.53	4,930.62
J-400	2,505.37	5,134.87	J-400	20	285.61	5,134.71
J-401	2,505.37	5,493.62	J-401	20	294.75	5,493.62
J-402	2,505.37	5,507.98	J-402	20	295.3	5,507.99
J-403	4,005.37	5,341.19	J-104	15.55	312.73	4,882.22
J-404	4,005.37	5,988.44	J-104	8.05	295.43	4,829.01
J-45	1,005.37	8,029.19	64	10.72	303.5	6,666.07
J-500	2,505.37	4,262.54	J-500	20	263.12	4,262.58
J-501	2,505.37	4,168.21	J-501	20	262.65	4,168.19
J-502	2,505.37	4,069.19	J-502	20	261.54	4,069.20
J-503	2,505.37	4,259.41	J-503	20	263.11	4,259.44
J-504	2,505.37	4,372.40	J-503	19.99	263.08	4,371.74
J-505	2,505.37	4,184.70	J-505	20	262.17	4,184.69
J-506	2,505.37	4,517.86	J-506	20	261.9	4,517.83
J-507	2,505.37	4,575.83	J-507	20	263.84	4,575.79
J-508	2,505.37	4,625.82	J-508	20	263.27	4,625.76
J-509	1,005.37	4,421.73	J-509	20	264.57	4,421.81
J-510	1,005.37	4,025.68	J-510	20	263.52	4,025.68
J-511	2,505.37	4,135.39	J-511	20	264.92	4,135.38
J-512	1,005.37	2,940.92	J-512	20	267.64	2,940.77
J-513	1,005.37	2,754.36	J-513	20	265.95	2,754.26
J-514	1,005.37	2,834.02	J-514	20	266.66	2,833.90
J-515	1,005.37	2,712.13	J-515	20	265.96	2,712.06
J-516	2,505.37	3,696.43	J-512	17.38	261.59	3,587.81
J-517	1,005.37	3,809.55	J-517	20	309.97	3,809.55
J-518	1,005.37	4,003.58	J-518	20	319.07	4,003.58
J-519	4,005.37	3,103.72	J-519	20	282.6	3,103.72
J-521	1,005.37	2,091.39	J-521	20	271.4	2,091.39
J-522	4,005.37	4,345.48	J-522	20	263.33	4,345.57
J-523	4,005.37	3,947.82	J-523	20	272.31	3,947.81
J-524	4,005.37	4,031.99	J-524	20	271.85	4,031.99
J-525	4,005.37	4,359.18	J-525	20	272.48	4,359.26
J-526	4,005.37	5,139.76	J-104	17.48	317.2	4,876.69
J-527	4,005.37	4,824.34	J-527	20	269.41	4,824.34
J-528	4,005.37	4,705.89	J-528	20	268.06	4,705.89
J-529	4,005.37	5,184.57	J-104	16.94	315.94	4,866.50

2028 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
J-530	4,005.37	4,452.30	J-530	20	267.87	4,452.22
J-531	4,005.37	4,296.11	J-531	20	267.83	4,296.25
J-532	4,005.37	4,469.62	J-532	20	267.29	4,469.50
J-533	4,005.37	5,341.77	J-104	15.36	312.31	4,866.14
J-534	4,005.37	5,865.38	J-104	9.81	299.48	4,859.58
J-535	4,005.37	5,872.79	J-104	9.69	299.23	4,857.20
J-536	4,005.37	5,437.25	J-104	14.28	309.81	4,857.20
J-537	4,005.37	4,639.70	J-537	20	272.17	4,639.70
J-538	4,005.37	3,631.08	J-538	20	266.85	3,630.88
J-539	4,005.37	3,885.42	J-539	20	269.42	3,885.42
J-540	4,005.37	4,515.35	J-540	20	270.74	4,515.22
J-541	4,005.37	3,491.97	J-541	20	269.97	3,491.98
J-542	4,005.37	3,610.99	J-542	20	267.53	3,610.77
J-543	4,005.37	3,798.89	J-543	20	272.47	3,798.84
J-544	4,005.37	4,534.05	J-544	20	271.01	4,533.87
J-545	4,005.37	2,221.23	J-545	20	267.26	2,221.24
J-546	4,005.37	2,492.49	J-546	20	267.76	2,492.49
J-547	4,005.37	2,692.11	J-547	20	268.26	2,692.12
J-548	4,005.37	3,522.86	J-547	19.49	267.08	3,501.88
J-549	4,005.37	2,734.59	J-549	20	266.89	2,734.59
J-550	4,005.37	2,530.91	J-550	20	266.6	2,530.91
J-551	4,005.37	2,622.42	J-551	20	267.19	2,622.43
J-552	4,005.37	2,608.50	J-552	20	267.31	2,608.50
J-553	4,005.37	2,704.88	J-553	20	266.66	2,704.89
J-554	4,005.37	2,864.58	J-552	19.74	266.72	2,856.19
J-555	4,005.37	3,224.04	J-547	19.39	266.85	3,201.33
J-556	4,005.37	4,572.15	J-557	19.97	268.62	4,569.97
J-557	4,005.37	3,290.87	J-557	20	268.7	3,290.87
J-558	2,505.37	5,662.52	J-104	13.93	309	5,017.63
J-559	2,505.37	5,510.28	J-104	15.44	312.5	5,020.56
J-560	2,505.37	5,331.32	J-104	17.17	316.48	5,022.75
J-561	2,505.37	5,193.99	J-104	18.45	319.44	5,023.40
J-562	2,505.37	5,071.92	J-104	19.56	322	5,023.40
J-563	2,505.37	5,405.61	J-104	16.61	315.19	5,035.62
J-564	2,505.37	5,643.84	J-104	14.46	310.23	5,046.77
J-565	2,505.37	4,992.56	J-565	20	258.62	4,992.41
J-566	2,505.37	5,360.47	J-104	17.15	316.44	5,046.77
J-567	2,505.37	4,859.35	J-567	20	262.49	4,859.23
J-568	4,005.37	5,220.68	J-104	17.67	317.64	4,970.76
J-569	2,505.37	6,330.42	J-104	13.86	308.85	5,601.34
J-570	1,005.37	4,232.38	J-570	20	285.39	4,232.38
J-571	1,005.37	4,244.99	J-571	20	284.5	4,244.98
J-572	1,005.37	5,162.35	J-572	20	289.91	5,162.34
J-573	1,005.37	3,451.94	J-573	20	294.65	3,451.94
J-574	1,005.37	3,261.56	J-574	20	285.24	3,261.56
J-575	1,005.37	2,393.73	J-575	20	288.2	2,393.69

2028 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
J-576	1,005.37	2,707.99	J-576	20	294.31	2,707.83
J-577	1,005.37	4,704.01	74	13.79	281.61	4,310.49
J-578	1,005.37	4,564.36	74	15.29	285.07	4,267.28
J-59	4,005.37	5,674.46	J-104	13.55	308.13	4,996.99
J-590	1,005.37	4,790.95	J-104	17.63	317.55	4,556.09
J-591	1,005.37	4,498.25	J-104	19.99	322.98	4,497.06
J-592	1,005.37	4,498.04	J-104	19.99	322.98	4,496.67
J-593	1,005.37	4,654.49	J-104	18.72	320.05	4,527.18
J-594	2,505.37	7,160.65	J-104	13.84	308.8	6,332.51
J-595	1,005.37	2,479.05	J-595	20	340.63	2,479.21
J-596	2,505.37	5,840.06	J-629	15.98	286.93	5,487.32
J-597	2,505.37	5,813.25	J-104	18.05	318.51	5,576.08
J-598	2,505.37	5,315.56	J-598	20	285.66	5,315.19
J-599	2,505.37	5,488.27	J-599	20	284.45	5,488.28
J-6	4,005.37	5,190.06	J-104	17.63	317.53	4,937.47
J-600	2,505.37	5,320.81	J-600	20	285.84	5,320.44
J-603	2,505.37	4,162.44	J-603	20	291.38	4,162.38
J-604	2,505.37	5,661.19	J-603	17.98	286.72	5,493.06
J-605	2,505.37	5,578.22	J-104	19.83	322.62	5,557.31
J-606	2,505.37	4,094.80	J-606	20	291.62	4,094.75
J-607	2,505.37	5,661.40	J-606	18.72	288.67	5,552.78
J-608	2,505.37	5,256.96	J-608	20	288.99	5,256.63
J-609	2,505.37	4,981.08	J-613	19.54	294.87	4,945.22
J-610	2,505.37	4,262.01	J-610	20	289.62	4,261.93
J-611	2,505.37	4,720.73	J-611	20	294.45	4,720.60
J-613	2,505.37	4,749.54	J-613	20	295.93	4,749.39
J-615	2,505.37	4,525.75	J-615	20	293.75	4,525.57
J-616	2,505.37	5,629.69	J-616	20	292.39	5,629.70
J-617	2,505.37	5,772.27	J-630	17.26	290.11	5,527.83
J-618	2,505.37	4,998.39	J-620	18.7	292.34	4,898.99
J-619	2,505.37	4,523.05	J-619	20	292.41	4,523.04
J-62	4,005.37	5,422.85	J-104	15.84	313.42	4,980.66
J-620	2,505.37	4,286.22	J-620	20	295.34	4,286.11
J-621	2,505.37	4,815.15	J-621	20	293.96	4,815.46
J-622	2,505.37	4,520.70	J-622	20	295.66	4,520.68
J-623	2,505.37	4,517.98	J-630	19.55	295.39	4,485.61
J-624	2,505.37	5,029.45	J-630	19.27	294.72	4,971.31
J-625	2,505.37	5,211.94	J-630	18.53	293.03	5,092.49
J-626	2,505.37	4,953.65	J-626	20	288.65	4,953.72
J-627	2,505.37	4,776.74	J-627	20	289.32	4,776.76
J-628	2,505.37	4,680.71	J-629	17.33	290.05	4,492.41
J-629	2,505.37	3,496.37	J-629	20	296.2	3,496.37
J-630	2,505.37	4,046.63	J-630	20	296.42	4,046.56
J-631	2,505.37	5,094.31	J-634	19.21	289.27	5,034.76
J-632	2,505.37	4,708.85	J-634	19.29	289.45	4,658.95
J-633	2,505.37	4,409.79	J-633	20	286.44	4,409.68

2028 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
J-634	2,505.37	4,429.37	J-634	20	291.1	4,429.23
J-635	2,505.37	4,696.06	J-635	20	286.5	4,695.97
J-636	2,505.37	4,813.37	J-634	19.41	289.73	4,771.83
J-637	2,505.37	4,443.81	J-637	20	286.15	4,443.69
J-638	2,505.37	4,390.30	J-638	20	284.65	4,390.20
J-639	2,505.37	4,516.67	J-639	20	287.72	4,516.66
J-640	2,505.37	5,048.04	J-640	20	287.48	5,048.00
J-641	2,505.37	4,577.66	J-634	19.46	289.86	4,541.17
J-642	2,505.37	4,497.01	J-642	20	290.63	4,496.85
J-643	2,505.37	5,297.40	J-643	20	288.72	5,297.05
J-644	2,505.37	6,041.14	J-104	16.74	315.49	5,642.44
J-645	2,505.37	4,110.47	J-645	20	290.13	4,110.41
J-646	2,505.37	4,081.74	J-646	20	289.61	4,081.69
J-647	1,005.37	1,983.61	J-647	20	289.66	1,983.61
J-648	1,005.37	3,466.89	J-649	19.39	290.29	3,437.01
J-649	1,005.37	2,815.71	J-649	20	291.69	2,815.51
J-650	1,005.37	3,948.01	J-650	20	295.19	3,947.81
J-651	1,005.37	6,235.04	J-651	20	300.39	6,235.03
J-652	1,005.37	3,434.93	J-652	20	293.55	3,434.89
J-653	2,505.37	3,370.89	J-653	20	316.95	3,370.89
J-654	2,505.37	3,404.63	J-654	20	311.66	3,404.63
J-655	2,505.37	3,611.89	J-655	20	326.33	3,611.89
J-656	1,005.37	7,986.86	64	11.03	304.21	6,666.73
J-657	2,505.37	6,263.77	J-657	20	289.13	6,263.78
J-66	2,505.37	5,744.86	J-104	13.02	306.91	5,010.50
J-664	1,005.37	2,554.13	J-666	19.66	406.09	2,547.09
J-666	1,005.37	2,520.49	J-666	20	406.88	2,520.48
J-67	4,005.37	5,929.93	J-104	11.06	302.38	5,003.30
J-675	4,005.37	5,857.90	J-104	9.81	299.5	4,854.08
J-68	4,005.37	5,832.54	J-104	12.01	304.58	5,000.63
J-680	1,005.37	4,278.72	J-680	20	270.44	4,278.72
J-682	2,505.37	4,911.74	J-206	16.67	300.56	4,637.41
J-683	1,005.37	6,996.32	J-104	13.67	308.41	6,168.42
J-684	4,005.37	3,284.10	J-519	19.53	281.51	3,264.32
J-685	1,005.37	5,216.28	J-104	12.97	306.79	4,548.80
J-686	2,505.37	5,761.39	J-104	12.86	306.54	5,010.84
J-687	4,005.37	5,259.23	J-104	17.35	316.91	4,975.06
J-688	4,005.37	5,242.69	J-104	17.49	317.22	4,973.17
J-689	4,005.37	5,142.17	J-104	18.44	319.4	4,973.17
J-69	4,005.37	5,560.62	J-104	14.64	310.64	4,993.70
J-690	2,505.37	2,680.84	J-690	20	259.67	2,680.82
J-691	1,005.37	5,739.83	J-104	18.83	320.3	5,595.55
J-692	1,005.37	6,114.48	J-104	13.81	308.72	5,405.09
J-693	1,005.37	2,869.54	J-693	20	290.31	2,869.43
J-694	2,505.37	7,006.85	J-104	16.72	315.44	6,542.64
J-695	1,005.37	3,644.88	J-695	20	288.15	3,644.87

2028 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
J-696	1,005.37	3,515.40	J-696	20	286.84	3,515.40
J-697	1,005.37	3,624.97	J-697	20	288.18	3,624.97
J-70	4,005.37	5,572.95	J-104	14.48	310.28	4,990.75
J-71	4,005.37	5,578.22	J-104	14.4	310.08	4,988.03
J-72	4,005.37	5,592.87	J-104	14.22	309.68	4,985.60
J-73	2,505.37	5,873.29	J-104	17.71	317.72	5,593.73
J-74	2,505.37	5,855.89	J-104	17.98	318.35	5,608.30
J-75	2,505.37	5,903.67	J-104	17.76	317.84	5,628.31
J-76	2,505.37	5,347.61	J-76	20	289.85	5,347.17
J-77	2,505.37	4,606.40	J-77	20	290.02	4,606.34
J-78	2,505.37	4,080.32	J-78	20	289.5	4,080.27
J-79	2,505.37	2,044.37	J-79	20	288.95	2,044.23
J-80	2,505.37	4,546.00	J-80	20	292.07	4,545.98
J-81	2,505.37	5,743.91	J-104	18.97	320.62	5,616.14
J-82	2,505.37	5,779.42	J-104	18.66	319.91	5,614.11
J-83	2,505.37	5,626.00	J-104	19.93	322.85	5,617.44
J-84	2,505.37	5,742.32	J-104	19.01	320.73	5,620.25
J-85	2,505.37	5,855.24	J-104	18.1	318.63	5,621.52
J-86	2,505.37	5,282.38	J-86	20	286.58	5,282.06
J-87	2,505.37	4,657.86	J-87	20	291.53	4,657.77
J-88	2,505.37	4,095.52	J-88	20	291.19	4,095.46
J-89	2,505.37	4,619.59	J-89	20	293	4,619.52
J-90	2,505.37	5,267.22	J-90	20	290.74	5,266.87
J-91	1,005.37	5,851.85	J-104	17.83	318.01	5,587.43
J-92	1,005.37	5,759.62	J-104	18.58	319.74	5,585.57
J-93	1,005.37	5,930.50	J-104	17.15	316.44	5,584.92
J-94	1,005.37	6,135.52	J-104	15.39	312.36	5,583.32
J-95	1,005.37	6,340.39	J-104	13.54	308.1	5,577.91
J-96	1,005.37	5,791.47	J-104	18.18	318.81	5,569.29
J-97	1,005.37	3,723.02	J-97	20	268.29	3,723.02
J-98	1,005.37	4,953.37	J-246	14.7	270.48	4,627.59
J-99	1,005.37	4,691.97	J-243	18.81	276.8	4,619.41
PH_1	2,505.37	4,382.36	PH_1	20	263.15	4,382.61
PH_10	1,005.37	3,531.07	RM4	10.04	328.33	2,713.53
PH_2	4,005.37	4,673.02	PH_2	20	264.94	4,673.02
PH_3	4,005.37	5,405.17	J-104	15.99	313.76	4,978.54
PH_4	1,005.37	4,164.21	PH_4	20	322.1	4,164.36
PH_5	1,005.37	3,339.71	PH_5	20	292.66	3,339.71
PH_6	2,505.37	5,679.47	J-104	19.46	321.76	5,612.59
PH_7	1,005.37	3,799.15	PH_7	20	280.18	3,799.15
PH_8	2,505.37	8,831.73	64	4.74	289.69	6,667.34
PH_9	1,005.37	2,626.91	HH62	15.38	381.48	2,540.21
RM10	1,005.37	2,280.09	RM4	11.72	332.2	1,820.71
RM12	1,005.37	1,758.65	RM12	20	289.01	1,758.55
RM2	1,005.37	2,048.12	RM4	16.09	342.29	1,820.71
RM4	1,005.37	1,528.36	RM4	20	351.32	1,528.36

2028 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
RM6	1,005.37	2,324.32	RM4	10.84	330.18	1,820.71
RM8	1,005.37	2,425.52	RM4	8.78	325.43	1,820.71

2038 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
10	1,007.01	2,413.14	12	15.94	259.23	2,303.18
12	1,007.01	1,901.52	12	20	268.6	1,901.52
14	1,007.01	2,753.07	14	20	282.21	2,752.92
16	1,007.01	2,548.47	16	20	285.44	2,548.39
18	1,007.01	2,461.12	18	20	287.16	2,461.06
20	1,007.01	4,090.21	20	20	277.1	4,090.20
22	1,007.01	2,234.36	22	20	285.83	2,234.34
24	2,507.01	3,232.20	24	20	284.54	3,232.20
26	2,507.01	6,251.87	J-104	13.5	308.02	5,356.81
28	1,007.01	2,152.13	28	20	270.2	2,152.12
30	1,007.01	1,936.46	30	20	259.32	1,936.45
32	2,507.01	5,243.51	J-104	19.55	321.97	5,179.78
34	2,507.01	5,601.56	J-104	18.7	320.02	5,413.04
36	1,007.01	4,441.22	36	20	279.49	4,441.21
38	1,007.01	5,336.25	36	18.13	275.19	5,198.36
40	1,007.01	4,897.32	40	20	251.92	4,897.32
42	1,007.01	5,182.96	42	20	254.53	5,182.96
44	1,007.01	5,268.89	44	20	252.53	5,268.89
46	1,007.01	5,736.39	64	19.92	324.71	5,722.43
48	1,007.01	5,650.42	48	20	254.34	5,650.41
50	1,007.01	6,076.30	64	17.67	319.54	5,711.46
52	1,007.01	6,144.54	64	17.23	318.51	5,711.58
54	1,007.01	6,588.96	64	14.21	311.55	5,703.49
56	1,007.01	6,365.11	64	15.7	314.98	5,701.14
58	1,007.01	5,095.02	58	20	285.81	5,095.07
60	1,007.01	5,211.43	60	20	295.89	5,211.49
62	1,007.01	6,716.38	J-104	13.39	307.75	5,749.29
64	1,007.01	4,447.97	64	20	324.91	4,447.90
66	1,007.01	4,759.59	66	20	328.94	4,759.45
68	1,007.01	6,953.40	64	11.5	305.3	5,678.66
70	1,007.01	4,871.14	70	20	318.19	4,871.04
72	1,007.01	5,733.00	66	19.48	327.73	5,643.93
74	1,007.01	3,018.60	74	20	295.94	3,018.60
76	1,007.01	3,131.88	76	20	295.18	3,131.61
78	1,007.01	2,863.40	78	20	294.26	2,863.39
80	1,007.01	2,948.56	80	20	292.37	2,948.56
82	1,007.01	3,115.80	82	20	291.38	3,115.81
84	1,007.01	3,120.64	84	20	290.84	3,120.65
86	1,007.01	3,190.64	86	20	295.26	3,190.48
88	1,007.01	3,111.86	88	20	294.61	3,111.88
90	1,007.01	2,987.53	90	20	292.54	2,987.53
92	1,007.01	2,876.89	92	20	293.01	2,876.89
94	1,007.01	2,767.46	94	20	295.57	2,767.46
96	1,007.01	3,022.61	96	20	290.71	3,022.61
98	1,007.01	3,111.40	98	20	294.85	3,111.40
100	1,007.01	3,241.01	100	20	294.55	3,241.00

2038 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
102	1,007.01	2,968.68	102	20	292.9	2,968.68
104	1,007.01	3,428.10	98	18.31	290.95	3,332.67
106	1,007.01	2,929.28	106	20	270.97	2,929.02
108	1,007.01	6,885.57	64	12.03	306.52	5,685.57
110	1,007.01	5,878.05	64	17.96	320.2	5,566.44
112	1,007.01	5,661.24	112	20	324.15	5,661.27
114	1,007.01	5,034.37	J-104	18.47	319.49	4,833.43
116	1,007.01	6,194.81	J-104	9.05	297.74	4,840.75
118	2,507.01	6,255.02	J-104	8.15	295.66	4,799.39
126	2,507.01	8,089.53	64	3.13	285.98	5,683.34
128	2,507.01	7,484.63	64	7.7	296.51	5,683.34
130	2,507.01	3,987.00	130	20	265.45	3,986.98
132	1,007.01	4,065.59	132	20	251.9	4,065.59
138	4,007.00	4,257.90	J-104	18.14	318.72	4,054.83
140	4,007.00	4,204.20	J-104	18.64	319.87	4,055.19
142	4,007.00	4,164.71	J-104	19	320.7	4,054.93
144	4,007.00	4,133.26	J-104	19.29	321.37	4,054.95
146	4,007.00	4,130.63	J-104	19.31	321.43	4,054.98
148	4,007.00	4,185.03	J-104	18.82	320.29	4,055.76
152	1,007.01	5,898.27	J-104	12.28	305.2	4,909.53
154	1,007.01	4,650.13	154	20	279.44	4,650.10
156	1,007.01	4,501.01	HH176	19.88	283.15	4,492.69
158	1,007.01	3,720.65	158	20	280.47	3,720.65
160	1,007.01	3,624.16	160	20	284.46	3,624.16
162	2,507.01	5,052.59	J-104	15.86	313.45	4,548.97
164	2,507.01	4,319.99	J-104	17.85	318.05	4,082.12
166	2,507.01	4,291.63	J-104	18.1	318.62	4,081.15
168	2,507.01	3,516.09	168	20	260.38	3,516.09
170	2,507.01	4,084.93	J-104	19.98	322.95	4,081.78
172	2,507.01	4,029.99	J-511	19.84	264.55	4,021.48
174	2,507.01	3,364.38	J-512	19.11	265.58	3,325.26
176	1,007.01	5,821.75	J-104	9.77	299.41	4,603.67
178	2,507.01	6,193.63	J-104	9.19	298.07	4,845.70
180	1,007.01	6,370.91	J-104	8.51	296.5	4,922.10
182	1,007.01	6,426.52	J-104	8.6	296.69	4,976.18
184	1,007.01	5,902.84	J-104	10.4	300.87	4,724.39
186	1,007.01	5,732.68	J-104	11.15	302.59	4,657.62
188	2,507.01	5,297.10	J-104	16.66	315.29	4,858.55
190	1,007.01	6,552.26	J-104	7.81	294.87	5,005.47
192	1,007.01	4,936.64	HH172	19.88	256.07	4,929.53
194	1,007.01	5,727.20	J-104	11.85	304.2	4,719.49
196	1,007.01	5,190.29	J-104	16.31	314.49	4,719.49
198	1,007.01	6,017.28	J-104	12.09	304.76	4,995.78
210	1,007.01	3,338.57	210	20	283.92	3,338.57
212	2,507.01	7,718.50	64	5.95	292.49	5,683.23
FH_1	2,507.01	3,871.40	FH_1	20	263.97	3,871.36

2038 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
FH_10	2,507.01	3,874.57	RM4	3.39	312.99	2,568.59
FH_2	4,007.00	3,859.06	FH_2	20	264.32	3,858.99
FH_3	4,007.00	4,791.27	J-104	13.3	307.56	4,079.11
FH_4	1,007.01	3,543.88	FH_4	20	307.49	3,543.86
FH_5	1,007.01	3,265.97	J-235	19.89	292.16	3,260.01
FH_6	2,507.01	4,881.90	J-104	17.27	316.72	4,546.68
FH_7	1,007.01	3,661.77	FH_7	20	285	3,661.76
FH_8	2,507.01	7,523.76	64	7.41	295.85	5,683.34
FH_9	1,007.01	2,599.93	HH62	12.49	374.81	2,459.59
HH10	1,007.01	3,281.10	HH8	19.2	285.07	3,244.81
HH100	1,007.01	2,625.35	HH62	11.17	371.77	2,460.58
HH102	1,007.01	2,564.96	HH62	14.12	378.58	2,455.14
HH104	1,007.01	2,539.42	HH62	15.5	381.75	2,455.14
HH106	1,007.01	2,614.41	HH62	11.44	372.4	2,455.14
HH108	1,007.01	2,524.37	HH62	16.3	383.62	2,455.14
HH110	1,007.01	2,521.58	HH62	16.45	383.96	2,455.14
HH112	1,007.01	2,635.76	J-666	11.47	387.19	2,462.17
HH114	1,007.01	2,527.76	J-666	16.78	399.46	2,461.87
HH116	1,007.01	2,519.62	J-666	17.15	400.3	2,461.23
HH118	1,007.01	2,424.27	HH118	20	392.65	2,424.27
HH12	1,007.01	4,286.10	HH12	20	330.33	4,286.07
HH120	1,007.01	2,507.34	HH128	14.38	355.78	2,417.47
HH122	1,007.01	2,421.93	HH128	18.05	364.23	2,391.06
HH124	1,007.01	2,400.11	HH128	19.19	366.87	2,387.43
HH126	1,007.01	2,400.14	HH128	19.16	366.8	2,386.95
HH128	1,007.01	2,358.52	HH128	20	368.74	2,358.58
HH130	1,007.01	2,484.74	HH128	15.27	357.82	2,409.35
HH132	1,007.01	7,157.33	64	10.09	302.04	5,683.74
HH134	1,007.01	4,808.12	HH134	20	290.02	4,808.11
HH136	1,007.01	4,665.29	HH136	20	297.13	4,665.28
HH138	1,007.01	6,368.95	64	15.65	314.86	5,697.35
HH142	1,007.01	3,741.48	PH_4	19.23	320.32	3,665.61
HH144	2,507.01	4,711.26	HH148	18.45	265.65	4,622.23
HH146	2,507.01	4,386.82	HH148	19.92	269.04	4,382.61
HH148	2,507.01	3,805.10	HH148	20	269.22	3,805.09
HH150	2,507.01	5,770.36	HH148	16.51	261.17	5,529.49
HH154	2,507.01	4,108.55	130	19.87	265.14	4,102.08
HH156	2,507.01	5,745.98	64	19.65	324.09	5,689.88
HH158	2,507.01	5,573.70	HH158	20	257.06	5,573.54
HH160	2,507.01	6,356.79	64	15.66	314.89	5,688.60
HH162	2,507.01	6,026.33	64	17.86	319.97	5,692.13
HH164	1,007.01	5,387.45	J-104	18.12	318.68	5,126.73
HH166	1,007.01	5,666.33	J-104	15.63	312.92	5,074.83
HH168	2,507.01	5,344.91	J-104	18.37	319.26	5,118.90
HH170	2,507.01	5,449.12	J-104	17.28	316.73	5,076.09
HH172	1,007.01	3,967.57	HH172	20	256.35	3,967.57

2038 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
HH174	1,007.01	3,337.55	HH174	20	284.14	3,337.55
HH176	1,007.01	3,990.29	HH176	20	283.42	3,990.28
HH178	2,507.01	6,166.89	J-104	9.88	299.66	4,890.00
HH18	2,507.01	3,963.07	RM4	2.08	309.95	2,568.59
HH180	2,507.01	6,087.10	J-104	10.38	300.81	4,872.84
HH182	1,007.01	5,490.23	J-104	13.77	308.63	4,712.00
HH184	1,007.01	5,435.24	J-104	14.18	309.59	4,707.44
HH186	1,007.01	5,436.49	J-104	14.02	309.21	4,691.23
HH188	1,007.01	5,905.04	J-104	8.06	295.46	4,523.88
HH190	4,007.00	4,082.86	J-104	19.96	322.92	4,078.54
HH196	4,007.00	4,572.65	J-104	15.44	312.49	4,079.38
HH198	4,007.00	4,524.43	J-104	15.9	313.56	4,079.21
HH2	1,007.01	3,363.79	HH8	19.07	284.76	3,320.46
HH20	2,507.01	4,167.60	RM4	-1.06	302.72	2,568.59
HH200	4,007.00	4,530.63	J-104	15.84	313.42	4,079.08
HH202	4,007.00	4,619.28	J-104	14.99	311.45	4,079.42
HH204	4,007.00	4,510.66	J-104	16.04	313.86	4,079.41
HH206	4,007.00	3,941.10	HH208	19.92	258.85	3,937.07
HH208	4,007.00	3,350.97	HH208	20	259.05	3,350.96
HH210	4,007.00	3,639.80	HH210	20	259.15	3,639.80
HH212	4,007.00	3,690.05	HH212	20	261.85	3,689.70
HH214	4,007.00	4,522.04	J-104	15.92	313.6	4,078.94
HH216	4,007.00	4,493.71	J-104	16.19	314.21	4,078.61
HH218	4,007.00	4,380.54	J-104	17.25	316.66	4,078.54
HH22	2,507.01	4,449.96	RM4	-5.59	292.25	2,568.59
HH220	4,007.00	4,567.91	J-104	15.46	312.54	4,077.32
HH222	4,007.00	4,458.73	J-104	16.5	314.93	4,077.15
HH224	4,007.00	4,530.92	J-104	15.82	313.37	4,077.51
HH226	4,007.00	4,426.31	J-104	16.82	315.66	4,078.14
HH228	4,007.00	4,601.58	J-104	15.13	311.78	4,077.08
HH230	4,007.00	4,090.23	J-104	19.9	322.77	4,078.54
HH232	4,007.00	4,636.49	J-104	14.79	310.99	4,076.91
HH234	4,007.00	4,578.61	J-104	15.35	312.29	4,076.77
HH236	4,007.00	4,645.99	J-104	14.7	310.77	4,076.69
HH238	4,007.00	4,884.03	J-104	12.59	305.9	4,093.34
HH24	2,507.01	4,965.19	RM4	-14.48	271.74	2,568.59
HH240	4,007.00	5,124.13	J-104	10.12	300.2	4,089.50
HH26	2,507.01	3,932.05	RM4	2.54	311.02	2,568.59
HH28	2,507.01	3,551.69	RM4	7.99	323.61	2,568.59
HH30	1,007.01	3,497.59	RM4	8.73	325.32	2,568.57
HH32	1,007.01	4,910.34	RM4	-13.5	274.01	2,568.57
HH34	1,007.01	4,210.88	RM4	-1.74	301.15	2,568.57
HH36	2,507.01	3,727.52	RM4	5.53	317.92	2,568.59
HH38	2,507.01	4,813.04	RM4	-11.77	277.99	2,568.59
HH4	1,007.01	2,950.93	HH4	20	270.19	2,950.90
HH40	2,507.01	4,094.61	RM4	0.08	305.33	2,568.59

2038 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
HH58	1,007.01	2,463.05	HH58	20	406.04	2,463.05
HH6	1,007.01	2,803.15	HH6	20	278.18	2,803.12
HH60	1,007.01	2,407.93	HH60	20	395.55	2,407.93
HH62	1,007.01	2,392.35	HH62	20	392.15	2,392.35
HH64	1,007.01	2,467.58	HH62	17.91	387.33	2,429.00
HH66	1,007.01	2,529.73	HH62	15.31	381.33	2,442.69
HH68	1,007.01	2,411.10	HH68	20	391.29	2,411.10
HH70	1,007.01	2,434.11	HH70	20	388.82	2,434.11
HH72	1,007.01	2,427.68	HH72	20	387.44	2,427.68
HH74	1,007.01	2,421.55	HH74	20	383.54	2,421.55
HH76	1,007.01	2,449.30	HH62	19.98	392.11	2,448.97
HH78	1,007.01	2,400.73	HH78	20	382.08	2,400.95
HH8	1,007.01	3,054.29	HH8	20	286.92	3,054.21
HH80	1,007.01	2,424.78	HH80	20	380	2,424.78
HH82	1,007.01	2,480.91	HH78	17.3	375.85	2,433.68
HH84	1,007.01	2,409.18	HH84	20	376.83	2,409.38
HH86	1,007.01	2,397.98	HH86	20	378.09	2,398.17
HH88	1,007.01	2,456.76	HH86	18.33	374.23	2,428.17
HH90	1,007.01	2,540.30	HH78	14.47	369.31	2,443.32
HH92	1,007.01	2,459.63	HH62	19.64	391.31	2,452.78
HH94	1,007.01	2,556.96	HH62	14.4	379.23	2,452.53
HH96	1,007.01	2,565.12	HH62	14.38	379.18	2,459.83
HH98	1,007.01	2,613.21	HH62	11.68	372.95	2,458.05
J-100	2,507.01	4,398.27	J-206	12.09	289.97	3,782.22
J1004	2,507.01	4,684.32	J-104	15.79	313.28	4,206.17
J1006	2,507.01	4,656.61	J-104	16.04	313.86	4,206.17
J-101	2,507.01	5,137.21	J-104	5.41	289.35	3,773.29
J1010	2,507.01	4,480.50	J-104	17.61	317.49	4,206.17
J1012	2,507.01	4,248.30	J-104	19.64	322.17	4,206.17
J-102	1,007.01	4,397.05	J-104	13.23	307.39	3,736.74
J1020	2,507.01	4,169.67	J1020	20	268.71	4,169.50
J1022	2,507.01	3,986.88	J1022	20	263	3,986.80
J1024	2,507.01	3,855.03	J1024	20	263.93	3,854.98
J1026	2,507.01	3,804.46	J1026	20	264.75	3,804.42
J1028	2,507.01	3,834.13	J1028	20	263.03	3,834.10
J-103	1,007.01	3,736.01	J-104	19.76	322.47	3,711.80
J1030	4,007.00	4,536.51	J-104	14.94	311.33	4,007.49
J-104	1,007.01	3,685.99	J-104	20	323.01	3,685.83
J-105	2,507.01	4,071.64	J-206	19.41	306.88	4,020.42
J-106	1,007.01	3,845.58	J-104	18.69	320	3,712.15
J-107	1,007.01	4,025.04	J-104	17.22	316.6	3,742.03
J-108	1,007.01	4,204.20	J-104	15.52	312.67	3,754.17
J-109	1,007.01	4,425.76	J-104	13.32	307.61	3,765.89
J-110	1,007.01	4,130.15	J-104	16.27	314.4	3,751.69
J-111	1,007.01	3,792.70	J-112	18.35	313.1	3,647.90
J-112	1,007.01	3,306.29	J-112	20	316.9	3,306.28

2038 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
J-113	4,007.00	5,236.47	J-104	5.52	289.6	3,862.85
J-114	4,007.00	3,054.39	J-519	19.6	281.67	3,036.53
J-115	4,007.00	2,447.19	J-115	20	279.5	2,447.20
J-116	4,007.00	5,123.45	J-104	8.62	296.74	3,990.24
J-117	4,007.00	5,038.81	J-104	9.89	299.68	4,016.29
J-118	4,007.00	4,552.95	J-104	14.79	310.98	4,008.82
J-119	4,007.00	3,700.33	J-119	20	263.97	3,700.04
J-120	4,007.00	4,983.46	J-104	10.75	301.67	4,036.31
J-121	4,007.00	4,861.84	J-104	12.09	304.76	4,042.72
J-122	4,007.00	4,772.14	J-104	13.08	307.04	4,048.04
J-123	4,007.00	4,637.50	J-104	14.46	310.22	4,050.53
J-124	4,007.00	4,530.38	J-104	15.53	312.69	4,052.11
J-125	4,007.00	4,404.90	J-104	16.75	315.5	4,053.27
J-126	4,007.00	4,305.27	J-104	17.69	317.69	4,054.26
J-127	4,007.00	4,240.92	J-104	18.3	319.09	4,054.99
J-128	4,007.00	4,197.12	J-104	18.79	320.23	4,064.32
J-129	4,007.00	4,678.30	J-104	14.38	310.04	4,076.29
J-130	4,007.00	5,147.23	J-104	9.26	298.22	4,049.46
J-131	4,007.00	4,031.09	J-131	20	265.71	4,031.09
J-132	4,007.00	3,842.22	J-132	20	262.15	3,842.13
J-133	4,007.00	5,136.94	J-104	9.49	298.75	4,057.92
J-134	4,007.00	4,999.28	J-104	11.04	302.32	4,067.07
J-135	4,007.00	5,071.69	J-104	10.41	300.88	4,074.62
J-136	4,007.00	5,142.36	J-104	9.81	299.5	4,082.21
J-137	4,007.00	5,114.64	J-104	10.22	300.43	4,089.65
J-138	4,007.00	5,040.04	J-104	11.06	302.38	4,095.27
J-139	2,507.01	3,987.07	J-139	20	297.59	3,986.88
J-140	2,507.01	5,150.10	J-104	10.03	299.99	4,099.76
J-141	2,507.01	5,113.17	J-104	10.85	301.88	4,124.93
J-142	2,507.01	5,192.32	J-104	11.03	302.32	4,206.17
J-143	1,007.01	5,225.41	J-104	11.2	302.69	4,251.45
J-144	1,007.01	5,508.47	J-104	10.08	300.11	4,387.53
J-145	1,007.01	5,542.58	J-104	10.37	300.78	4,438.65
J-146	1,007.01	5,725.93	J-104	9.21	298.12	4,483.44
J-147	1,007.01	5,440.61	J-104	11.4	303.17	4,447.78
J-148	1,007.01	5,431.27	J-104	11.66	303.76	4,462.83
J-149	2,507.01	5,280.02	J-104	13.21	307.35	4,481.27
J-150	2,507.01	5,530.79	J-104	11.08	302.42	4,491.85
J-151	1,007.01	5,511.21	J-104	11.37	303.1	4,501.79
J-152	1,007.01	5,534.93	J-104	11.26	302.83	4,510.76
J-153	1,007.01	5,225.25	J-104	14.15	309.51	4,524.95
J-154	1,007.01	5,057.99	J-104	15.66	313	4,531.78
J-155	1,007.01	4,682.80	J-104	18.78	320.2	4,531.68
J-156	1,007.01	4,841.93	J-104	17.47	317.17	4,530.98
J-157	1,007.01	4,850.12	J-104	17.38	316.97	4,528.63
J-158	1,007.01	2,747.35	J-158	20	273.2	2,747.13

2038 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
J-159	1,007.01	4,851.35	J-104	17.41	317.03	4,532.85
J-160	2,507.01	4,912.59	J-104	16.98	316.03	4,541.88
J-161	2,507.01	5,030.60	J-104	16	313.77	4,543.02
J-162	1,007.01	4,927.85	J-104	16.82	315.67	4,538.16
J-163	1,007.01	4,518.74	J-572	19.86	289.58	4,507.33
J-164	1,007.01	3,595.55	J-165	19.48	290	3,563.85
J-165	1,007.01	2,748.38	J-165	20	291.2	2,748.38
J-166	1,007.01	2,457.27	J-166	20	290.42	2,457.06
J-167	1,007.01	3,588.50	J-168	19.46	289.75	3,555.52
J-168	1,007.01	3,165.33	J-168	20	291	3,165.33
J-169	1,007.01	3,558.17	J-169	20	290.68	3,558.17
J-170	1,007.01	3,635.92	J-170	20	293.51	3,635.90
J-171	1,007.01	3,277.53	J-171	20	291.47	3,277.52
J-172	1,007.01	3,729.13	J-172	20	292.46	3,729.11
J-173	1,007.01	3,307.66	J-173	20	291.68	3,307.66
J-174	2,507.01	4,869.95	J-104	17.35	316.9	4,544.40
J-175	2,507.01	4,940.51	J-104	16.8	315.62	4,548.18
J-176	2,507.01	4,811.95	J-104	17.86	318.07	4,547.83
J-177	2,507.01	4,867.42	J-104	17.35	316.89	4,541.95
J-178	2,507.01	5,098.19	J-104	15.21	311.96	4,522.97
J-179	2,507.01	4,706.81	J-104	18.14	318.72	4,481.46
J-180	2,507.01	4,416.16	J-104	19.54	321.96	4,362.13
J-181	2,507.01	4,299.06	J-104	19.96	322.92	4,294.65
J-182	2,507.01	3,989.51	J-182	20	297.19	3,989.33
J-183	2,507.01	3,951.04	J-183	20	299.03	3,950.89
J-184	2,507.01	4,045.61	J-184	20	297.29	4,045.41
J-185	2,507.01	4,337.12	J-206	12.46	290.82	3,754.28
J-186	2,507.01	4,317.12	J-206	14.26	294.99	3,854.12
J-187	2,507.01	4,360.02	J-206	13.59	293.45	3,846.57
J-189	2,507.01	4,392.86	J-206	13.14	292.4	3,844.63
J-190	2,507.01	4,133.77	J-206	17.03	301.39	3,887.82
J-191	1,007.01	3,378.29	J-191	20	293.27	3,378.29
J-192	1,007.01	3,301.42	J-192	20	293.45	3,301.42
J-194	2,507.01	3,846.73	J-194	20	289.7	3,846.63
J-195	2,507.01	3,810.66	J-195	20	289.39	3,810.57
J-196	2,507.01	3,805.89	J-196	20	287.9	3,805.82
J-197	2,507.01	4,179.03	J-206	16.99	301.28	3,926.51
J-198	2,507.01	4,305.53	J-206	15.29	297.37	3,915.98
J-199	2,507.01	3,966.81	J-199	20	289.87	3,966.65
J-200	2,507.01	4,297.69	J-206	13	292.08	3,755.51
J-201	2,507.01	4,320.99	J-206	14.92	296.52	3,903.55
J-202	2,507.01	4,177.04	J-206	14.04	294.48	3,718.46
J-203	2,507.01	3,817.98	J-206	18.15	303.96	3,674.36
J-204	2,507.01	3,780.68	J-206	18.31	304.32	3,650.45
J-205	2,507.01	2,956.98	J-205	20	307.16	2,956.98
J-206	2,507.01	2,816.30	J-206	20	308.23	2,816.30

2038 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
J-207	2,507.01	3,762.53	J-206	18.67	305.15	3,659.35
J-208	2,507.01	4,045.07	J-206	15.46	297.75	3,695.77
J-209	2,507.01	4,381.45	J-206	11.86	289.44	3,754.52
J-218	1,007.01	3,417.18	J-576	17.36	288.21	3,273.76
J-219	1,007.01	2,958.95	J-575	19.55	287.17	2,938.47
J-220	1,007.01	2,934.64	J-220	20	284.63	2,934.64
J-221	1,007.01	3,137.90	J-221	20	286.95	3,137.90
J-222	1,007.01	3,185.76	J-221	19.85	286.61	3,178.47
J-223	1,007.01	2,975.94	J-223	20	292.9	2,975.93
J-224	1,007.01	3,085.65	J-224	20	293.64	3,085.65
J-225	2,507.01	4,157.66	J-225	20	295.61	4,157.40
J-226	1,007.01	5,048.63	J-104	7.07	293.18	3,804.48
J-235	1,007.01	3,139.13	J-235	20	292.42	3,138.88
J-236	1,007.01	3,234.31	J-236	20	287.76	3,234.31
J-237	1,007.01	4,549.82	J-104	12.63	306	3,815.72
J-238	1,007.01	4,231.60	74	13.1	280.02	3,783.43
J-239	1,007.01	3,662.96	74	17.88	291.04	3,533.00
J-240	2,507.01	4,679.86	J-104	18.5	319.55	4,496.21
J-241	1,007.01	3,939.15	J-243	18.71	276.56	3,865.43
J-242	1,007.01	3,774.37	J-243	19.64	278.7	3,754.40
J-243	1,007.01	3,446.65	J-243	20	279.53	3,446.65
J-244	1,007.01	2,184.26	J-244	20	274.14	2,184.22
J-245	1,007.01	2,158.61	J-245	20	272.45	2,158.57
J-246	1,007.01	3,380.41	J-246	20	282.71	3,380.41
J-247	1,007.01	2,284.25	J-247	20	275.59	2,284.19
J-248	1,007.01	2,205.15	J-248	20	272.67	2,205.11
J-249	2,507.01	5,359.52	J-104	12.38	305.43	4,470.07
J-250	2,507.01	4,269.03	J-250	20	269.07	4,268.88
J-251	2,507.01	4,802.59	J-104	17.27	316.7	4,472.15
J-252	1,007.01	4,507.13	J-104	19.68	322.28	4,467.80
J-253	1,007.01	5,508.18	J-104	10.37	300.8	4,412.39
J-254	1,007.01	3,877.68	J-254	20	270.49	3,877.68
J-255	1,007.01	4,631.11	J-104	18.78	320.19	4,481.35
J-256	1,007.01	3,143.24	J-256	20	263.45	3,143.24
J-257	1,007.01	4,574.58	J-104	19.31	321.42	4,489.50
J-258	1,007.01	4,055.94	J-258	20	273.93	4,055.93
J-259	1,007.01	4,699.82	J-104	18.32	319.13	4,493.74
J-260	1,007.01	5,385.73	J-104	12.48	305.65	4,500.15
J-261	2,507.01	5,663.81	J-104	11.48	303.34	4,635.37
J-262	4,007.00	4,960.13	J-104	11.65	303.75	4,081.40
J-263	4,007.00	4,820.85	J-104	13.02	306.91	4,080.03
J-264	4,007.00	4,785.43	J-104	13.36	307.69	4,079.04
J-265	4,007.00	4,761.09	J-104	13.58	308.2	4,077.72
J-266	4,007.00	4,720.27	J-104	13.98	309.11	4,077.09
J-267	4,007.00	4,728.86	J-104	13.89	308.91	4,076.96
J-268	4,007.00	4,351.12	J-104	17.26	316.69	4,053.74

2038 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
J-270	4,007.00	4,640.54	J-104	14.75	310.89	4,076.52
J-271	4,007.00	4,662.86	J-104	14.53	310.39	4,076.63
J-272	4,007.00	4,549.32	J-104	15.64	312.94	4,076.77
J-273	4,007.00	4,423.58	J-104	16.83	315.69	4,076.77
J-274	4,007.00	4,312.49	J-104	17.86	318.07	4,076.77
J-275	4,007.00	4,252.32	J-104	18.41	319.35	4,076.77
J-283	1,007.01	4,331.19	J-283	20	263.97	4,331.18
J-284	2,507.01	5,034.57	J-104	15.48	312.59	4,492.70
J-285	1,007.01	4,283.25	J-285	20	266.35	4,283.24
J-286	1,007.01	4,252.64	J-290	18.51	272.7	4,162.82
J-287	1,007.01	3,233.81	J-287	20	262.37	3,233.81
J-288	1,007.01	4,360.39	J-288	20	272.04	4,360.37
J-289	1,007.01	4,509.23	J-290	18.77	273.32	4,429.44
J-290	1,007.01	2,714.81	J-290	20	276.15	2,714.56
J-291	2,507.01	4,189.11	J-291	20	273.22	4,188.96
J-292	2,507.01	4,036.94	J-292	20	273.1	4,036.85
J-293	2,507.01	4,068.65	J-294	18.92	273.64	4,006.60
J-294	2,507.01	2,547.54	J-294	20	276.14	2,547.54
J-295	2,507.01	5,368.27	J-104	13.51	308.04	4,585.31
J-296	2,507.01	5,313.43	J-104	13.74	308.56	4,561.00
J-297	2,507.01	5,367.58	J-104	13.08	307.05	4,543.48
J-298	2,507.01	5,859.78	J-104	8.49	296.45	4,527.26
J-299	1,007.01	5,901.90	J-104	8.15	295.66	4,528.46
J-300	2,507.01	4,811.27	J-104	18.1	318.64	4,575.49
J-301	1,007.01	5,126.73	J-104	14.78	310.96	4,502.15
J-302	1,007.01	5,252.42	J-104	13.71	308.5	4,505.54
J-303	1,007.01	5,231.80	J-104	13.89	308.91	4,505.02
J-304	1,007.01	5,169.98	J-104	14.42	310.14	4,504.25
J-305	1,007.01	4,124.51	J-305	20	268.45	4,124.51
J-306	1,007.01	4,191.41	J-306	20	271.09	4,191.40
J-307	1,007.01	4,473.75	J-307	20	271.7	4,473.73
J-308	1,007.01	4,219.80	J-308	20	274.58	4,219.79
J-309	1,007.01	4,872.87	J-104	16.87	315.78	4,492.58
J-311	2,507.01	4,287.02	J-311	20	262.3	4,286.90
J-312	2,507.01	4,367.85	J-312	20	261.79	4,367.70
J-313	2,507.01	2,808.90	J-313	20	260.82	2,808.68
J-314	2,507.01	5,117.37	J-104	15.13	311.76	4,529.61
J-315	2,507.01	4,315.30	J-315	20	290.68	4,314.98
J-316	2,507.01	3,943.11	J-316	20	288.5	3,943.11
J-317	1,007.01	6,047.54	J-104	12.12	304.83	5,026.09
J-318	1,007.01	6,582.52	J-104	12.73	306.24	5,553.33
J-319	1,007.01	3,050.57	J-319	20	273.07	3,050.32
J-322	1,007.01	5,609.00	J-322	20	334.8	5,609.01
J-343	2,507.01	4,887.17	J-104	16.54	315.03	4,471.18
J-345	2,507.01	6,038.87	J-104	9.52	298.83	4,754.27
J-346	2,507.01	5,299.54	J-104	15.85	313.44	4,768.43

2038 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
J-347	2,507.01	6,025.83	J-104	9.82	299.51	4,771.38
J-349	1,007.01	4,323.63	J-353	17.55	267.11	4,185.96
J-350	1,007.01	6,049.52	J-104	10.42	300.91	4,849.01
J-351	1,007.01	6,351.94	J-104	7.6	294.39	4,833.23
J-352	1,007.01	3,355.56	J-353	17.9	267.92	3,265.25
J-353	1,007.01	2,851.86	J-353	20	272.75	2,851.64
J-37	2,507.01	5,099.36	J-104	11.4	303.16	4,149.04
J-393	1,007.01	4,004.29	J-393	20	328.97	4,004.28
J-397	1,007.01	7,731.78	64	5.99	292.58	5,696.49
J-399	2,507.01	4,942.58	J-104	17.05	316.2	4,577.76
J-4	4,007.00	5,125.39	J-104	9.45	298.66	4,047.10
J-400	2,507.01	4,507.09	J-400	20	285.61	4,507.09
J-401	2,507.01	4,715.27	J-104	18.15	318.75	4,490.87
J-402	2,507.01	4,721.13	J-104	18.09	318.6	4,489.00
J-403	4,007.00	4,708.42	J-104	13.28	307.5	4,014.05
J-404	4,007.00	5,263.67	J-104	6.86	292.69	3,974.27
J-45	1,007.01	7,103.60	64	10.46	302.89	5,681.82
J-500	2,507.01	3,832.57	J-500	20	263.12	3,832.53
J-501	2,507.01	3,755.42	J-501	20	262.65	3,755.39
J-502	2,507.01	3,676.68	J-502	20	261.54	3,676.66
J-503	2,507.01	3,829.83	J-503	20	263.11	3,829.78
J-504	2,507.01	3,927.54	J-503	19.93	262.95	3,923.97
J-505	2,507.01	3,771.10	J-505	20	262.17	3,771.06
J-506	2,507.01	4,051.76	J-506	20	261.9	4,051.65
J-507	2,507.01	4,093.49	J-104	19.9	322.77	4,081.56
J-508	2,507.01	4,136.28	J-104	19.51	321.89	4,081.57
J-509	1,007.01	3,960.52	J-509	20	264.57	3,960.51
J-510	1,007.01	3,633.80	J-510	20	263.52	3,633.80
J-511	2,507.01	3,720.07	J-511	20	264.92	3,720.04
J-512	1,007.01	2,689.49	J-512	20	267.64	2,689.49
J-513	1,007.01	2,529.74	J-513	20	265.95	2,529.53
J-514	1,007.01	2,598.04	J-514	20	266.66	2,598.04
J-515	1,007.01	2,492.43	J-515	20	265.96	2,492.25
J-516	2,507.01	3,361.04	J-512	17.38	261.59	3,250.10
J-517	1,007.01	3,297.37	J-517	20	309.97	3,297.37
J-518	1,007.01	3,373.27	J-518	20	319.07	3,373.24
J-519	4,007.00	2,820.07	J-519	20	282.6	2,820.08
J-521	1,007.01	1,945.85	J-521	20	271.4	1,945.83
J-522	4,007.00	3,918.35	J-522	20	263.33	3,918.32
J-523	4,007.00	3,551.69	J-523	20	272.31	3,551.70
J-524	4,007.00	3,623.41	J-524	20	271.85	3,623.41
J-525	4,007.00	3,893.56	J-525	20	272.48	3,893.51
J-526	4,007.00	4,550.16	J-104	14.82	311.05	4,009.15
J-527	4,007.00	4,295.20	J-104	17.28	316.73	4,006.21
J-528	4,007.00	4,205.07	J-104	18.11	318.65	4,003.15
J-529	4,007.00	4,595.98	J-104	14.27	309.78	4,001.56

2038 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
J-530	4,007.00	3,993.85	J-530	20	267.87	3,993.86
J-531	4,007.00	3,862.45	J-531	20	267.83	3,862.38
J-532	4,007.00	4,009.95	J-104	19.95	322.9	4,004.95
J-533	4,007.00	4,722.79	J-104	12.97	306.8	4,001.24
J-534	4,007.00	5,142.98	J-104	8.51	296.5	3,997.57
J-535	4,007.00	5,150.18	J-104	8.41	296.26	3,995.79
J-536	4,007.00	4,762.43	J-104	12.49	305.68	3,995.79
J-537	4,007.00	4,130.74	J-104	18.94	320.56	4,016.29
J-538	4,007.00	3,295.02	J-538	20	266.85	3,295.02
J-539	4,007.00	3,500.53	J-539	20	269.42	3,500.54
J-540	4,007.00	4,017.87	J-540	20	270.74	4,017.88
J-541	4,007.00	3,166.27	J-541	20	269.97	3,166.28
J-542	4,007.00	3,274.99	J-542	20	267.53	3,274.99
J-543	4,007.00	3,416.12	J-543	20	272.47	3,416.12
J-544	4,007.00	4,027.48	J-544	20	271.01	4,027.48
J-545	4,007.00	2,049.97	J-545	20	267.26	2,049.98
J-546	4,007.00	2,289.35	J-546	20	267.76	2,289.37
J-547	4,007.00	2,464.01	J-547	20	268.26	2,464.02
J-548	4,007.00	3,188.98	J-547	19.49	267.07	3,167.43
J-549	4,007.00	2,503.00	J-549	20	266.89	2,503.01
J-550	4,007.00	2,324.47	J-550	20	266.6	2,324.49
J-551	4,007.00	2,403.79	J-551	20	267.19	2,403.80
J-552	4,007.00	2,391.42	J-552	20	267.31	2,391.44
J-553	4,007.00	2,477.49	J-553	20	266.66	2,477.51
J-554	4,007.00	2,617.18	J-552	19.74	266.72	2,608.52
J-555	4,007.00	2,930.57	J-547	19.39	266.85	2,907.18
J-556	4,007.00	4,065.36	J-104	19.89	322.77	4,053.74
J-557	4,007.00	2,994.20	J-557	20	268.7	2,994.20
J-558	2,507.01	4,993.82	J-104	11.64	303.72	4,102.75
J-559	2,507.01	4,868.26	J-104	12.9	306.63	4,104.19
J-560	2,507.01	4,724.00	J-104	14.32	309.9	4,105.52
J-561	2,507.01	4,611.36	J-104	15.4	312.4	4,105.92
J-562	2,507.01	4,512.59	J-104	16.33	314.54	4,105.92
J-563	2,507.01	4,809.58	J-104	13.6	308.25	4,113.36
J-564	2,507.01	5,002.08	J-104	11.82	304.13	4,118.72
J-565	2,507.01	4,471.89	J-104	16.74	315.5	4,109.19
J-566	2,507.01	4,775.04	J-104	14.02	309.21	4,118.72
J-567	2,507.01	4,342.46	J-104	17.89	318.14	4,105.92
J-568	4,007.00	4,625.54	J-104	14.87	311.16	4,074.62
J-569	2,507.01	5,565.95	J-104	11.26	302.84	4,536.94
J-570	1,007.01	3,772.00	J-570	20	285.39	3,772.02
J-571	1,007.01	3,786.78	J-571	20	284.5	3,786.79
J-572	1,007.01	4,486.24	J-572	20	289.91	4,486.15
J-573	1,007.01	3,070.80	J-573	20	294.65	3,070.82
J-574	1,007.01	2,947.17	J-574	20	285.24	2,947.17
J-575	1,007.01	2,190.62	J-575	20	288.2	2,190.53

2038 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
J-576	1,007.01	2,450.67	J-576	20	294.31	2,450.67
J-577	1,007.01	4,202.35	74	13.13	280.09	3,759.40
J-578	1,007.01	4,066.98	74	14.68	283.66	3,724.28
J-59	4,007.00	5,012.95	J-104	11.25	302.82	4,090.04
J-590	1,007.01	4,187.24	J-104	15.47	312.56	3,732.95
J-591	1,007.01	3,694.38	J-104	19.97	322.95	3,691.62
J-592	1,007.01	3,694.17	J-104	19.97	322.95	3,691.34
J-593	1,007.01	3,856.22	J-104	18.6	319.78	3,713.42
J-594	2,507.01	6,257.16	J-104	11.73	303.92	5,161.34
J-595	1,007.01	2,417.97	J-595	20	340.63	2,418.07
J-596	2,507.01	5,063.60	J-104	15.65	312.96	4,537.02
J-597	2,507.01	5,032.61	J-104	15.79	313.29	4,524.13
J-598	2,507.01	4,650.77	J-104	19.03	320.77	4,530.63
J-599	2,507.01	4,797.17	J-104	17.83	318.01	4,531.24
J-6	4,007.00	4,593.51	J-104	14.9	311.24	4,051.21
J-600	2,507.01	4,653.62	J-104	19	320.71	4,530.47
J-603	2,507.01	3,691.55	J-603	20	291.38	3,691.49
J-604	2,507.01	4,915.23	J-104	16.79	315.6	4,524.95
J-605	2,507.01	4,815.50	J-104	17.51	317.25	4,511.89
J-606	2,507.01	3,634.76	J-606	20	291.62	3,634.72
J-607	2,507.01	4,898.52	J-104	16.89	315.84	4,521.11
J-608	2,507.01	4,579.46	J-104	19.53	321.92	4,521.11
J-609	2,507.01	4,327.76	J-613	19.47	294.71	4,284.98
J-610	2,507.01	3,787.18	J-610	20	289.62	3,787.18
J-611	2,507.01	4,120.58	J-611	20	294.45	4,120.42
J-613	2,507.01	4,132.24	J-613	20	295.93	4,132.05
J-615	2,507.01	3,973.17	J-615	20	293.75	3,973.14
J-616	2,507.01	4,844.35	J-104	17.8	317.94	4,572.05
J-617	2,507.01	4,985.86	J-104	16.52	314.99	4,559.84
J-618	2,507.01	4,349.37	J-620	18.66	292.25	4,244.25
J-619	2,507.01	3,970.37	J-619	20	292.41	3,970.32
J-62	4,007.00	4,820.70	J-104	13.02	306.91	4,079.80
J-620	2,507.01	3,765.46	J-620	20	295.34	3,765.82
J-621	2,507.01	4,189.35	J-621	20	293.96	4,189.07
J-622	2,507.01	3,946.27	J-622	20	295.66	3,946.22
J-623	2,507.01	3,946.00	J-630	19.55	295.39	3,913.69
J-624	2,507.01	4,387.04	J-630	18.82	293.7	4,291.81
J-625	2,507.01	4,548.83	J-630	18.03	291.88	4,386.28
J-626	2,507.01	4,338.16	J-626	20	288.65	4,337.80
J-627	2,507.01	4,191.79	J-627	20	289.32	4,191.56
J-628	2,507.01	4,110.88	J-629	17.33	290.05	3,921.67
J-629	2,507.01	3,114.55	J-629	20	296.2	3,114.54
J-630	2,507.01	3,565.85	J-630	20	296.42	3,565.83
J-631	2,507.01	4,455.76	J-634	19.07	288.96	4,384.52
J-632	2,507.01	4,136.13	J-634	19.29	289.45	4,085.93
J-633	2,507.01	3,914.96	J-633	20	286.44	3,914.95

2038 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
J-634	2,507.01	3,904.28	J-634	20	291.1	3,904.27
J-635	2,507.01	4,145.49	J-635	20	286.5	4,145.33
J-636	2,507.01	4,222.67	J-634	19.34	289.57	4,174.65
J-637	2,507.01	3,943.90	J-637	20	286.15	3,943.87
J-638	2,507.01	3,908.80	J-638	20	284.65	3,908.79
J-639	2,507.01	3,994.18	J-639	20	287.72	3,994.11
J-640	2,507.01	4,422.62	J-640	20	287.48	4,422.19
J-641	2,507.01	4,029.50	J-634	19.46	289.86	3,992.73
J-642	2,507.01	3,963.12	J-642	20	290.63	3,963.07
J-643	2,507.01	4,613.54	J-104	19.56	321.99	4,558.03
J-644	2,507.01	5,221.65	J-104	14.63	310.62	4,570.96
J-645	2,507.01	3,650.56	J-645	20	290.13	3,650.52
J-646	2,507.01	3,629.53	J-646	20	289.61	3,629.50
J-647	1,007.01	1,824.79	J-647	20	289.66	1,824.78
J-648	1,007.01	3,101.50	J-649	19.39	290.29	3,071.26
J-649	1,007.01	2,547.41	J-649	20	291.69	2,547.41
J-650	1,007.01	3,647.68	J-650	20	295.19	3,647.68
J-651	1,007.01	5,583.33	64	19.67	324.15	5,533.16
J-652	1,007.01	3,231.25	J-652	20	293.55	3,231.11
J-653	2,507.01	3,106.83	J-653	20	316.95	3,106.83
J-654	2,507.01	3,155.69	J-654	20	311.66	3,155.69
J-655	2,507.01	3,273.60	J-655	20	326.33	3,273.59
J-656	1,007.01	7,079.26	64	10.64	303.31	5,682.44
J-657	2,507.01	5,528.50	J-104	18.89	320.46	5,370.04
J-66	2,507.01	5,048.79	J-104	11.03	302.3	4,098.58
J-664	1,007.01	2,473.64	J-666	19.66	406.09	2,466.56
J-666	1,007.01	2,441.08	J-666	20	406.88	2,441.07
J-67	4,007.00	5,247.93	J-104	8.93	297.47	4,093.95
J-675	4,007.00	5,134.70	J-104	8.54	296.57	3,993.44
J-68	4,007.00	5,159.29	J-104	9.81	299.49	4,092.31
J-680	1,007.01	3,898.12	J-680	20	270.44	3,898.13
J-682	2,507.01	4,282.22	J-206	15.8	298.55	3,932.38
J-683	1,007.01	6,095.61	J-104	11.7	303.85	5,023.25
J-684	4,007.00	2,979.31	J-519	19.53	281.51	2,958.85
J-685	1,007.01	4,430.45	J-104	12.89	306.59	3,738.09
J-686	2,507.01	5,064.88	J-104	10.87	301.94	4,098.78
J-687	4,007.00	4,674.80	J-104	14.41	310.11	4,076.26
J-688	4,007.00	4,665.52	J-104	14.49	310.29	4,075.07
J-689	4,007.00	4,596.38	J-104	15.16	311.84	4,075.07
J-69	4,007.00	4,910.04	J-104	12.25	305.13	4,088.00
J-690	2,507.01	2,497.99	J-690	20	259.67	2,497.99
J-691	1,007.01	4,975.21	J-104	16.37	314.63	4,532.00
J-692	1,007.01	5,342.78	J-104	11.62	303.67	4,387.53
J-693	1,007.01	2,595.84	J-693	20	290.31	2,595.84
J-694	2,507.01	6,120.45	J-104	14.51	310.34	5,360.99
J-695	1,007.01	3,252.25	J-695	20	288.15	3,252.25

2038 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
J-696	1,007.01	3,152.44	J-696	20	286.84	3,152.39
J-697	1,007.01	3,236.20	J-697	20	288.18	3,236.20
J-70	4,007.00	4,933.81	J-104	11.99	304.52	4,086.15
J-71	4,007.00	4,949.49	J-104	11.81	304.1	4,084.44
J-72	4,007.00	4,973.51	J-104	11.54	303.49	4,082.92
J-73	2,507.01	5,067.25	J-104	15.61	312.88	4,536.11
J-74	2,507.01	5,058.68	J-104	15.79	313.29	4,546.51
J-75	2,507.01	5,082.61	J-104	15.72	313.14	4,561.19
J-76	2,507.01	4,642.34	J-104	19.31	321.42	4,556.19
J-77	2,507.01	4,049.99	J-77	20	290.02	4,049.88
J-78	2,507.01	3,628.97	J-78	20	289.5	3,628.94
J-79	2,507.01	1,881.41	J-79	20	288.95	1,881.41
J-80	2,507.01	3,988.66	J-80	20	292.07	3,988.59
J-81	2,507.01	4,948.52	J-104	16.75	315.52	4,550.39
J-82	2,507.01	4,976.44	J-104	16.51	314.95	4,548.96
J-83	2,507.01	4,831.00	J-104	17.73	317.78	4,551.35
J-84	2,507.01	4,950.21	J-104	16.77	315.55	4,553.45
J-85	2,507.01	5,042.90	J-104	16	313.78	4,554.35
J-86	2,507.01	4,613.25	J-104	19.49	321.84	4,549.81
J-87	2,507.01	4,080.57	J-87	20	291.53	4,080.43
J-88	2,507.01	3,633.91	J-88	20	291.19	3,633.87
J-89	2,507.01	4,040.59	J-89	20	293	4,040.47
J-90	2,507.01	4,568.60	J-104	19.84	322.65	4,549.24
J-91	1,007.01	5,214.21	J-104	14.25	309.74	4,525.36
J-92	1,007.01	5,128.49	J-104	14.98	311.42	4,523.73
J-93	1,007.01	5,286.46	J-104	13.6	308.23	4,523.34
J-94	1,007.01	5,361.09	J-104	12.92	306.68	4,521.55
J-95	1,007.01	5,603.81	J-104	10.72	301.6	4,518.82
J-96	1,007.01	5,143.55	J-104	14.72	310.83	4,511.08
J-97	1,007.01	3,404.45	J-97	20	268.29	3,404.44
J-98	1,007.01	4,443.67	J-246	14.38	269.74	4,092.14
J-99	1,007.01	4,207.95	J-246	18.09	278.3	4,086.35
PH_1	2,507.01	3,955.55	PH_1	20	263.15	3,955.49
PH_10	1,007.01	3,454.67	RM4	9.31	326.66	2,568.57
PH_2	4,007.00	4,184.72	J-104	18.63	319.85	4,035.91
PH_3	4,007.00	4,816.63	J-104	13.04	306.96	4,078.44
PH_4	1,007.01	3,459.34	PH_4	20	322.1	3,459.28
PH_5	1,007.01	2,985.67	PH_5	20	292.66	2,985.66
PH_6	2,507.01	4,904.21	J-104	17.1	316.31	4,547.70
PH_7	1,007.01	3,462.20	PH_7	20	280.18	3,462.20
PH_8	2,507.01	8,003.54	64	3.79	287.5	5,683.34
PH_9	1,007.01	2,553.15	HH62	15.09	380.83	2,461.09
RM10	1,007.01	2,234.45	RM4	11.06	330.69	1,732.79
RM12	1,007.01	1,725.28	RM12	20	289.01	1,725.28
RM2	1,007.01	1,964.93	RM4	16.09	342.29	1,732.79
RM4	1,007.01	1,459.03	RM4	20	351.32	1,459.03

2038 Available Fire Flow

ID	Total Demand (gpm)	Available Flow at Hydrant (gpm)	Critical Node ID	Critical Node Pressure (psi)	Critical Node Head (ft)	Design Flow (gpm)
RM6	1,007.01	2,288.19	RM4	10	328.24	1,732.79
RM8	1,007.01	2,399.11	RM4	7.74	323.02	1,732.79

APPENDIX H

WELLHEAD PROTECTION

Pierce County
Local Emergency Planning Committee

Pierce County
Department of Emergency Management

Hazardous Materials Response Plan

Emergency Support Function 10

October 2010

2501 South 35th Ste D
Tacoma, WA 98409-7405
(253) 798-6595

Promulgation Document

As the Chairperson of the Tacoma-Pierce County Local Emergency Planning Committee and the Director of Emergency Management, I promulgate this Pierce County Hazardous Materials Response Plan (Emergency Support Function 10). The purpose of this plan is to provide a framework for cooperation between the private sector and government in an effort to mitigate the results of an accidental release of extremely hazardous materials. It is intended to meet the requirements of the Superfund Amendments and Reauthorization Act of 1986. This plan will be part of the overall comprehensive emergency management plan of Pierce County rather than constituting a separate program.

_____

Steven C. Bailey
Director, Pierce County Department of Emergency Management
Chairperson, Tacoma-Pierce County Local Emergency Planning Committee

Record of Revisions

Revision Number	Nature of Change	Date of Change
1. 1	**Update of CEMP Annex O on Radiological and Technological Protection**	**January 1992**
2. 2	**Change to ESF format**	**June 1998**
3. 3	**Total rewrite as a stand-alone plan**	**October 2003**
4. 4	**Reformat and rewrite sections**	**October 2004**
5. 5	**Minor rewrite**	**December 2004**
6. 6	**Minor changes**	**June 2005**
7. 7	**Moderate rewrite**	**June 2006**
8. 8	**Reformat and moderate rewrite**	**June 2009**
9. 9	**Revise and Update**	**September 2010**
10.		
11.		
12.		
13.		
14.		
15.		

All revisions to the Pierce County Hazardous Materials Response Plan – Emergency Support Function (ESF) 10 will originate from the Local Emergency Planning Committee. Before any revisions are finalized, the chairperson will approve the revisions recommended by the LEPC or its subcommittee.

Table of Contents

PROMULGATION DOCUMENT **2**
RECORD OF REVISIONS **3**
TABLE OF CONTENTS **4**
INTRODUCTION **6**
A. PURPOSE 6
B. SCOPE 6
POLICIES **6**
LEGAL AUTHORITIES: 7
SITUATION **7**
A. EMERGENCY/DISASTER HAZARDS AND CONDITIONS 7
B. PLANNING ASSUMPTIONS 7
CONCEPT OF OPERATIONS **8**
A. GENERAL 8
B. ORGANIZATION 9
C. PROCEDURES 10
D. RESPONSIBILITIES/MITIGATION/PREPAREDNESS/RESPONSE ACTIVITIES 10
F. RECOVERY ACTIVITIES 24
RESOURCE REQUIREMENTS **24**
A. COMMUNICATIONS 24
B. ALERTS, WARNINGS AND EMERGENCY PUBLIC NOTIFICATION 24
C. SAMPLE EVACUATION PUBLIC WARNING MESSAGE 27
REFERENCES **28**
A. CODE OF FEDERAL REGULATIONS (CFR) 28
B. UNITED STATES CODE 28
C. REVISED CODE OF WASHINGTON (RCW) 28
D. WASHINGTON ADMINISTRATIVE CODE (WAC) 29
E. OTHER 29
TERMS AND DEFINITIONS **30**
APPENDICES **32**
APPENDIX 1 - HAZARDOUS MATERIALS WORKSHEETS 33
APPENDIX 2. -CONTACT PHONE NUMBERS 37
APPENDIX 3 - TITLE III, EPCRA: A SHORT SUMMARY 38
APPENDIX 4. –HAZARDOUS MATERIALS RELEASES IN PIERCE COUNTY 39
APPENDIX 5– TIER II FACILITIES 40
APPENDIX 6. - DUTY OFFICER SOP #12 – HAZARDOUS MATERIALS/OIL SPILLS 55
APPENDIX 7. - HAZARD INCIDENT COMMAND UNITS/EQUIPMENT/CONTACTS 58
APPENDIX 8. - EVACUATION PLANS -FACILITIES WITH SIGNIFICANT QUANTITIES OF HAZARDOUS MATERIALS* 59
APPENDIX 9. - HAZARDOUS MATERIALS TRAINING STATEWIDE 60
APPENDIX 10. METHODS/SCHEDULES FOR EXERCISING HAZMAT 2010-2011 65
APPENDIX 11. HAZMAT INCIDENT COMMAND DESIGNATION 66

Emergency Support Function 10
Hazardous Materials

Coordination of ESF 10 Hazardous Materials falls to the Local Emergency Planning Committee (LEPC) per SARA Title III, "The Emergency Planning and Community Right-To-Know Act of 1986". The Pierce County Department of Emergency Management provides support to the LEPC in the coordination of ESF 10.

Joint Primary Agencies

- Tacoma Fire Department, Boeing – Fredrickson Fire Department, Joint Base Lewis-McChord Fire and Emergency Services Hazardous Materials Team (HAZMAT 105), and Pierce County Hazardous Incident Team (Central Pierce, Graham Fire and Rescue, East Pierce, Lakewood Fire Dept)
- Pierce County Fire Districts and Municipal Fire Departments
- Washington State Patrol
- Washington State Department of Ecology
- Tacoma-Pierce County Health Department
- Pierce County Department of Emergency Management
- United States Coast Guard
- United States Environmental Protection Agency

Support Agencies

- Tacoma Department of Emergency Management
- City of Puyallup Emergency Management
- Other county fire agencies through mutual aid agreements
- Fire Comm/Law Enforcement Support Agency (LESA)/Tacoma Fire Dispatch
- Pierce County Local Emergency Planning Committee
- County and City Public Works and Roads Departments
- Pierce County Sheriff's Department/Tacoma Police Department/Municipal Police Departments
- Fire-based and private emergency medical services
- American Red Cross, Mount Rainier Chapter
- Washington State Department of Ecology
- Washington State Department of Labor and Industries
- Washington State Department of Natural Resources
- Washington State Department of Health
- Washington State Military Department
    - Emergency Management Division (EMD)
    - 10th Civil Support Team
- Washington State Department of Transportation
- Pierce County Facilities Management
- Responsible Party (owner or shipper)
- Department of Homeland Security Infrastructure Protection
- FBI HazMat Response Unit (Seattle)

I. INTRODUCTION

A. Purpose

1. To insure a coordinated response to a hazardous materials release.

2. To minimize the effects of a hazardous materials release on people and the environment.

3. To provide guidance for establishing and maintaining information available to the public under SARA Title III, "The Emergency Planning and Community Right-To-Know Act of 1986" hereafter referred to as EPCRA. (See Appendix on EPCRA.)

4. This plan shall be used in conjunction with the Comprehensive Emergency Management Plans of Pierce County and the cities and towns within it. In addition, it is to act in concordance with the Washington State CEMP and all relevant Federal plans including the National Response Framework.

B. Scope

1. This ESF describes the policies, situation, planning assumptions, concept of operations and the responsibilities of a hazardous materials response in Pierce County.

2. Agencies responding to hazardous materials releases will have their own procedures. This ESF does not supersede those procedures; instead it is designed to coordinate the efforts of the various agencies responding to the same incident.

3. This ESF provides a general overview of drug lab operations and should not be considered as a procedural manual.

II. POLICIES

Federal and state regulations require that local jurisdictions form Local Emergency Planning Committees (LEPCs). It is the responsibility of each LEPC to develop a hazardous materials response plan (HMRP). Planning may include coordination with outside agencies, recognition procedures, safe distances, places of refuge, site security, control procedures, evacuation routes and procedures, and a list of required personal protective equipment. See the REFERENCES section (pp. 30-31) for associated regulations.

For incidents that exceed the county's ability to effectively respond, the Pierce County Executive will process a local proclamation of emergency under Chapter 38.52 RCW. The proclamation allows for several provisions, one being the improvement of statutory immunity from claims for negligence arising from the emergency response.

Legal Authorities:

1. SARA Title III (Public Law 99-499)
2. Chapter 70.136 RCW Hazardous Materials Incidents
3. Chapter 118.40 WAC
4. OSHA 1910.120
5. NFPA 1500, 1081, 1982, 472, 473
6. Chapter38.52 RCW: Emergency Management
7. 42 USC 116
8. Title 70 RCW: Public health and safety/Title 246 WAC Health, Department
9. Chapter 246-205 WAC: Decontamination of illegal drug manufacturing or storage sites.
10. Chapter 64.44 RCW, Contaminated properties
11. Chapter 70.105 RCW Dispositions Hazardous Waste Management
12. Chapter 296-824 WAC: Emergency Response

III. SITUATION

A. Emergency/Disaster Hazards and Conditions

1. Hazardous materials or oil spill incidents can occur anywhere at any time as identified in the Pierce County Hazard Identification and Risk Assessment (published separately).

2. The emergency response operations of a hazardous materials incident may require multi-disciplinary response. Respondents may include fire services, law enforcement, environmental containment and cleanup specialists, fish and wildlife experts, emergency medical services, environmental health, and other agencies. Upon initial assessment, some incidents may not have obvious impacts on life, property or the environment. However, they may have subtle long-term consequences for human health and the environment.

3. Oil spills and hazardous materials incidents have some different characteristics:

   - The major threat presented by oil spills is damage to the environment. Oil spills can occur on water or on land.

   - The major threat presented by hazardous materials incidents is to public health and safety, as well as damage to the environment. Every incident will be different depending on the chemical or the waste involved the size of the release, location of the spill, and other factors such as season and time of day.

B. Planning Assumptions

1. A hazardous materials release or spill may develop slowly, or occur suddenly without warning.

2. Actual or threatened releases of hazardous materials, oil spills, or other releases often require immediate response by a number of agencies.
3. Properly trained and equipped local emergency responders can handle most hazardous material incidents.
4. Due to limited local resources, Pierce County and local responders have a limited capability for response to multiple incident events.
5. Implementing prevention programs can reduce the number and severity of hazardous materials incidents.
6. Coordination of responding agencies is critical to the successful recapture of spilled materials and subsequent cleanup.
7. The National Incident Management System (NIMS) will be used in all Pierce County hazardous materials (HAZMAT) incidents from start to finish, in accordance with federal, state and local laws.
8. When a hazardous materials release occurs in the City of Tacoma, the Tacoma Department of Emergency Management (DEM)/Emergency Operations Center (EOC) is the dedicated agency to support the field operations. When a hazardous materials release occurs in unincorporated Pierce County, the Pierce County Department of Emergency Management (DEM)/Emergency Operations Center (EOC) is the dedicated agency to support field operations. With spills occurring in other cities and towns within the County, the County may act as the lead agency to support field operations upon request from the local jurisdiction.

IV. CONCEPT OF OPERATIONS

A. General

- 1. Hazardous materials response operations shall be conducted using the National Incident Management System (NIMS) in accordance with state and federal laws and will be in concert with the National Response Framework (NRF).

2. In the event of a hazardous materials incident, the appropriate 9-1-1 dispatch center shall be the first to be notified. A hazardous materials incident includes but is not limited to the normally following conditions:
    - Any release of a hazardous material which poses or has the potential to pose a threat to public health, safety or the environment.
    - Any condition that has the potential to become a release that will pose a threat to public health, safety or the environment.
3. Depending on the nature of the incident, 9-1-1 dispatch will notify the appropriate fire service and Pierce County Emergency Management and any other agency as necessary listed on the hazardous materials reporting sheet dispatch copy.
4. Medical facilities within Pierce County are limited in their capability to receive contaminated patients.

5. When the Tacoma and/or Pierce County Emergency Operations Center (EOC) is/are activated, the designated fire resource coordinator is responsible for coordinating all hazardous materials requests if requested by the on-scene Incident Commander (see Pierce County Fire Service Emergency Resource Plan – published separately). In his/her absence, the EOC Manager shall assume this responsibility.

6. The Washington State Department of Ecology (ECOLOGY), Washington State Department of Natural Resources (DNR), Washington State Department of Health (DOH), and the Tacoma – Pierce County Health Department (TPCHD) are assigned to assist water and sewer utilities in the investigation and mitigation of impacts from the effects of a hazardous materials incident.

7. The lead DEM notifies Washington State Military Department Emergency Management Division (WEMD) who then contacts state ECOLOGY and / or DNR. The lead DEM notifies TPCHD.

8. The lead DEM will contact the Puyallup Tribe directly if the hazardous materials incident is located on, or has the potential to affect, the property or natural resources of the Puyallup Tribe.

9. Local HAZMAT teams are trained and equipped with the proper resources to handle hazardous materials incidents. If additional resources are required, they can be requested through mutual aid agreements or from the Pierce County fire resource coordinator. Each HAZMAT team maintains a list of hazardous materials response equipment and trained personnel available from their respective agencies. Pierce County Fire-Based Hazardous Materials Response Teams are:

    - Tacoma Fire Department HM44
    - Pierce County Hazardous Incident Team (CPFR, Graham Fire and Rescue, EPFR, Lakewood Fire, and Gig Harbor Fire)
    - Boeing – Fredrickson Fire Department
    - Joint Base Lewis-McChord Fire and Emergency Services

B. Organization

1. Primary Agencies

    - Tacoma Fire Department HM44, Pierce County Hazardous Incident Team (Central Pierce, Graham, East Pierce, Lakewood, and Gig Harbor Fire), Boeing – Fredrickson Fire Department/Joint Base Lewis-McChord Fire and Emergency Services Hazardous Materials Teams
    - Washington State Patrol (WSP)
    - Washington State Department of Ecology
    - Pierce County Department of Emergency Management
    - U.S. Coast Guard
    - Pierce County Fire Districts and Municipal Fire Departments
    - United States Environmental Protection Agency
    - Tacoma-Pierce County Health Department

2. Support Agencies (Local)

   - Tacoma Department of Emergency Management
   - Pierce County Fire and Emergency Medical Services Departments/Districts
   - Other fire agencies through mutual aid agreements
   - Fire Comm/Law Enforcement Support Agency (LESA)/Tacoma Fire Dispatch
   - Pierce County Local Emergency Planning Committee
   - County and City Public Works and Roads Departments
   - Pierce County Sheriff's Department/Tacoma Police Department/Other local law enforcement agencies
   - Private emergency medical services
   - American Red Cross, Mount Rainier Chapter
   - Pierce County Facilities Management

3. Support Agencies (State)

   - Washington State Department of Labor and Industries
   - Washington State Department of Natural Resources
   - Washington State Department of Health
   - Washington State Military Department Emergency Management Division
   - Washington State Department of Transportation

C. Procedures

All primary and support agencies will respond in accordance with federal, state, local and agency plans and regulations and will function under the NIMS.

D. Responsibilities/Mitigation/Preparedness/Response Activities

Primary Agencies

Primary agencies have lead responsibilities in the mitigation, preparedness, response, and recovery phases of emergency management with a focus on life safety, property protection and environmental preservation. Those responsibilities include but are limited to ensuring a state of readiness in the form of: skilled personnel, appropriate and maintained equipment, rapid response procedures, maintaining a training program, resource coordination, identifying short and long-term recovery priorities, and coordinating the hazardous materials program. These responsibilities may include, initial response either to the incident, command post and / or lead emergency operations center. Primary agencies are expected to participate in the unified command of incident management.

1. Fire Agencies

   Responsibilities

   - All First Responders(responsibilities include but are not limited to):

- Provide a limited initial response to hazardous materials incidents based on responder training and expertise.
- Notify the appropriate dispatch agency when the magnitude of the incident exceeds the expertise of the initial responder(s).
- Isolate the area according to the DOT Guide Book or other appropriate resource information.
- Identify hazardous material(s) without compromising safety (placard number, shipping documents, driver comments, etc.).
- Provide for the safety of the public by whatever actions are necessary (evacuation, shelter-in-place).
- Support Pierce County HAZMAT teams with personnel, equipment, and other assistance as required.

Fire Departments

- Act as incident commander (except on state, interstate highways or in areas where the Washington State Patrol has been designated as incident commander).
- Effectively deploy all necessary, and available, fire jurisdiction equipment and manpower.
- Deploy mutual aid as requested.
- Provide coordination and control of manpower and equipment through the communications center and at a command post near the scene.
- Provide manpower and equipment for decontamination and emergency medical aid at the scene of a hazardous material incident.
- Provide manpower and equipment for control and containment of a hazardous material release or fire involving hazardous materials whenever possible.
- Provide emergency medical care and transportation for those injured in a hazardous material incident.
- Other operations which may be appropriate in accordance with training.

Pierce County Fire-based Hazardous Materials Response Teams

- Respond in support of first response agencies when requested.
- Assess actions taken by first-in units.
- Provide a technical level response to hazardous materials incidents.
- Provide incident management expertise and equipment.
- Evaluate/Establish exclusionary zones.
- Perform substance identification testing via HazCat testing, Hazard ID analysis and/or radiological testing.
- Determine the proper level of personal protective equipment, emergency medical treatment, decontamination techniques, and additional authorities requiring notification.
- Perform duties as directed by incident command.
- Coordinate with representatives from the Tacoma and/or Pierce County Department(s) of Emergency Management.

Mitigation Activities

Pierce County Fire Departments/Districts, the jurisdictional fire marshal, and hazardous materials response teams conduct building and facility fire safety inspections and prepare pre-fire plans. Fire department personnel make recommendations as needed. However, fire districts do not have the authority to enforce codes. The Pierce County Fire Marshal is the fire code enforcer for unincorporated Pierce County. The jurisdictional fire marshal is the fire code enforcer for his or her respective city or town.

Preparedness Activities

- Develop, test and maintain SOPs for responding to hazardous materials incidents in coordination with this plan.
- Train personnel consistent with their emergency response requirements to identify potential hazardous materials incidents through the use of the North American Emergency Response Guidebook, and additional and advanced training offered through the Washington State Patrol, fire service, and other vendors.
- Train all personnel to principles identified in NIMS.
- Train EMS personnel in proper initial medical care for patients exposed to hazardous materials.

Response Activities

- Identify the type(s) of materials involved, and the scope of the incident as quickly as possible. Information can be gathered from the reporting party, 9-1-1 dispatch, the responsible party, placards, and references such as the North American Response Guidebook, Chemtrec, and CAMEO.
- The first emergency responder on-scene will report and size-up the incident, request assistance as needed, and begin establishing incident command. The size-up and other information gathered will determine the establishment of exclusion and evacuation zones, as well as what emergency medical aid may be needed for anyone exposed to the hazard.
- First emergency responder will identify a safe route of entry and an area for staging.
- First emergency responder will initiate notifications as appropriate to size and nature of the incident.
- Identify and contact (if possible) the responsible party for further information, assistance, and cleanup.

2. Washington State Patrol (WSP)

Responsibilities

- All First Responders(responsibilities include but are not limited to):
- Provide a limited initial response to hazardous materials incidents based on responder training and expertise.
- Notify the appropriate dispatch agency when the magnitude of the incident exceeds the expertise of the initial responder(s).
- Isolate the area according to the DOT Guide Book or other appropriate resource information.

- Identify hazardous material(s) without compromising safety (placard number, shipping documents, driver comments, etc.).
- Provide for the safety of the public by whatever actions are necessary (evacuation, shelter-in-place).
- Support Pierce County HAZMAT teams with personnel, equipment, and other assistance as required.
-
- WSP Specific

- The Washington State Patrol (WSP) is the designated state incident command agency for HAZMAT incidents on interstate and state highways and in areas specifically designated by the local political entity.
- The WSP is the state incident commander (IC), overseeing HAZMAT response operations. The WSP will establish a unified command system with fire departments, emergency medical services, and other state and federal agencies.
-

Mitigation Activities

- Conduct safety inspections on vehicles transporting hazardous materials and waste, and enforce state and federal transportation regulations, per Chapter 46.48 RCW.
- Provide technical assistance to shippers and carriers and also enforce rules and regulations pertaining to the transportation of hazardous materials.
- Investigate all transportation accidents involving hazardous materials, on state highways, or when requested by the incident commander, to determine the cause.

Preparedness Activities

- Develop internal guidelines and emergency procedures for HAZMAT response.
- Develop and conduct hazardous materials training for all levels of local and state responders.
- Participate on the state Emergency Management Council and State Emergency Response Committee, a sub-committee of the Emergency Management Council, to address hazardous materials issues.

Response Activities

- WSP develops internal guidelines and procedures for HAZMAT response.
- Assume the role of incident commander on highways and other specified jurisdictions, unless local MOUs provide for local assumption of incident command.
- Assist local jurisdictions when requested.
- When acting in the role of incident command, initiate proper notification procedures as discussed above.
- Coordinate and maintain liaison with other state agencies involved with an incident, and assist in receiving and disseminating warning information.
- Provide communications and technical support to the incident, when requested.

- Provide, when requested and practical, aerial reconnaissance of the impacted area.
- Coordinate with fire responders when emergency mobilization is authorized for a hazardous materials incident.

3. Washington State Department of Ecology (Ecology)

Responsibilities

- Provide 24-hour emergency response to reported spill incidents.
- Represent state laws and interests in oil and hazardous substances incidents by acting as the State On-Scene Coordinator (SOSC) in the Unified Command System.
- Assume responsibility for incident cleanup (in some cases in conjunction with the U.S. Coast Guard or U.S. EPA) if the responsible party is unavailable, unresponsive or unidentified.
- At the request of law enforcement, Ecology removes the chemical precursors and wastes associated with clandestine drug lab manufacturing.

Preparedness Activities

- Provide 24-hour response capability.
- Establish and maintain emergency response contracts with environmental contractors.
- Participate in local HAZMAT training and exercise events.
- Provide advice on response equipment and training needs.
- Conduct on-site inspections and emergency response drills for commercial vessels and oil handling facilities.
-

Response Activities

- Act as the pre-designated lead state agency for oil and hazardous materials incidents impacting marine and fresh waters, and for inland spills where the WSP or local incident command has curtailed emergency response operations.
- Act within the Unified Command System as the State On-Scene Coordinator (SOSC) for oil and hazardous materials incidents.
- Coordinate response efforts with other local, state, federal and tribal organizations.
- Determine the release source, cause and responsible party.
- Sample and conduct field identification tests of unknown substances.
- Provide response advice, maritime expertise and resource listings to responsible parties and responding agencies.
- Coordinate Natural Resource Damage Assessment (NRDA) activities for the state.
- Set cleanup standards for the incident in accordance with federal and state law, and ensure that source control, containment, cleanup and disposal are accomplished.
- Participate in a Joint Information Center (JIC) or coordinate public information activities with responding agencies.
- Initiate enforcement actions as appropriate.

4. Pierce County Department of Emergency Management (in conjunction with the LEPC)

Responsibilities

- Pierce County Code Chapter 2.118 identifies Pierce County Department of Emergency Management as the hazardous materials incident coordinating agency for Pierce County.
- Function as lead agency for the Tacoma–Pierce County LEPC.
- Designate a coordinator to work with the Local Emergency Planning Committee.
- Provide public education materials to the public and businesses on hazardous materials and preparedness.
- Provide public information on response activities and public safety as necessary during major incidents.
- Provide duty officer support for the logistical requirements of hazardous materials emergency response. Duty officer notification will be through 253-798-7470.
- The duty officer, or other Emergency Management staff will as necessary:
    - Provide notification of agencies and organizations as requested by either the facility representative or first responders.
    - Activate the County EOC when indicated.
    - Provide on-scene liaison when requested by incident/unified command.
    - Script and transmit emergency alert system (EAS) messages when requested and appropriate.
    - Attempt other methods of notification to the public either for informational purposes, shelter-in-place or for evacuation as dictated by the situation.

Tacoma Department of Emergency Management

Responsibilities

- Notify local, state, and federal authorities as requested by the incident commander or as appropriate to the situation.
- Implement the currently approved operations plan as applicable.
- Activate the City EOC when necessary.
- Support the incident commander on scene as requested.
- Provide resource coordination as requested.

Mitigation Activities

- Develop and maintain an all hazard mitigation plan that includes measures for mitigating hazardous materials incidents.

Preparedness Activities

- Maintain and coordinate the updating of this plan, and develop interagency agreements for response to hazardous materials incidents.

- Maintain current emergency/contingency plans and a state of readiness to ensure rapid EOC activation with adequate and appropriately trained staff.
- Coordinate training of non-uniformed personnel for HAZMAT response and recovery support functions.
- Sponsor exercises, drills, and plans for evacuation and shelter.
- Coordinate with other cities and counties regarding hazards in their jurisdictions that could impact Pierce County
- Develop lists of specialized resources available.
- Coordinate and host local LEPC meetings (responsibility of the LEPC chairperson).
- In conjunction with the LEPC, conduct outreach to review organizations' plans and preparedness for HAZMAT incidents.

Response Activities

- Support first response agencies and incident command with information and resource coordination as required. Some of this will be through Pierce County's WEB Portal.
- Assist with federal, state, and other notifications.
- If necessary, or requested, activate the Emergency Operations Center in support of the field response. When activated, the EOC will use WebEOC to facilitate information exchange with the State and other jurisdictions.
- Provide public information related to areas to avoid, alternate routes of travel, shelter-in-place or evacuation, or other information as required.
- Assist incident command in determining need for evacuation or shelter-in-place.

5. United States Coast Guard

Responsibilities

- Operate the National Response Center (NRC) that receives reports of incidents and serves as a focal point for notification of government authorities when a pollution incident occurs.
- Represent federal laws and interests in oil and hazardous substance incidents involving the coastal zone by acting as the Federal On-Scene Coordinator (FOSC) in the Unified Command System.
- Assume responsibility for incident cleanup in the coastal zone (in conjunction with state and local agencies) if the responsible party is unavailable, unresponsive or unidentified.

Preparedness Activities

- Maintain and manage emergency response teams for response to discharges of oil and hazardous substances in the coastal zone.
- Oversee standards for maritime vessels shipping hazardous materials.
- Enforce regulations pertaining to all hazardous materials shipments on water.
- Participate on the Regional Response Team (RRT).

Response Activities

- Act as the pre-designated lead federal agency for oil and hazardous materials incidents impacting the coastal zone.
- Act within the Unified Command System as the Federal On-Scene Coordinator (FOSC) for oil and hazardous materials incidents impacting the coastal zone.
- Coordinate response efforts with other federal and tribal organizations.
- Provide response advice and guidance to responsible parties and responding agencies.
- Activate and deploy the Pacific Strike Team consisting of specialized personnel and response equipment.
- Participate in a Joint Information Center (JIC) or coordinate public information activities with responding agencies.
- Initiate enforcement actions as appropriate.

6. United States Environmental Protection Agency

Responsibilities

- Represent federal laws and interests for inland oil and hazardous substance incidents by acting as the Federal On-Scene Coordinator (FOSC) in the Unified Command System.
- Assume responsibility for inland incident cleanup (in conjunction with state and local agencies) if the responsible party is unavailable, unresponsive or unidentified.

Preparedness Activities

- Maintain and manage emergency response teams and contractors for response to discharges of oil and hazardous substances in inland areas.
- Participate on the Regional Response Team (RRT).

Response Activities

- Act as the pre-designated lead federal agency for inland oil and hazardous materials incidents.
- Act within the Unified Command System as the Federal On-Scene Coordinator (FOSC) for inland oil and hazardous materials incidents.
- Coordinate response efforts with other federal and tribal organizations.
- Provide response advice and guidance to responsible parties and responding agencies.
- Activate and deploy EPA's technical assistance contractors consisting of specialized personnel and response equipment.
- Participate in a Joint Information Center (JIC) or coordinate public information activities with responding agencies.
- Initiate enforcement actions as appropriate.

7. Tacoma-Pierce County Health Department (TPCHD)

Responsibilities

- Take such measures as the Health Officer deems necessary to promote and protect the public's health.

- In conjunction with Ecology and DOH, assist water and sewer utilities in the investigation and mitigation of impacts from the effects of a hazardous materials incident.
- Direct the closure of contaminated sites, as necessary
- Provide information to the public on the health effects of, and how to avoid contamination from a hazardous materials release as needed.
- Make a final determination on when contamination no longer poses a public health risk.

Preparedness Activities

- Develop procedures and criteria to close an incident site for health and safety reasons.
- In conjunction with the Ecology and DOH, develop procedures to help investigate and mitigate possible threats to public health as the result of impacts to water supplies and sewer systems.
- Assess potential impacts to public health and develop and provide recommendations to the Pierce County Health Officer.

Response Activities

- Assess the public health implications of a hazardous materials incident and take appropriate actions.
- In conjunction with Ecology and DOH assist water and sewer utilities in the investigation and mitigation of impacts from the effects of a hazardous materials incident.
- Initiate actions to close contaminated sites when indicated.
- Initiate actions to reopen sites that were contaminated when properly mitigated.

Support Agencies (Local)

The role of a support agency is to support the hazardous materials program which includes the four phases of emergency management.

8. Fire Comm/Law Enforcement Support Agency (LESA)/Tacoma Fire Dispatch

Responsibilities

- Maintain current run cards for fire dispatch.
- Dispatch the appropriate HAZMAT team.
- Notify Pierce County DEM duty officer.
- Script and transmit emergency alert system (EAS) messages when requested and appropriate (Law Enforcement Support Agency).

Preparedness Activities

- Maintain emergency contingency plans and resources to ensure continuation of service.

9. Pierce County Local Emergency Planning Committee (LEPC)

Responsibilities

- The Pierce County LEPC is responsible for the development of this plan and the distribution of emergency response plans to the appropriate agencies and the general public.
- Will set up and coordinate an annual hazardous materials exercise.
- Will act as the repository of the annual Tier II submittals.
- Will compile a list of companies with reportable quantities of hazardous materials.
- Will as time and funding allow identify transportation routes

Mitigation Activities

- Maintain and review issues relating to hazardous material vulnerability analysis. Records pertaining to EPCRA and individual organization risk management plans are maintained and accessible to the staff and the public.
- Coordinate with county and city planning agencies, as the location of hazardous materials fixed sites and transportation routes could have a significant impact on life and property, as well as future construction of roads and buildings.

10. Tier II Businesses

Responsibilities

- Designate a Facility Emergency Coordinator to act as the contact for facility and hazardous materials information.
- Submit Tier II and other information as required, by federal, state or local law.

Preparedness Activities

- Prepare hazardous materials emergency plans and provide copies to the Pierce County LEPC when requested.
- Train and equip personnel to implement the plans.
- Coordinate the plans with the local fire jurisdictions.

11. City and County Public Works and Roads Departments

Responsibilities

- All First Responders(responsibilities include but are not limited to):
- Provide a limited initial response to hazardous materials incidents based on responder training and expertise.
- Notify the appropriate dispatch agency when the magnitude of the incident exceeds the expertise of the initial responder(s).
- Isolate the area according to the DOT Guide Book or other appropriate resource information.
- Identify hazardous material(s) without compromising safety (placard number, shipping documents, driver comments, etc.).
- Provide for the safety of the public by whatever actions are necessary (evacuation, shelter-in-place).

- Support Pierce County HAZMAT teams with personnel, equipment, and other assistance as required.

Public Works specifically
- Provide equipment and manpower to assist in the containment of a hazardous material release.
- Provide equipment and manpower to repair essential city and county facilities damaged as a result of a hazardous material release.
- Provide assistance to law enforcement with regard to traffic control on evacuation routes and at the incident scene.
- Provide protection / mitigation measures to ensure safety and integrity of drinking water and waste water systems.

Preparedness Activities
- Equip and train personnel consistent with their emergency response requirements.
- Provide current 24-hour call rosters to respective emergency management departments and a state of readiness to provide for a rapid deployment of resources when requested.

12. Pierce County Sheriff's Department/Tacoma Police Department/Other local law enforcement

Responsibilities
- All First Responders(responsibilities include but are not limited to):
- Provide a limited initial response to hazardous materials incidents based on responder training and expertise.
- Notify the appropriate dispatch agency when the magnitude of the incident exceeds the expertise of the initial responder(s).
- Isolate the area according to the DOT Guide Book or other appropriate resource information.
- Identify hazardous material(s) without compromising safety (placard number, shipping documents, driver comments, etc.).
- Provide for the safety of the public by whatever actions are necessary (evacuation, shelter-in-place).
- Support Pierce County HAZMAT teams with personnel, equipment, and other assistance as required.

Law enforcement
- Lead agency for all drug lab operations.
- Provide coordination of resources during a hazardous materials emergency.
- Provide for traffic control and maintenance of evacuation during a hazardous materials emergency.
- Insure that law enforcement personnel are familiar with procedures for the identification and movement of essential personnel during a hazardous material emergency.
- Perform evacuation within parameters established for specific incident action plans.
- Other operations which may be appropriate in accordance with training.

- Assist where necessary in the rapid dissemination of warning and evacuation information to the public.

Preparedness Activities
- Develop, test, maintain, and update SOPs for response to hazardous materials incidents including drug lab response in coordination with this plan.
- Equip and train personnel consistent with emergency response requirements.
- Train personnel in the NIMS.
- Maintain lists of available resources.

Response Activities
- Coordinate with and support incident command.
- Act as the lead agency for drug lab operations.

13. Fire-based and Private Emergency Medical Services

Responsibilities
- Provide advanced and basic life support services to hazardous materials exposure victims when requested.

14. American Red Cross, Mount Rainier Chapter

Responsibilities

- Provide temporary shelter, feeding, welfare inquiries, and information services.

15. Pierce County Department of Facilities Management

Responsibilities
- Provides expertise regarding acquisition, disposition, and remediation of polluted property of the County.

Support Agencies (State)

16. Washington State Department of Labor and Industries

Mitigation Activities
- Inspect facilities where hazardous materials are generated, used, stored, disposed of or destroyed.

17. Washington State Department of Natural Resources

Mitigation Activities

- Manage state-owned aquatic lands and associated habitat to reduce or eliminate the effects of hazardous materials.

18. Washington State Emergency Management Division

Responsibilities
- Provide 24-hour duty officer staffing in support and coordination of field, local, state, and federal operations, as requested.
- Make all indicated notifications and contacts.

Preparedness Activities
- Coordinate and maintain the Washington State Comprehensive Emergency Management Plan (CEMP).
- Maintain 24-hour notification capability.
- Provide communications links to state agencies and local jurisdictions to the state EOC.
- Coordinate and update notification lists of local, state and federal resources.
- Coordinate and participate in local training and exercises.

18. Washington State Department of Transportation

Preparedness Activities
- Develop procedures for non-hazardous materials clean-up activities on state and interstate highways.
- Assist first responders by providing supporting information on shippers and handlers of hazardous materials statewide. Provide personnel and equipment to support response operations on highways and lands under state and federal jurisdiction.

19. Washington State Department of Health

Preparedness Activities
- Providing technical assistance and support regarding sample collection, laboratory analysis, hazard identification, and assessment of public health impact of chemical incidents

20. Other Supporting Agencies

Preparedness Activities
- Maintain and share current internal plans, standard operating procedures, and checklists detailing status of resources with other supporting agencies to this plan.

21. All Support Agencies

Preparedness Activities
- Maintain current mutual aid agreements as indicated.

Response Activities
- Notify 9-1-1, and other agencies as required or necessary, when a hazardous materials incident occurs.
- Using NIMS, implement emergency plans in coordination with the local fire jurisdictions.

- Shall develop response plans for incidents occurring at their facilities. These response plans will include evacuation routes and methods for those both on site and in the immediate proximity.

21. Responsible Party

Responsibilities

- The responsible party (owner or shipper) has ultimate accountability for ensuring effective and expeditious abatement of a release or threatened release of oil or hazardous materials (RCW 4.24.314 Person causing hazardous material incident—Responsibility for incident cleanup--Liability) to include cleanup costs and reimbursement for the local responders
- Will notify all agencies as required under Sections 302, 304, 311, 312, and 313of EPCRA and any enabling legislation at the state level.
-

E. Drug Lab Response Operations

This section provides an overview for responses directly relating to drug lab cleanup.

Agency responders will work with law enforcement personnel when requested to dispose of drug related lab chemicals from the sites of illicit drug labs and lab dumps. Removing these chemicals and processing them for proper disposal reduces the immediate threat to public health and safety posed by the illegal labs.

State and federal response agencies act in a supporting role to law enforcement and public health agencies assisting in drug lab response, cleanup, and chemical disposal under the following authorities and laws.

Federal statutes for removal of drug lab wastes are found in:

- Comprehensive Environmental Response
- Compensation and Liability Act, as amended by the Superfund Amendments and Reauthorization Act

WA Department of Ecology's responsibilities for drug lab response are found in:

- RCW 69.50.511, Cleanup of hazardous substances at illegal drug manufacturing facility--Rules
- RCW 70.105D, Hazardous waste cleanup – model toxics control act
- RCW 90.48, Water pollution control

Tacoma-Pierce County Health Department Authority to lead cleanup activities at an illegal drug lab comes from:

- RCW 64.44, Contaminated properties
- WAC 246-205, Decontamination of illegal manufacturing or storage sites

"Drug lab related chemicals" include all controlled substances, immediate precursors and hazardous chemicals used in the illicit drug-making process. The definitions for these terms are listed below:

- Controlled substance: a drug, substance, or immediate precursor.

- Immediate precursor: a substance or principal compound that is primarily used in the manufacturing process of a controlled substance (RCW 69.43.010).
- Hazardous chemicals: hazardous substances used in the manufacturing of illegal drugs

F. Recovery Activities

1. The responsible party is responsible for any cleanup. If the responsible party is unable to pay for cleanup or cannot be identified, funding may be available from the State Ecology or the EPA. Ecology, the Coast Guard, or EPA may hire a cleanup contractor.
2. If no responsible party can be determined, EPA may provide funding through the local Government Reimbursement Program (800-431-9209) for up to $25,000 in extraordinary expenses for qualifying incidents.
3. General recovery activities include documentation of the incident and any actions taken as well as participation in post-event critiques. It is the responsibility of responding agencies to follow recovery procedures specific to their agencies.

Resource Requirements

A. Communications

The incident commander shall establish the mode(s) of communications to be used between the command post and responding agencies. Communications may include (1) use of PCWarn and/or Pierce County Alert System (utilizes telephones, cellular telephones, e-mails, faxes); (2) public safety and tactical channels, (3) On-Scene Command and Coordination Radio (OSCCR), (4) amateur radio systems, (5) Red Network (REDNET), and/or (6) runners.

It is the responsibility of the responding agency communications personnel to organize, establish and maintain a communications capability sufficient to meet the emergency services requirements during a hazardous materials incident.

In order to avoid possible fire / explosion hazards, all communications equipment used within the hazardous area should be intrinsically safe.

B. Alerts, Warnings and Emergency Public Notification

1. Warning Systems

   With several noteworthy exceptions, there are no fixed emergency warning systems in place to alert the public within Pierce County to a dangerous hazardous materials situation.

2. Emergency Public Notification
   In place of warning systems, one of the following methods will be used to notify the public of potential danger:

- Door-to-door notification by uniformed personnel.
- National Oceanic and Atmospheric Administration (NOAA) all hazard radio operating out of Sand Point in Seattle can be accessed.
- Pierce County Alert is a computer based, telephone ring-down program in Pierce County that can notify people living or working in a defined geographic area of a release. Vulnerable populations and facilities can be warned with this system.
- Pierce County Warning & Alert Response Network (PCWARN) is a computer based program for notifying response personnel and select groups, of an incident by pager, cellular phone, or email.
- Public announcements using public address systems on radio equipped city vehicles.
- Emergency Alert System (activated by LESA, Tacoma Fire Dispatch or Pierce County DEM).
- News media releases and both press and public access to emergency information on Pierce County's main web site.

Individual authority to initiate emergency public notification shall be according to local emergency plan procedures. If not designated, any of the following individuals has the authority to initiate emergency public notification:

- Jurisdictional Public Information Officer (PIO)
- Incident Commander
- Pierce County Fire Department/District Chief or designee
- Pierce County Sheriff or Deputy
- City Police Chief
- Pierce County Health Officer
- Public Works Director (city or county)
- Executive/Mayor/City Manager
- City or County Engineer
- DEM Director or designee

The decision to initiate emergency public notification will be based on recommendations from any of the following individuals:

- The HAZMAT Team Leader
- Incident Commander
- Pierce County Fire Department/District Chief
- Pierce County Sheriff/City Police Chief
- Public Works Director or County/City Engineer
- Executive/Mayor/City Manager
- DEM Director or designee

When life-threatening materials are released, speed of response is crucial. Delay in alerting the public can lead to injury and loss of life. It is not enough to have planned for alerting the community; one department must be assigned direct responsibility of alerting the public on short notice. As such, each city and the County shall designate in their emergency operations plan specific individuals who are accessible on short notice 24-hours a day and have designated alternates to be responsible for alerting the public and conducting evacuation operations.

3. Warning Messages

The following are some recommended components of an effective public warning message:

- **Messages should be short and uncomplicated**. Limit the message to 3 short sentences, conveying 3 key messages, in 30 words or less (3-3-30 Rule).

  If detailed instructions are necessary, prepare messages in stages so that recipients can listen to and act on the messages at the same time (i.e., "Leave your house now. Instructions will be repeated on this station as you drive away from the danger area."). Also realize that most will not be writing out the message and, therefore, will not remember long messages.

- **Use common and familiar words**. Avoid ambiguous terms like "an emergency has just occurred." Confusing messages lead to panic. Develop the message so that each word and each phrase has a purpose.

- **Use strong words**. People obey warnings when they use "mild fear" terms (i.e., "You are in danger," "you must leave this area NOW," etc.).

- **Give the public the impression someone is 'in charge'.** Use the name of the executive, mayor or some other familiar person in authority. Plan the message to give assurance that someone is in control, and that there is a plan for the well-being of those affected.

- **Read important instructions.** Have the messages repeated immediately a second time and then repeated again each 5-10 minutes when appropriate.

C. Sample Evacuation Public Warning Message
(Substitute specific local information at underlining)

ATTENTION! (Lead law enforcement / Executive / Mayor / City Manager) of _____, and the _____Fire Department / District have issued the following emergency bulletin at (time) this morning / afternoon / evening: A chemical leak of _____ occurred at (time) this morning / afternoon / evening at facility name at (address). This is a highly poisonous chemical and you are in immediate danger if exposed. No leak of the chemical is occurring at this time, I repeat there is no leak at this time, but a leak is possible while workers repair the valve. You are directed to follow these emergency instructions now!

All persons within the area bounded by _____Street / Avenue / Road / etc. on the north,_____ Street / Avenue / Road / etc. on the east,_____ Street / Avenue / Road / etc. on the south and_____ Street / Avenue / road / etc. on the west are directed to evacuate immediately. Tie a white cloth or towel to the outside front door knob to indicate the premises are vacated. Police will secure the area vacated and no one will be allowed to enter.

Use_____ Street / Avenue / Road / etc. to the north and_____ Street / Avenue / Road / etc. to the east as evacuation routes. Public shelters are set up at (name and address of facility) and (name and address of facility) if you need shelter. The (public transit system) buses will provide transportation for residents of (facility name, facility name and (facility name). School children will be evacuated to (facility name) by their school buses. DO NOT go to the school to pick them up.

If you need transportation or special help, call (telephone number). DO NOT call 9-1-1 for assistance or information. Emergency workers are in the area to assist. Stay tuned to this (radio or TV) station for further instructions and for the "All Clear" to be issued.

The county and / or city Public Information Officer (PIO) and the DEM PIO shall coordinate information to be released to the public.

For evacuations, the lead EOC coordinator will provide the Executive, Mayor, or City Manager with an evacuation order for signature as soon as possible.

References

A. Code of Federal Regulations (CFR)

1. CFR Title 40 – Protection of Environment– Parts 300-399 Superfund Emergency Planning and Community Right to Know (EPCRA)
2. 29 CFR 1910.120 (q), Hazardous waste operations and emergency response, *Emergency response to hazardous substance releases.*
3. 40 CFR 300, National Contingency Plan, SARA, Title III, Local Emergency Planning and Preparedness Requirements
4. 40 CFR Part 300, National Oil and Hazardous Substances Pollution Contingency Plan
5. 40 CFR 355, Emergency Planning and Notification.
6. CFR Title 44, Emergency Management and Assistance.

B. United States Code

1. USC Title 42. Chapter 116 - Emergency Planning and Community Right–to-Know.

C. Revised Code of Washington (RCW)

1. RCW 4.24.48, Liability of members of state hazardous materials planning committee and local emergency planning committees
2. RCW 4.24.314, Person causing hazardous materials incident—Responsibility for incident cleanup--Liability
3. Chapter 49.70 RCW, Worker and Community Right-to-Know
4. RCW 70.136, Hazardous Materials Incident
5. RCW 70.136.030, Incident command agencies – Designation by political subdivisions
6. Chapter 90.48 RCW, Water Pollution
7. Chapter 90.56 RCW, Oil and hazardous substance spill prevention and response

D. Washington Administrative Code (WAC)

1. Chapter 118.040 WAC, Hazardous chemical emergency response planning and community right-to-know reporting
2. Chapter 173.180 WAC, Facility oil handling standards
3. Chapter 173.182 WAC, Oil spill contingency plan
4. Chapter 173.303 WAC, Dangerous waste regulations
5. Chapter 296-824 WAC, Emergency response

E. Other

1. Northwest Area Contingency Plan, 2008, as amended
2. Department of Ecology, Spill Response Operations Manual
3. Pierce County Hazard Identification and Vulnerability Analysis (HIRA, see Appendix 4.)
4. Pierce County Fire Service Emergency Resource Plan

Terms and Definitions

Advanced Life Support - The use of more advanced techniques than covered by Basic Life Support, and limited drugs as covered by County protocols in the field treatment and transport of cardiac arrest, and other life threatening injuries.

Basic Life Support - Emergency cardiopulmonary resuscitation, control of bleeding, treatment of shock, acidosis, and poisoning, stabilization of injuries and wounds, basic first aid, and the use of an Automatic Electronic Defibrillator (AED).

Containment – Offensive posture. Stop leaks or get materials into a container.

Decontamination – Relevant to hazardous materials operations, decontamination denotes the actions required to physically remove or chemically change the contaminants found on personnel or equipment.

Emergency operations center – A pre-designated facility established by an agency or jurisdiction to coordinate the overall agency or jurisdictional response and support to an emergency.

Hazardous material (HAZMAT) – Any material which is explosive, flammable, poisonous, corrosive, reactive, or radioactive (or any combination), and requires special care in handling because of the hazards posed to public health, safety, and/or the environment.

Incident action plan (IAP) – NIMS/ICS term for a document that contains objectives reflecting the overall incident strategy and specific tactical actions and supporting information for the next operational period. The IAP may be oral or written. When in writing, the IAP may have a number of forms as attachments (e.g., traffic plan, safety plan, communications plan, maps, etc.).

Incident command post (ICP) – NIMS/ICS term for the location at which the primary command functions are executed. The ICP may be collected with the incident base or other incident facilities.

Local Emergency Planning Committee (LEPC) - A committee that represents local governments, emergency response officials, environmental and citizen groups, industry and other interested parties in each of the 40 Emergency Planning Districts in Washington State that was established by the State Emergency Response Commission to coordinate hazardous material issues and carry out the mandate of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA).

Mitigation – Those activities designed to alleviate the effects of a major disaster or emergency or long-term activities to minimize the potentially adverse effects of future disasters in affected areas.

National Incident Management System (NIMS) - A comprehensive incident response system ordered by the Homeland Security Presidential Directive-5 (HSPD-5) that provides a consistent nationwide template to enable all government, private-sector, and nongovernmental organizations to work together during domestic incidents.

Preparedness – Those activities, programs, and systems that exist prior to an emergency that are used to support and enhance response to an emergency or disaster.

Public Address System - An electronic amplification system used as a communication system in public areas, also referred to as a PA System.

Public information officer (PIO) – An individual assigned responsibility for collecting and disseminating information related to an incident. The PIO usually coordinates all media activities associated with the incident. The lead PIO also oversees hour-to-hour JIC operations.

Recovery – These activities usually begin within days after the event and continue after the response activities cease. Recovery includes individual and public assistance programs which provide temporary housing assistance, grants and loans to eligible individuals and government entities to recover from the effects of a disaster.

Response – Activities to address the immediate and short-term effects of an emergency or disaster. Response includes immediate actions to save lives, protect property, and meet basic human needs. Based on the requirements of the situation, response assistance will be provided to an affected State under the National Response Framework using a partial activation of selected Emergency Support Functions (ESFs) or the full activation of all 15 ESFs to meet the needs of the situation.

Shelter-In Place - To seek immediate shelter and remain there during a chemical emergency, terrorist event or natural disaster rather than evacuate the area. Unless instructed to evacuate by emergency personnel, sheltering in a pre-determined safe location in your home or place of work is the preferred method of safely waiting out a hazardous materials release. In place sheltering usually lasts no more than one-to-two hours and preparations, made in advance, can ensure that the event is as comfortable as possible.

Standard operating procedure (SOP) – A set of instructions covering those features of operations that lend themselves to a definite or standardized procedure without loss of effectiveness. A SOP is applicable unless ordered otherwise.

Unified command – Under the NIMS/ICS concept of operations, unified command is a unified team effort which allows all agencies with responsibility for an incident, either geographical or functional, to manage an incident by establishing a common set of incident objectives and strategies. This unified command effort is accomplished without losing or abdicating agency authority, responsibility, or accountability.

Appendices

1. Hazardous Materials Worksheets
   - Tacoma/Pierce County Hazardous Materials Notification Worksheet – Field Copy
   - Tacoma/Pierce County Hazardous Materials Notification Worksheet – Dispatch Copy
2. Contact Phone Numbers
3. Title III, EPCRA: A Short Summary
4. Pierce County Tier-II Facilities
5. Duty Officer SOP #12 – Hazardous Materials/Oil Spills
6. Hazard Incident Command Units/Equipment/Contacts
7. Facilities with Significant Quantities of Hazardous Materials
8. Hazardous Materials Training Statewide
9. Schedules for Exercising HAZMAT
10. HAZMAT Incident Command Designations

Appendix 1 - Hazardous Materials Worksheets

TACOMA/PIERCE COUNTY FIELD COPY **Incident #**_____

HAZARDOUS MATERIALS NOTIFICATION WORKSHEET

A. General (Fill out in all cases)

1. Date of call _____ Time of call _____

2. Reporting Party _____ Callback Phone # _____

3. Incident Location _____

4. Situation Summary _____

5. Immediate Hazard: Major _____ Minor _____ Possible _____ None _____ Unknown _____

6. Assistance Needed _____

7. Department of Ecology Responder _____ Callback Phone# _____

B. Material Identification (Fill out those which can be obtained safely and which apply)

7. Chemical Name _____ Placard # Info _____

8. ID#s: UN/NA _____ STCC _____ CAS _____ Other _____

9. NFPA 704: Health(Blue) _____ Flammability(Red) _____ Reactivity(Yellow) _____ Info(White) _____

10. Container Description (Size, type, color, markings, numbers) _____

11. Shipping Papers (Location) _____ Product Color/Odor _____

12. Shipper/Manufacturer _____

C. Site Details (Fill out as available)

13. Location of Command Post

_____

14. Location of Staging Area

_____

15. Weather (Rain, temp, forecast, etc.)

_____

16. Safest Approach to Staging Area

_____

17. Wind Direction: From _____ To _____ Speed

_____

18. Spill/Release Status: None _____ Possible _____ Amount _____ Flow _____ Rate

_____

19. Medium into which release occurred: Air _____Ground ____ Water ____ Drainage ____ Sewer

_____

20. Exposures (Occupancies, streets, people, etc.)

_____

_____

_____

_____

WORKSHEET COMPLETED BY _____ **DATE**

_____

RELAY ABOVE INFORMATION TO APPROPRIATE 9-1-1 DISPATCH CENTER

TACOMA/PIERCE COUNTY DISPATCH COPY **Incident #**_____

HAZARDOUS MATERIALS NOTIFICATION WORKSHEET

PART 1 - INCIDENT INFORMATION

A. General (Fill out in all cases)

1. Date of call _____ Time of call _____
2. Reporting Party _____ Callback Phone # _____
3. Incident Location _____
4. Situation Summary

_____

_____

_____

5. Immediate Hazard: Major _____ Minor ___ Possible _____ None __ _____ Unknown _____
6. Assistance Needed _____

B. Material Identification (Fill out those which can be obtained safely and which apply.)

7. Chemical Name _____ Placard _____
8. ID#s: UN/NA _____ STCC _____ CAS _____ Other _____
9. NFPA 704: Health(Blue)_____ Flammability(Red)_____ Reactivity(Yellow)_____ Info(White)_____
10. Container Description (Size, type, colors, markings, numbers)

_____

_____

_____

11. Shipping Papers (Location)_____ Product Color/Odor _____
12. Shipper/Manufacturer_____ Phone # _____

C. Site Details (Fill out as available.)

13. Command Post Location _____
14. Staging Location _____
15. Weather (Rain, temp., forecast, etc.) _____
16. Safest Approach to Staging Area _____

_____

_____

17. Wind Direction: From _____ To _____ Speed _____

18. Spill/Release Status: None _____ Possible _____ Amount _____ Flow Rate _____

19. Medium into which release occurred: Air ____ Ground ____ Water ____ Drainage ____ Sewer _____

20. Exposures (Occupancies, streets, people, etc.) _____

_____

PART 2 – NOTIFICATION

A. All Incidents (No matter how small) Time _____ Date _____

21. Appropriate Fire Dispatch _____

22. Washington State Dept. of Ecology _____

23. Pierce County DEM Duty Officer (253.798.7470) _____

B. Other as Necessary

24. State EMD Duty Officer (1-800-258-5990) _____

25. Department of Health _____

26. Appropriate Law Enforcement _____

27. County Fire Marshal _____

28. Public Works _____

29. TIMAP (253-596-8992) _____

30. CHEMTREC (1-800-424-8802) _____

31. National Response Center (1-800-424-8802) _____

32. Other _____

WORKSHEET COMPLETED BY

_____DATE_____

Appendix 2. - Contact Phone Numbers

Contact Phone Numbers:

National Response Center		**800-424-8802**
Washington State EMD Duty Officer		**800-258-5990**
Washington State Patrol		**253 548-2020**
CHEMTREC		**800-424-9300**
Department of Ecology	**Spill line**	**360-407-6300**
Environmental Protection Agency - EPA	**EPCRA Hotline**	**800-424-9346**
	Region 10	**800-424-4372**
	Section 313 Questions	**206-553-1200**
	Other Title III Questions	**206-553-4349**
Local Emergency Planning Committee	**LEPC**	**253-798-6595**
Pierce County DEM Duty Officer	**Day Phone**	**253-798-6595**
	Evening Phone	**253-798-7470**
Pierce County EOC		**253-798-7470**
Puyallup City Communications		**253-841-5432**
Puyallup Emergency Operations Center		**253-770-3336**
Port of Tacoma Harbor Master		**253-591-5737**
State Emergency Response Commission	**SERC**	**800-562-6108**
Tacoma EOC		**253-404-3700**
Tacoma/Pierce County Health Dept.	**Emergency Day or Evening**	**253-798-6500**
U.S. Coast Guard		**206-217-6001**

Appendix 3 - Title III, EPCRA: A Short Summary

Congress enacted the Superfund Amendments and Reauthorization Act of 1986 as a direct result of the toxic chemical spill in Bhopal India that killed and injured several thousand people; Title III, the Emergency Planning and Community Right to Know Act (EPCRA), established requirements for federal, state, and local governments as well as industry regarding hazardous chemical response planning and the right of individual citizens to know what hazardous chemicals reside in the community.

Codified under Title 42 Chapter 116 of the U.S. Code, the EPCRA requires communities organize a Local Emergency Planning Committee, develop and maintain hazardous materials response plans inform the public about hazardous materials in the community and requires timely notification of the public in the advent of a spill or anticipated spill or leak.

EPCRA has four main sections:

- Section 301 through 303 covers Emergency Response Planning. It requires the, designation of State Emergency Response Commissions (SERCs), Local Emergency Planning Committee (LEPCs) and Tribal Emergency Response Commission (TERCs). The SERCs, TERCs and LEPCs are to develop hazardous materials emergency response plans. They are to be composed of a broad range of representatives from the community.

- Section 304 covers reporting requirements associated with the release of hazardous chemicals in excess of a reportable quantity as defined by EPA and the release could affect persons beyond the boundary of a facility.

- Section 311 and 312. Section 311 requires covered facilities to submit Material Safety Data Sheets (MSDS) or a list of hazardous chemical present on site over the threshold planning quantity to the SERC the LEPC and the local fire department.
  Section 312 requires covered facilities to submit annual Tier II Hazardous Chemical Inventory Forms to the State Emergency Response Commission (SERC) the Local Emergency Planning Committee and the local fire department.

- Section 313 requires covered facilities submit an annual report to the EPA for each listed toxic chemical manufactured, processed, or used in excess of the threshold amount. This report, on Form R, documents releases of a listed toxic chemical to the environment for the previous year.

Appendix 4

Hazardous Materials Releases in Pierce County

Table HM-1 Reported Releases (in lbs.) of all chemicals, for Pierce Co. in 2008, all industries[i]

	Chemical	Total On-site Disposal or Other Releases	Total Off-site Disposal or Other Releases	Total On & Off-site Disposal or Other Releases
1	1,2,4-TRIMETHYLBENZENE	1,472	573	2,045
2	1,2-DICHLOROETHANE	366	0	366
3	ACETALDEHYDE	33,269	0	33,269
4	ACETONITRILE	260	0	260
5	AMMONIA	119,452	7	119,459
6	ANTIMONY	21	68	89
7	ARSENIC COMPOUNDS	5	250	255
8	BARIUM	69	20	89
9	BARIUM COMPOUNDS	61	10	71
10	BENZENE	2,794	9	2,803
11	BENZO(G,H,I)PERYLENE	4	4	9
12	CATECHOL	1	0	1
13	CERTAIN GLYCOL ETHERS	0	0	0
14	CHLORINE	15	0	15
15	CHLORINE DIOXIDE	40	0	40
16	CHLOROFORM	293	0	294
17	CHROMIUM	487	68,242	68,729
18	CHROMIUM COMPOUNDS(EXCEPT CHROMITE ORE MINED IN THE TRANSVAAL REGION)	5	750	755
19	COPPER	49	16,576	16,625
20	COPPER COMPOUNDS	265	2,706	2,971
21	CYCLOHEXANE	4,116	10	4,126
22	DICHLOROMETHANE	5,639	2	5,640
23	DIISOCYANATES	1,239	9	1,248
24	DIOXIN AND DIOXIN-LIKE COMPOUNDS	**	**	**
25	ETHYLBENZENE	1,644	79	1,723
26	ETHYLENE GLYCOL	28	878	906
27	FORMALDEHYDE	21,774	521	22,295
28	FORMIC ACID	513	0	513
29	HEXACHLOROBENZENE	0	0	0
30	HYDROCHLORIC ACID	335,005	0	335,005
31	LEAD	140,030	424	140,454
32	LEAD COMPOUNDS	840	38,337	39,176
33	MANGANESE	103	18,030	18,133
34	MANGANESE COMPOUNDS	19,044	42	19,086
35	MERCURY	0	.	0
36	MERCURY COMPOUNDS	4	7	11
37	METHANOL	353,317	2,616	355,933
38	METHYL ISOBUTYL KETONE	315	0	315
39	METHYL TERT-BUTYL ETHER	360	0	360
40	MOLYBDENUM TRIOXIDE	0	0	0
41	N,N-DIMETHYLFORMAMIDE	282	0	282
42	N-BUTYL ALCOHOL	304	0	304
43	N-HEXANE	10,122	7	10,129
44	N-METHYL-2-PYRROLIDONE	19,506	1	19,507
45	NAPHTHALENE	2,112	9,841	11,953
46	NICKEL	235	30,891	31,126
47	NITRATE COMPOUNDS	79,500	29	79,529
48	NITRIC ACID	0	53,000	53,000
49	PENTACHLOROPHENOL	6	5	11
50	PHENOL	20,972	427	21,399
51	POLYCHLORINATED BIPHENYLS	0	0	0
52	POLYCYCLIC AROMATIC COMPOUNDS	385	1,778	2,163
53	PYRIDINE	384	0	384
54	SILVER	200	590	790
55	STYRENE	405	0	405
56	SULFURIC ACID	7,780	0	7,780
57	TOLUENE	22,832	104	22,936
58	TRIETHYLAMINE	117	0	117
59	XYLENE (MIXED ISOMERS)	26,219	619	26,838
	Total	**1,234,258**	**247,464**	**1,481,721**

APPENDIX 5

Pierce County

COMMUNITY RIGHT-TO-KNOW

Tier-II Facilities

EPA ID	FACILITY	Contact	Phone
WAD988482592	**BOEING COMMERCIAL AIRPLANES - FREDERICKSON**	LESLIE PIERSON	253-351-1697
WAD980974315	**Air Products Mfg Corp.**	RANDY SKOW	760-929-6312
CRK000009240	**Airgas Nor Pac**	VIRGIL OCHSNER	(253)473-8921
WAD17747904	**Air Liquide America LP**	Larry Miller	(253) 383-3637
CRK 000 048 840	**US Foodservice Inc**	Dave Sears	(253) 620-3920
WAD079258844	**Birds Eye Foods**	MARTY KRAMER	(253) 591-3293
WAD 988 522 843	**TWIN CREEK ANTENNA RANGE**	STEPHEN RYAN	(206) 544-1490
CRK 000 046 190	**LAKE OF THE WOODS REMOTE**	OPERATIONS	(253) 851-1310
CRK 000 046 500	**SOUTH PRAIRIE CO**	OPERATIONS	(360) 893-5510
CRK 000 046 530	**VAUGHN REMOTE**	OPERATIONS	(360) 851-1310
CRK 000 046 390	**ORTING CO**	OPERATIONS	(360) 893-5110
CRK 000 046 170	**POINT FOSDICK REMOTE**	OPERATIONS	(253) 851-1321
CRK 000 046 150	**GIG HARBOR CO**	OPERATIONS	(253) 851-1321
CRK 000 046 160	**ROSEDALE REMOTE**	OPERATIONS	(800) 824-2877
CRK 000 046 010	**ANDERSON ISLAND REMOTE**	OPERATIONS	(253) 851-1310
CRK 000 046 020	**ASHFORD CO**	OPERATIONS	(360) 893-5110
WAH 000 017 806	**CARDINAL HEALTH**	MIKE DEJONG	(253) 896-2713
WA1 570 097 310	**CAMP MURRAY AIR NATIONAL GUARD STATION**	KENNETH WONG	(253) 512-3205
WAD 067 162 586	**BUSBY MARINE AND TANK INCORPORATED**	ALLAN MCCOMAS	(253) 383-5000
WAD 980 975 221	**BURLINGTON NORTHERN SANTA FE**	JENNIFER WIENER	(206) 625-6034
CRK 000 049 900	**MINTER REMOTE**	OPERATIONS	(253) 851-1310
WAD 097 249 411	**CONOCO PHILLIPS - TACOMA TERMINAL NORTH**	JEFFREY MCBRIDE	(253) 627-3878
CRK 000 002 480	**CHS INC - PURDY (BURLEY)**	PETE MUTSCHLER	(651) 355-6935
UNKNOWN	**Cingular Wireless-TACOMA 1**	DON HARRIS	(425) 580-4618

CRK 000 054 680	**COSTCO DEPOT #171**	DALE ANDERSON	(425) 313-8545
CRK 000 054 670	**COSTCO DEPOT #285**	DALE ANDERSON	(425) 313-8545
CRK 000 002 640	**CHS INC - TACOMA STATION & CAR WASH**	PETE MUTSCHLER	800-210-9324
WA0 000 148 734	**ARCLIN SURFACES INC**	KELLY GREGORY	(253) 682-3203
CRK000028370	**DARLING INTERNATIONAL INC**	MARTIN GUTHRIE	972-281-4465
WAD 000 641 522	**CONOCO PHILLIPS - TACOMA TERMINAL SOUTH**	JEFFREY MCBRIDE	(253) 627-3878
UNKNOWN	**CINGULAR WIRELESS-TACOMA RDC**	DON HARRIS	(425) 580-4618
WAD 114 685 373	**TACOMA PUBLIC UTILITIES (TPU) - UTILITIES CENTER & OFFICES**	SAMUEL RUPERT	(253) 502-8513
WAD 000 009 001	**CITY OF TACOMA PUBLIC UTILITIES-HOOD STREET RESERVOIR**	SAMUEL RUPERT	(253) 502-8513
CRK 000 013 230	**CITY OF TACOMA PUBLIC UTILITIES-PORTLAND AVE RESERVOIR**	SAMUEL RUPERT	(253) 502-8513
WAD 998 523 445	**TACOMA PUBLIC UTILITIES LOVELAND CENTER**	SAMUEL RUPERT	(253) 502-8513
WAD 980 975 79	**EXIDE TECHNOLOGIES**	EXIDE TECHNOLOGIES	(253) 863-5134
CRK 000 061 240	**GLACIER NORTHWEST INC TACOMA NARROWS PLANT**	EDWARD PETTIT	(206) 768-7612
WAD 981 766 710	**GLACIER NORTHWEST INC TAYLOR WAY PLANT dba CALPORTLAND**	MATTHEW HINCK	(206) 768-7612
CRK 000 060 410	**JIFFY LUBE STORE 1092**	BRIAN D. CLARK	(402) 333-0990
CRK 000 060 460	**JIFFY LUBE STORE 2049**	BRIAN D. CLARK	(402) 333-0990
CRK 000 060 500	**JIFFY LUBE STORE 2058**	BRIAN D. CLARK	(402) 333-0990
CRK 000 060 580	**JIFFY LUBE STORE 2076**	BRIAN D. CLARK	(402) 333-0990
CRK 000 060 740	**JIFFY LUBE STORE 2813**	BRIAN D. CLARK	(402) 333-0990
CRK 000 060 400	**JIFFY LUBE STORE 963**	BRIAN D. CLARK	(402) 333-0990
UNKNOWN	**EAST PENN MANUFACTURING**	KAREN GEORGE	(610) 682-6361
CRK 000 060 380	**JIFFY LUBE STORE 888**	BRIAN D. CLARK	(402) 333-0990
CRK 000 061 350	**CONWAY WESTERN EXPRESS**	KEVIN HARTMAN	(714) 562-0110
WAD 037 991 999	**COMMENCEMENT BAY CORRUGATED**	VICKI MENZER	(253) 845-3100
CRK000068600	**VERIZON WIRELESS - PCC**	SUSAN CALDERON	908-559-7265
WAH 000 004 903	**JAMES HARDIE BUILDING PRODUCTS**	USMAN KHANAR	(253) 875-2332
WA1 360 007 271	**VA PUGET SOUND HEALTHCARE SYS AMERICAN LAKE DIV**	LARRY HSU	(206) 277-6301

CRK 000 062 070	**VERIZON WIRELESS LAKE TAPPS**	SUSAN CALDERON	(908) 559-7265
CRK 000 031 280	**VERIZON WIRELESS - NORTH TACOMA MSC**	SUSAN CALDERON	(908) 559-7265
CRK 000 062 140	**VERIZON WIRELESS-TACOMA CELL SITE**	COLLEEN CASEY	(908) 908-559-726
CRK 000 042 420	**VOIGHTS CREEK HATCHERY**	BRODIE ANTIPA	(253) 840-4790
CRK 000 054 820	**WA CORRECTIONS CENTER FOR WOMEN**	JOHN KESSLER	(253) 858-4234
CRK 000 061 760	**AMERICAN PORTABLE STORAGE**	PAMELA S. PAWELEK	(360) 695-4858
CRK 000 061 780	**WASTE CONNECTIONS INC-DM RECYCLING**	KEITH KOVALENKO	(360) 695-4858
WAD 055 498 232	**WESTERN WOOD PRESERVING CO**	MICHEAL REIMER	(253) 863-8191
WAR 000 006 312	**WESTMARK PRODUCTS INC**	TERI MYERS	(253) 439-6805
WAD06754916	**JCI JONES CHEMICALS, INC**	JAMES GROH	(253) 274-0104
CRK 000043 680	**FRED MEYER DISTRIBUTION CENTER**	DENNIS HICKS	(253) 770-6825
CRK000025450	**FIELDS COMPANY, LLC**	LARRY NORDI	(253) 627-4098
WAO 000 915 355	**FREDERICKSON POWER**	RICHARD RECOR	(253) 846-0528
CRK 000 017 910	**WILCOX FARMS LLC**	RODNEY HAGEMAN	(360) 458-6804
CRK000038770	**SCS Refrigerated Services, LLC**	ANITA LYDIARD	(253)779-2469
WAD082510595	**Simpson Tacoma Kraft Co**	GREGORY NARUM	(253) 596-0234
CRK000046270	**Centurytel-Longbranch Remote**	Operations	(253)851-1310
WAD988467080	**TACOMA RAIL (BELTLINE DIVISION)**	SAMUEL RUPERT	(253)502-8513
CRK000046180	**Centurytel-Woodhill Remote**	Operations	(253)851-6775
CRK000046530	**Centurytel-Vaughn Remote**	Operations	(253)851-1310
CRK000046500	**Centurytel-South Prairie Co.**	Operations	(360)893-5110
CRK000046160	**Centurytel-Rosedale Remote**	Operations	(253)851-1321
CRK000046150	**Centurytel-Rosedale Co.**	Operations	(253)851-1321
CRK000049900	**Centurytel-Minter Remote**	Operations	(253)851-1310
CRK000046390	**Centurytel-Orting Co.**	Operations	(360)893-5110
CRK000046190	**Centurytel-Lake of the Woods Remote**	Operations	(253)851-1310

CRK000046250	**CenturyTel Lakebay Co**	Operations	(253)851-1310
CRK00046020	**Centurytel-Ashford Co**	Operations	(360)893-5110
CRK000046010	**Century Tel-Anderson Island Remote**	Operations	(253)851-1310
CRK000046170	**Centurytel-Point Fosdick Remote**	Operations	(253)851-1321
WAD981772072	**CITY OF TACOMA CENTRAL WASTEWATER TREATMENT PLANT #1**	KIRK ZEMPEL	(253)520-2158
WAD981769110	**EMERALD SERVICES INC - ALEXANDER**	SHEILA SMITH	(206)832-3204
WAH000007658	**GLACIER NORTHWEST INC DUPONT PLANT**	MATTHEW HINCK	(206)768-7612
CRK000048700	**PNEC DBA PACIFIC COAST OIL CO.**	MITCH JOHNSON	(253)475-7600
WAD981764434	**MANKE LUMBER COMPANY**	CRAIG MCNEIL	(253)863-4495
WAD988478723	**NORTHWEST ETCH TECHNOLOGY INC**	STEVE GRAHAM	(253)572-2401
CRK000048740	**MUTUAL MATERIALS-PARKLAND BRANCH**	JEFF LINSTAD	(425)452-2362
CRK000053490	**PABCO ROOFING PRODUCTS**	DENNIS WILLIAMS	(253)272-0374
WAD071836019	**PACIFIC LUTHERAN UNIVERSITY**	JENNIFER WAMBOLDT	(253)535-7233
CRK000043130	**PNEC CORP DBA PACIFIC COAST OIL CO.**	MITCH JOHNSON	(253)475-7600
WAD009241621	**PARKER PAINT COMPANY**	MIKE JONES	(253)471-4622
WAD988513347	**PIERCE COUNTY PW & UTILITIES CHAMBERS CREEK TREATMENT PLANT**	NONE	NONE
WAD009242314	**PIONEER AMERICAS LLC TERMINAL**	GEORGE KARSCIG	(253)593-1390
CRK000023590	**MUTUAL MATERIALS-LAKEWOOD BLOCK PLANT**	JEFF LINSTAD	(425)452-2362
WAD981770266	**PIERCE TRANSIT**	JASON HOVDE	(253)589-6371
CRK 000 062 040	**LEGACY PROPANE TACOMA LLC**	JEFFREY TURNER	(913) 461-5740
WAD890834543	**MCNEIL ISLAND CORRECTIONAL FACILITY**	JIM MCGINNIS	(253)512-6550
CRK000012250	**LAKEBAY MARINA**	NONE	NONE
CRK000034000	**MUTUAL MATERIALS-BRIDGEPORT BRANCH**	JEFF LINSTAD	(425)452-2362
CRK000049650	**MCI-FRDNWA**	NONE	NONE
UNKNOWN	**K-PAC CALIFORNIA TACOMA**	JAMES M. FILKINS	(253)922-2373

WAH000024450	**MILGARD MANUFACTURING INC PULTRUSION**	DAVE BUFFELEN	253-377-8084
CRK000043260	**MONIERLIFETILE LLC**	MICHEL WATSON	(253)581-3666
CRK000040900	**MINTER CREEK STATE FISH HATCHERY**	SCOTT MOORE	(253)857-5077
WAH000014019	**MULTICARE HEALTH SYSTEMS-ALLENMORE HOSPITAL**	JACK F. ROGERS	(253)403-2084
WAD078216405	**Tacoma General Hospital**	JACK F. ROGERS	(253)403-2084
WAT540012937	**QWEST-TACOMA JUNIPER 4 CO**	NONE	NONE
CRK000049080	**QWEST-SPANAWAY REGEN**	NONE	NONE
WAT540011434	**QWEST-SUMNER MAIN**	NONE	NONE
WAT540012903	**QWEST-TACOMA FAWCETT MAIN**	NONE	NONE
WAD980977748	**TACOMA Joint Base Lewis-McChord**	NONE	NONE
WAT540012861	**TACOMA GREENFIELD 5 CO**	NONE	NONE
WAT540012945	**QWEST-TACOMA SKYLINE CO.**	NONE	NONE
WAT540012911	**QWEST-TACOMA LENNOX CO**	NONE	NONE
WAT540012952	**QWEST-TACOMA LOGAN MAIN**	NONE	NONE
WAD980985253	**QWEST-TACOMA TRAFTON B SOC**	NONE	NONE
WAD000641316	**QWEST-ROY CDO 28220**	NONE	NONE
CRK000038490	**ROADWAY EXPRESS INC 873**	NONE	NONE
WAD988519401	**RENTAL SERVICE CORPORATION #561**	SHYAM SRINIVAS	480-609-2031
WAD043451038	**SOUND REFINING INC**	JUSTIN RANES	(253)272-9348
WAT540012879	**QWEST-TACOMA WAVERLY 2 CO.**	NONE	NONE
WAR000007930	**PSE FREDRICKSON GEN. STA.**	LEA BOYLE	(425)456-2285
WAT540012671	**QWEST-PUYALLUP CO**	NONE	NONE
WAH000018788	**SIMPSON LUMBER CO. (FORMERLY SIMPSON TIMBER)**	DAVE MCENTEE	253-779-6405
WAD009253352	**OLIN CHLOR ALKALI - PIONEER AMERICAS LLC-TACOMA TERMINAL**	GEORGE KARSCIG	(253)272-9376
CRK000023110	**PRAXAIR DISTRIBUTION INC. (SEA 4)**	STEVE GALE	(206)464-4455
CRK000042520	**DIERINGER**	JOHN RORK	(253)437-6766
WAD027555465	**PSE-TACOMA OFFICE**	LEA BOYLE	(253)437-6789

CRK000010070	**PSE-CRYSTAL MOUNTAIN GENERATING STATION**	LEA BOYLE	(425) 456-2285
WAT540011012	**QWEST-GRAHAM CO**	NONE	NONE
CRK000049070	**QWEST-LOVELAND REGEN**	NONE	NONE
WAD089344246	**PRAXAIR INC. FIFE**	CLEVE GUESSFORD	253-926-7253
WAT540011004	**QWEST-GRAHAM STORAGE**	NONE	NONE
CRK000057850	**PSE-NORTH TACOMA GATE STATION**	LEA BOYLE	(425)456-2285
WAT54001574	**QWEST-CRYSTAL MTN MAIN**	NONE	NONE
WAT540012127	**QWEST-BUCKLEY CO.**	NONE	NONE
WAT540012093	**QWEST-BONNEY LAKE ESS**	NONE	NONE
WAD000711994	**PSE-ELECTRON**	LEA BOYLE	(425)456-2285
WAD 988 475 323	**THERMO FLUIDS INC.**	TRACI ROHDE	503-788-4612
WAD988522603	**TORAY COMPOSITES (AMERICA)**	BILL AVALONE	(253)846-1777
WAD070397955	**TOTEM OCEAN TRAILER EXPRESS INC.**	RAND LYMANGROVER	(253)238-8487
CRK000015490	**SPRINT COMMUNICATIONS CO. TACOMA SWITCH**	KATHY FEIN	(913)762-6021
CRK000054110	**US DOI NPS MT RAINIER NATIONAL PARK-SUNRISE**	MATTHEW MEDFORD	(360)569-2211
WAD009252719	**US OIL AND REFINING CO.**	TY GAUB	(253)383-1651
WAH000012492	**UPS PACIFIC**	ROBERT COUNTS	(206)621-6261
WA4141707154	**US DOI NPS MT RAINIER NATIONAL PARK - LONGMIRE**	MATTHEW MEDFORD	(360)569-2211
CRK000035850	**TRUGREEN CHEMLAWN**	NONE	NONE
WAR000004879	**TRIDENT SEAFOODS-TACOMA**	STEPHEN HOCHBERG	(206)783-3818
CRK000024750	**PUGET SOUND CHIP CENTER**	DAVID WEED	(253)924-4610
CRK000054120	**US DOI NPS MT RAINIER NATIONAL PARK-PARADISE**	MATTHEW MEDFORD	(360)569-2211
CRK000021840	**CITY OF TACOMA NORTH END WASTEWATER TREATMENT PLANT #3**	KIRK ZEMPEL	253-502-2158
WA8570024200	**Joint Base Lewis-McChord**	NONE	NONE
WA988506010	**RAINIER PLYWOOD COMPANY**	DOUG BAUM	253-383-5533 (EXT.1

CRK000059420	**BASALITE**	RICHARD WILKERSON	253-964-5000
CRK000034540	**Anderson's Fine Foods Inc**	Greg Anderson	253-851-2521
WAD988469201	**SUPERVALU VEHICLE MAINTENANCE**	ERICA FRANSEN	208-395-4793
WAH000015842	**ICON Materials, Pacific Shop**	ROB BUCK	(253)261-2539
CRK000017560	**SUPERVALU FROZEN FOODS**	TAUNIA ROSSER	(253) 404-4123
CRK000017570	**SUPERVALU INC TACOMA**	ERICA FRANSEN	208-395-4793
CRK000017580	**SUPERVALU INC MEAT**	ERICA FRANSEN	208-395-4793
CRK000066210	**UNITED RENTALS, INC**	DANNY DYKEMA	253-261-1512
CRK000066120	**SC FUELS**	JEFF HAAS	800-735-7137
WAH000024277	**HOME DEPOT #4728**	ARCADIS US	860-645-1084
WAR000009969	**HOME DEPOT #4709**	ARCADIS US, INC	860-645-1084
N/A	**MICROCHIP TECHNOLOGY INCORPORATED**	JEFFREY THOMAS	480-792-7200
WAD045732740	**UNITED RENTALS NORTHWEST, INC - BRANCH 813**	SCOTT MCELROY	206-255-1050
N/A	**QWEST- TACOMA Joint Base Lewis-McChord**	N/A	N/A
CRK000064500	**COMCAST OF PUGET SOUND, INC**	HEIDI JORDAN	(720)851-2862
WAD009252891	**SSA TACOMA INC**	AL JEROUE	(253-627-0406
WAT540012861	**QWEST- TACOMA GREENFIELD 5XBAR**	N/A	N/A
CRK000054080	**COMCAST OF TACOMA, INC - INDIAN HILLS**	HEIDI JORDAN	(720)851-2862
CRK000054070	**COMCAST OF TACOMA, INC**	HEIDI JORDAN	(720)851-2862
CRK000064860	**PSE-GIG HARBOR LNG FACILITY**	LEA BOYLE	(425)456-2285
N/A	**AT&T COMMUNICATIONS OF WASHINGTON**	N/A	N/A
N/A	**TCG SERVICES INC (AT&T)**	N/A	N/A
WAD000642157	**WILLIAMS PIPELINE - SUMNER COMPRESSOR STATION**	MITCH SINGER	(360)666-2107
CRK000054450	**COOPER TIRE & RUBBER COMPANY**	DAVE SCHOCK	(253)826-5742
WA4180090033	**U.S. POSTAL SERVICE VEHICLE MAINTENANCE FACILITY**	OSKAR MARTINEZ	(253)471-0785

N/A	**SWIFT TRANSPORTATION**	GARY WEINBERGER	(800)800-2200
WAD021828204	**SONOCO PRODUCTS COMPANY**	MARTIN RYAN	(253)863-6366
CRK000018800	**BOWMAN PROPANE COMPANY LLC**	MICHAEL DEW	253-779-0907
WAD009241696	**AMERICAN REINFORCED PLASTICS INC**	TERRY JENSEN	253-922-5808
CRK000008940	**WILLIAMS PIPELINE - NORTH TACOMA METER STATION**	MITCH SINGER	(360)666-2107
CRK000051680	**360NETWORKS AMPLIFICATION FACILITY**	DAVE CALDERA	303-854-5549
CRK000065300	**MISSION FOODS**	DALE NERBY	253-896-4483 x13
WAH000012674	**HOME DEPOT #4720**	ARCADIS US	860-645-1084
WAD988476433	**GEORGIA-PACIFIC GYPSUM LLC**	BILL RIPPON	253-627-2108
WAD000643262	**SHORE TERMINALS/NUSTAR ENERGY**	TED LILYEBLADE	253-627-5711
WAR000010009	**HOME DEPOT #4701**	ARCADIS US, INC	860-645-1084
WAD009241803	**BRADKEN-ATLAS**	RICK BARELLO	253-475-4600
CRK000060970	**HANSON PIPE & PRECAST, INC**	MONTE KIRBY	503-285-7320
CRK000054100	**US DOI NPS MT RAINIER NATIONAL PARK-OHANAPECOSH**	MATTHEW MEDFORD	360-569-2211
CRK000067540	**LASERFAB INC**	Kevin Frazer	360-893-1940
UNKNOWN	**TACOMA-PIERCE COUNTY BLOOD BANK**	ABIGAIL FONDERWHITE	253-383-2553
WAD061681086	**GARDNER-FIELDS**	MIKE THRASHER	800-237-1155
CRK000066450	**Del's Farm Supply LLC**	BRIAN SPEARS	615-440-4115
WAD009242314	**GLENN SPRINGS/OCCIDENTAL CHEMICAL**	MAURY WASSMANN	253-274-9760
WAD988479010	**WILLIAMS PIPELINE - SOUTH TACOMA METER STATION**	MITCH SINGER	360-666-2107
WAH000018671	**ASHLAND WATER TECHNOLOGIES**	JEFF RISTEEN	253-475-8434
WAD082500133	**HERTZ EQUIPMENT RENTAL CORPORATION**	STEVE PIACITELLI	253-922-3852
UNKNOWN	**HALLIBURTON ENERGY SERVICES**	RENEE HUNTMAN	(907) 344-2929

WAD000602060	**ASSOCIATED PETROLEUM PRODUCTS INC TACOMA**	CLINT EAKIN	253-627-6179
WAD988511705	**ASSOCIATED PETROLEUM PRODUCTS INC EATONVILLE**	CLINT EAKIN	253-627-6179
0	**VERIZON WIRELESS, PROCTOR**	COLLEEN CASEY	908-559-7266
0	**VERIZON TACOMA MSC-NORTH TACOMA CELL (SITE 6)**	COLLEEN CASEY	908-559-7266
crk 000 067 650	**VERIZON WIRELESS - SUMNER**	SUSAN CALDERON	908-559-7265
CRK 000 009 430	**PEPSI BOTTLING GROUP (PBG)**	MIKE SOUTHARD	253-207-6001
WAD980383442	**TACOMA POWER STEAMPLANT #2**	SAMUEL RUPERT	253-502-8513
WAD 988 509 170	**WINGFOOT COMMERCIAL TIRE SYSTEMS #195**	TOM ALLMAN	479-788-6401
0	**WILTEL COMMUNICATIONS, PYLPWA1W**	SCOTT WALTER	918-547-0909
WAD000491688	**PQ CORPORATION, THE**	JIMM OLIVIER	323-326-1100
0	**WILTEL COMMUNICATIONS, SPAWWA1W**	SCOTT WALTER	918-547-0909
CRK 000 053 440	**VERIZON WIRELESS FORTY FIVE DEGREE RD ESA (WA2730162)**	WILLIAM IRWIN	978-837-3604
CRK000003730	**TACOMA PUBLIC UTILITIES - ALDER DAM**	SAMUEL RUPERT	253-502-8513
WAH 000 012 559	**COSTCO WHOLESALE #660**	DALE ANDERSON	425-313-8545
CRK000047650	**WS DOT ALDER**	CARLEN VOLK	360-705-7861
CRK000052780	**WSP TACOMA**	CARLEN VOLK	360-705-7861
CRK000048570	**WS DOT WILLOWS**	CARLEN VOLK	360-705-7861
CRK000061770	**MURREY'S DISPOSAL**	PAMELA PAWELEK	360-695-4858
CRK000063550	**SPAWWA1W**	Level 3 Communications	720-888-1000
CRK000063540	**PYLPWA1W**	Level 3 Communications	720-888-1000
CRK000067280	**USF REDDAWAY (TAC-R)**	0	0
WAD988485405	**TACOMA PUBLIC UTILITIES LAGRANDE DAM**	SAMUEL RUPERT	253-502-8513
CRK000048060	**WS DOT LAKEVIEW**	CARLEN VOLK	360-705-7861

CRK 000 045530	**MK BATTERY**	CHRIS WEBB	410-238-1526
WAD980835771	**GENERAL PLASTICS MANUFACTURING CO.**	JENNIFER RIVARD	253-473-5000
WAD988523890	**HOBART BAKERY SYSTEMS**	STEVE RODRIGUES	360-893-1304
CRK000044670	**TPU 214TH AVE EAST PUMP STATION**	SAMUEL RUPERT	253-502-8513
WAH000018846	**TPU- MCMILLIN RESERVOIR**	SAMUEL RUPERT	253-502-8513
WAH000031854	**HOME DEPOT #4747**	ARCADIS US	860-645-1084
WAH000028546	**HOME DEPOT #8562**	ARCADIS US	860-645-1084
CRK000060020	**ALLIED BATTERY SYSTEMS**	MARSHALL SADLER	253-627-5050
CRK000060150	**ADM SWEETENERS**	Jim Yeaw	253-845-4833
WAD043450014	**Brown & Haley**	Terry Muskopf	253-620-3077
NEW000000000	**Scott's Lawnservice #949**	JASON JOHANTGES	937-645-2751
CRK000 061 350	**Con-Way Freight-UTA**	NONE	734-757-1657
CRK000011040	**WASHINGTON COLD STORAGE**	MITCH BROWN	253-848-8511
CRK000069270	**CLOSETMAID**	ROSS JACKMAN	253-926-2563
CRK000070720	**Lowe's of South Tacoma #2498**	Rob Gass	704-758-6033
CRK000070620	**Lowe's of Lakewood #1081**	Rob Gass	888-429-6281
WAD020257945	**PHILIP SERVICES CORP - BURLINGTON ENVIRONMENTAL**	LAUREL LAFATA	425-204-7063
CRK000069120	**UNITED RENTALS NORTHWEST- BRANCH 057**	UNITED RENTALS NORTHWEST	303-286-4394
WAH000004358	**GLACIER NORTHWEST INC, PIONEER AGGREGATES**	MATTHEW HINCK	206-768-7612
CRK000068550	**VERIZON - HILLSDALE**	SUSAN CALDERON	908-559-7265
NONE	**AMERICAN TOWER - TACOMA MSC/N**	SCOT SANDEFUR	602-284-0280
CRK0000-63550	**L3 COMMUNICATIONS - SPANAWAY**	JODY WHITE	720-888-1163
CRK 0000 4100	**Puyallup Hatchery**	Brodie Antipa	253-840-4790
CRK 0000 69160	**LENNOX HEARTH PRODUCTS - SUMNER**	AMY GRELLA	NONE
CRK0000-63540	**L3 COMMUNICATIONS - PUYALLUP**	JODY WHITE	720-888-1163

CRK 000 070 160	**SCHWAN'S CONSUMER BRANDS**	ROB YAGER	253-840-1569
CRK 0000-61160	**COSTCO WHOLESALE #767**	DALE ANDERSON	425-313-8100
CRK0000-69030	**COSTCO WHOLESALE #624**	DALE ANDERSON	425-313-8545
WAH 000-011-973	**COSTCO WHOLESALE #95**	DALE ANDERSON	425-313-8100
WAD 988 497 467	**JIFFY LUBE #1175**	BRIAN CLARK	402-333-0990
CRK 000 065 600	**JIFFY LUBE #2229**	BRIAN CLARK	402-333-0990
CRK 000 065 660	**JIFFY LUBE #2576**	BRIAN CLARK	402-333-0990
CRK 000 065 770	**JIFFY LUBE #2630**	BRIAN CLARK	402-333-0990
CRK 000 069 240	**JIFFY LUBE #2755**	BRIAN CLARK	402-333-0990
CRK 000 065 860	**JIFFY LUBE #3062**	BRIAN CLARK	402-333-0990
CRK 000 065 910	**JIFFY LUBE #3175**	BRIAN CLARK	402-333-0990
CRK 000 064 880	**JIFFY LUBE #3178**	BRIAN CLARK	402-333-0990
CRK 000 067 520	**PERMAGAS - DUPONT**	GREG BOWLIN	425-334-8808
WAD 000-069-390	**LEGACY PROPANE - SPANAWAY**	JEFFREY TURNER	913-461-5740
CRK 000 064 470	**304TH LANDFILL**	SUSAN PENHALE	NONE
WAD 000-642-157	**SUMNER COMPRESSION STATION**	MITCH SINGER	360-666-2107
WAH 000-015-362	**HIDDEN VALLEY LANDFILL**	SUSAN PENHALE	NONE
CRK 000 069 010	**PURDY TRANSFER STATION**	SUSAN PENHALE	NONE
WAH 000009738	**HD SUPPLY CONSTRUCTION**	MARK LAUBACH	407-822-2822
NONE	**GCR TIRE CENTERS #4247**	NONE	NONE
WAD 008 958 357	**MCFARLAND CASCADE POLE AND LUMBER CO**	NONE	NONE
WAD 048 680 755	**ARAMARK UNIFORM AND CAREER APPAREL INC**	MIKE SCALISE	630-271-2964
CRK 000 061 770	**WASTE CONNECTIONS - MURREYS DISPOSAL**	KEITH KOVALENKO	253-922-6682
CRK 000 066 480	**PRAXAIR DISTRIBUTION INC**	MARK LULICH	253-620-1660
WAD 027 543 032	**PACIFIC FUNCTIONAL FLUIDS**	DENNIS MILLER	253-284-4302
0000732390	**NORTHWEST STEEL & PIPE INC**	BRIAN WAX	253-473-8888

CRK 000 073 820	**LOWE'S OF BONNEY LAKE #2895**	ROBERT GASS	704-758-6033
CRK 000 069 000	**VERIZON WIRELESS - JBLM ON DONOVAN HILL**	SUSAN CALDERON	908-559-7265
CRK 000 069 470	**VERIZON WIRELESS - BURRIS FIELD**	SUSAN CALDERON	908-559-7265
CRK 000 070 540	**VERIZON WIRELESS - FIRCREST**	SUSAN CALDERON	908-559-7265
NONE	**FIRST TRANSIT INC**	D GREGORY JERNIGAN	865-539-2077
CRK 000 069 540	**VERIZON WIRELESS - FIFE**	SUSAN CALDERON	908-559-7265
WAD 078 216 405	**MULTICARE MEDICAL CENTER**	JACK ROGERS	253-403-2084
WAD 988 484 796	**GOOD SAMARITAN HOSPITAL**	TOM ARMSTRONG	253-697-2269
CRK 000 068 890	**VERIZON WIRELESS - ORTING**	SUSAN CALDERON	908-559-7265
CRK 000 065 290	**TRIDENT SEAFOODS - FIFE**	STEPHEN HOCHBERG	206-783-3818
WAH 000 031 093	**AMERICAN PETROLEUM ENVIRONMENTAL SERVICES, INC**	FRANCO SANTIAGO	253-538-5252
WAD 144 258 779	**APM TERMINALS PACIFIC LTD**	GERRY OLSON	253-680-4440
CRK 000 072 470	**COCA-COLA ENTERPRISES - SOUTH SOUND**	STEVEN FULLER	253-503-4376
NONE	**HALLIBURTON - AMERICAN FAST FREIGHT**	NONE	NONE
NONE	**HALLIBURTON - PACIFIC ALASKA FREIGHTWAYS**	NONE	NONE
CRK 000 025 450	**GARDNER FIELDS (2)**	MIKE THRASHER	800-237-1155
WAD 092 875 830	**RAINIER SCHOOL**	ALAN MCLAUGHLIN	360-829-3067
WA 6211890052	**WA NATL GUARD - AVIATION SHOP AASF-1**	NONE	NONE
CRK 000 069 400	**SCI INFRASTRUCTURE, LLC**	MARK SCOCCOLO	253-218-0444
WAD 980 725 626	**WA ARMY GUARD**	NONE	NONE
WAD 981 772 205	**WA MIL DEPT - UNIT TRAINING AND EQUIPMENT SITE**	NONE	NONE
CRK 000 41510	**CARAUSTAR MILL GROUP INC., TACOMA PAPERBOARD**	JOHN RICHTER	253-627-1197
WAD 988 502 530	**PARKLAND LIGHT & WATER**	DALE BUDZINSKI	253-531-2666
CRK 000 035 610	**PARKLAND LIGHT & WATER - GOLDEN GIVEN**	DALE BUDZINSKI	253-531-2666

CRK 000 035 590	**PARKLAND LIGHT & WATER - SPANAWAY LOOP**	DALE BUDZINSKI	253-531-2666
CRK 000 035 580	**PARKLAND LIGHT & WATER - YAKIMA AVE**	DALE BUDZINSKI	253-531-2666
CRK 000 035 600	**PARKLAND LIGHT & WATER - A STREET**	DALE BUDZINSKI	253-531-2666
CRK 000 035 570	**PARKLAND LIGHT & WATER - 116TH/8TH**	DALE BUDZINSKI	253-531-2666
CRK 000 035 560	**PARKLAND LIGHT & WATER - 128TH**	DALE BUDZINSKI	253-531-2666
CRK000075060	**CHIEF LESCHI SCHOOLS**	AARON FOSTER	253-988-9684
CRK 000 024 120	**CITY OF PUYALLUP - MAPLEWOOD SPRINGS WATER TREATMENT FACILITY**	ALYSE RUSSELL	253-841-5524
CRK 000 024 110	**CITY OF PUYALLUP - SALMON SPRINGS WATER TREATMENT FACILITY**	ALYSE RUSSELL	253-841-5524
WAD 988000625	**CITY OF PUYALLUP - CORPORATE YARDS**	ROBERT ANDREOTTI	253-841-5513
wad 067 166 397	**GENERAL METALS OF TACOMA**	SCOTT SLOAN	253-404-6686
CRK 000 057 330	**AT&T MOBILITY NALLEY VALLEY 11583**	CAROLINE LAMMERS	425-580-1548
CRK 000 057 350	**AT&T MOBILITY FIFE2 11575**	CAROLINE LAMMERS	425-580-1548
CRK 000 057 230	**AT&T MOBILITY TACOMA RDC92234**	CAROLINE LAMMERS	425-580-1548
WAD 071 843 287	**ST JOSEPH MEDICAL CENTER**	MIKE ANDERSON	253-426-6929
CRK 000 070 820	**LINK PETROLEUM CO**	MICHAEL ROBERTSON	403-846-7978
UNKNOWN	**FEDEX FREIGHT INC**	CHONG LEE	408-654-3112
CRK 000 044 830	**SUBURBAN PROPANE**	CHANTEL HENDRIX	800-489-5686
CRK 000 074 900	**VERIZON WIRELESS - INDIAN HILL**	SUSAN CALDERON	908-559-7265
CRK 000 074 930	**VERIZON WIRELESS - NORPOINT**	SUSAN CALDERON	908-559-7265
NONE	**DREW MARINE USA, INC**	MARK ENKE	973-263-7743
CRK 000 038 490	**YRC INC (873)**	NONE	NONE
WAD 980 725 626	**WASHINGTON ARMY GUARD CAMP MURRAY**	NONE	NONE
NONE	**SPECIALTY PRODUCTS INC**	JOY FISH	253-588-7196
CRK 000 074 100	**IKEA DISTRIBUTION SERVICES**	JOSH NELSON	253-847-8532
CRK000 076 080	**LAKEWOOD POLICE DEPT**	TERRY NEUMANN	253-830-5059

CRK000 076 060	**GREEN MOUNTAIN COFFEE ROASTERS**	JAMES HULVERSON	253-447-9110
WAD 988 523 890	**BAXTER MANUFACTURING (ITW FOOD EQUIPMENT)**	STEVE RODRIGUES	360-893-1304
UNKNOWN	**SUNBELT RENTALS PC348**	NONE	NONE
WAH 000 029 533	**THERMO FLUIDS INC**	TRACI ROHDE	503-788-4612
UNKNOWN	**SUNBELT RENTALS PC344**	NONE	NONE
CRK 000 075 920	**COCA COLA BOTTLING CO - FIFE**	JOHN BLACK	253-778-7565
NONE	**PENNZOIL-QUAKER ST (DBA: SOPUS PRODUCTS TACOMA)**	JACK JACKSON	253-582-0404
WAD 988 485 413	**WASHINGTON TREE SERVICE INC - TACOMA**	JEFF BLACKNER	253-581-1881
WAD 009 242 041	**FLEISCHMANN'S VINEGAR INC**	DOUG JOHNSON	253-863-9216
CRK000046250	**CENTURYTEL LAKEBAY CO**	Stacey Douglas	407-889-6590
WAD988478723	**NW ETCH**	Steve conaham	253-572-2401
CRK000046390	**CENTURYTEL ORTING CO**	Stacey Douglas	407-889-6590
CRK000049900	**CENTURYTEL MINTER REMOTE**	Stacey Douglas	407-889-6590
CRK000046500	**CENTURYTEL SOUTH PRAIRIE CO**	Stacey Douglas	407-889-6590
CRK000046160	**CENTURYTEL ROSEDALE REMOTE**	Stacey Douglas	407-889-6590
CRK000046170	**CENTURYTEL POINT FOSDICK REMOTE**	Stacey Douglas	407-889-6590
CRK000046180	**CENTURYTEL WOODHILL REMOTE**	Stacey Douglas	407-889-6590
CRK000046150	**CENTURYTEL ROSEDALE CO**	Stacey Douglas	407-889-6590
CRK000046270	**CENTURYTEL LONGBRANCH**	Stacey Douglas	407-889-6590
CRK000046190	**CENUTRYTEL LAKE OF THE WOODS REMOTE**	Stacey Douglas	407-889-6590
CRK000046200	**CENTURYTEL GLENOMA CO**	Stacey Douglas	407-889-6590
CRK000046020	**CENTURYTEL ASHFORD CO**	Stacey Douglas	407-889-6590
WA1570097310	**CAMP MURRAY AIR NATIONAL GUARD**	-	-
CRK000075060	**CHIEF LESCHI SCHOOLS**	Aaron Foster	253-988-9684
WAH000000067	**GROUP HEALTH CORP TACOMA SPECIALTY CENTER**	Alex Truchot	206-988-2909

CRK000010070	**CRYSTAL MOUNTAIN GENERATING STATION**	Lea Boyle	425-456-2285
CRK000067540	**Laser Fab Incorporated**	Bob Yehl	253-846-8370
-	**VERSACOLD TACOMA**	Bob Brown	253-678-9865
CRK000046270	**CENTURYTEL LONGBRANCH**	Stacey Douglas	407-889-6590

Duty Officer SOP #12 – Hazardous Materials/Oil Spills

DATE	08/27/07
PURPOSE:	To provide guidance to the Pierce County Dept of Emergency Management Duty Officer for handling the reporting and coordination of resources for Hazardous Chemical Spills.
GENERAL INFORMATION:	Pierce County Code Chapter 2.118 identifies Pierce County Department of Emergency Management as the hazardous materials incident coordinating agency for Pierce County. In this capacity responding to requests for assistance with hazardous materials spills are one of the most frequent duty officer tasks. By far the majority of spills are handled with only an informational phone call or two. However the occasional spill either on water or land requires further coordination with one or more agencies and or jurisdictions. This SOP will distinguish between the two types of response required of the duty officer. ***NOTE:** Information must be inputted into the PIMS Duty Officer Log and into the ICS logs for larger more involved chemical incidents. Call to the County by spillers counts as the LEPC notification and must be documented.
PROCEDURES:	**INFORMATION ONLY NOTIFICATION:** This situation is normal for small spills. The Duty Officer (253 798-7470) will receive a call from some source, usually FireComm (Pierce County Fire Communications Center) or Washington EMD, reporting a small spill of usually gasoline, diesel, or some other chemical of a limited hazardous nature. 1) Identify source of the call. a) Follow the steps outlined in the Hazardous Materials Worksheet (See attachment.) This includes i) information on the reporting party, ii) contact numbers, iii) incident type, iv) location, v) chemical type, vi) current situation, vii) and assistance needed, if any. b) Get a mission number if one has not already been assigned. 2) Contact all relevant parties necessary for response. a) Relevant PSAP b) DEM Operations Chief c) Responsible jurisdiction d) Make sure that DOE has been notified by EMD. If not, call them yourself. e) Others as necessary (e.g. Coast Guard, Public Works, Health

Department, etc.)

3) Log all actions into PIMS Duty Officer Log.

***NOTE:** Do not contact clean up companies directly unless requested to by the responding jurisdiction or the Department of Ecology (DoE). This should be done either by the spiller or the DoE. Document any requests to contact spill cleanup companies with the requestor's name, organization and contact information.

RESPONSE REQUESTED: This situation arises occasionally and will usually involve large amounts of a hazardous substance, smaller quantities of a substance that requires a more complicated response, or may involve appreciable quantities into a marine environment.

1) Identify source of the call.
   a) Follow the steps outlined in the Hazardous Materials Worksheet (See attachment.) This includes
      i) information on the reporting party,
      ii) contact numbers,
      iii) incident type,
      iv) location,
      v) chemical type,
      vi) current situation,
      vii) assistance needed,
      viii) command post and staging area,
   b) Get a mission number if one has not already been assigned.
   c) Suggest support from MOCC if it seems warranted
   d) Respond to command post or MOCC if requested
   e) Assist with evacuation support if needed (this may involve getting busses for temporary shelter and locating a more permanent shelter site if needed,

2) Contact all relevant parties necessary for response.
   a) Relevant PSAP
   b) Responsible jurisdiction
   c) DEM Operations Chief
   d) Fire Resource Coordinator
   e) Make sure that DoE has been notified by EMD. If not, call them yourself.
   f) If material is in or has a probability of entering navigable waters contact the Coast Guard
   g) Others as necessary (e.g. DMCC, EPA, Health Department, Sheriff's Dept, Public Works, chaplain, ARC, Puyallup Tribe, business involved, etc.)

3) Log all actions into PIMS Duty Officer Log.

4) Open ICS on the Portal to track the incident.

5) Evaluate and discuss with operations chief the need for the EOC to open in support of the mission

	6) Open EOC if requested. ***NOTE:** Do not contact clean up companies directly unless requested to by the responding jurisdiction or the Department of Ecology. This should be done either by the spiller or the DoE. Document any requests to contact spill clean up companies with the requestor's name, organization and contact information.

References:
1. Pierce County ESF 10
2. Hazardous Materials Notification Worksheet

Contact Numbers:

Name	Position/Responsibility	Desk	Cell	Other
CHEMTREC	HazMat Information	800-424-9300		
Department of Ecology	Spill Line	360-407-6300		
National Response Center.	Reporting of all spills	800-424-8802		
Fire Communications	Contact HazMat teams	253-581-3888		
Jeff Jensen	Port of Tacoma Harbor Master/Coordinate response in the Port area	253-591-5737	253-973-0092	
Pierce County Public Works (John Collins)	Controlling small spills along roads or County property	253-798-4652		
Tacoma EOC	Operations within the City	253-404-3700		
Tacoma/Pierce County Health Department	Health issues related to HazMat – Business Hrs.	253-798-6500		After Hours 800-992-2456
U.S. Coast Guard	Seattle Office/Spills In or affecting the waterways	206-217-6001		
Washington State EMD	Duty Officer/Resource acquisition and notification of state agencies.	800-258-5990		

Hazard Incident Command Units/Equipment/Contacts

HAZMAT UNIT	EQUIPMENT	CONTACT	PHONE
Pierce County Hazard Incident Team (PCHIT)	2 HAZMAT Vehicles (Apparatus 59 & 69) 2 Mass Decon (Shelters) HAZMAT ID Ranger (Rescue 20) Air Monitors w/PIDs Monitors (gas, CL2, Radiation, etc) Geiger Counters Inflatable Shelters w/ Showers Microscope Weather Stations Decon Kits Level A & Level B Suits + Tyveks SCBAs Generator Gator PCs/Printer/	Graham Fire & Rescue Lead Fire Chief Reggie Romines rromines@grahamfire.org	(253) 847-8811
Central Pierce Fire & Rescue		Fire Chief Doug Willis dwillis@centralpiercefire.org	(253) 538-6400
East Pierce Fire & Rescue 22		Fire Chief Jerry Thorson jthorson@eastpiercefire.org	(253) 863-1800
Lakewood Fire District #2		Fire Chief Jay Sumerlin jsumerlin@lakewoodfire.org	(253) 377-3395
Gig Harbor Fire District #5		Fire Chief Bob Black bblack@piercefire.org	(253) 851-3111
Tacoma Fire Department	Station 12 HM # 44 Station 13 Mass Decon	Fire Chief Ron Stephens rstephens @tacomafiredepartment.org	(253) 591-5737
Boeing – Fredrickson Fire Department Station #5	HAZMAT Specialist for assistance	Deputy Chief Paul Spirup paul.a.spirup@boeing.com	(253) 657-2690
Joint Base Lewis-McChord Fire and Emergency Services Lakewood, WA	HAZMAT Heavy Vehicle w/ trailer HAZMAT Mass Decon Tractor /Trailer All w/ pertinent equipment	Battalian Chief Brett Stohr brett.stohr@ft.lewis.army.mil Ass't Chief John Harris john.harris02@mchord.af.mil	(253) 982-2603 (253) 982-2603

Pierce County Comprehensive Emergency Management Plan

Appendix 8

Evacuation Plans

Facilities with Significant Quantities of Hazardous Materials*

*To be completed 2011

Hazardous Materials Training Statewide





WASHINGTON STATE PATROL
OFFICE OF THE STATE FIRE MARSHAL
PREPAREDNESS DIVISION

The Office of the State Fire Marshal, Preparedness Division is sponsoring the following classes for the 2009-2010 year.

HazMat On-Scene Incident Command

Prerequisite: HazMat Operations

Medical Lake Fire	Oct 1-3, 2010
WSP Academy 631 W Dayton-Airport Rd Shelton WA	Nov 29-Dec 2
WSP Academy 631 W Dayton-Airport Rd Shelton WA	Feb 7-10
WSP Academy 631 W Dayton-Airport Rd Shelton WA	March 22-25
WSP Academy 631 W Dayton-Airport Rd Shelton WA	May 9-12
WSP Academy 631 W Dayton-Airport Rd Shelton WA	September 12-15

Classes at the WSP Academy in Shelton will start at 1300 on Day One and end at 1200 on Day 4.

This Course is designed to meet the training requirements in OSHA 29 CFR 1910.120 (q) (v) and WAC 296–824 for incident commanders at a hazardous materials incident. Our course is designed to give participants the knowledge and skills necessary to manage all types of hazardous materials incidents. It will provide emergency responders and industrial personnel with incident operations and management responsibilities the tools to effectively manage emergency incidents.

Course Content

Identifying the Problem
Protective Clothing and Equipment
Analyzing the Problem
Utilization of resources
Hazardous Materials Regulations
Evacuation vs. shelter–in–place
Planning for the Hazardous Materials Incident
Media Relations

Hazmat Safety Officer

Training Officers Conference	Feb 19-20, 2011
Northwest Regional Training Center 11606 NE 66th Cir Suite 103 Vancouver WA	June 25-26, 2011
Spokane 10 929 S. Garfield RD Airway Heights WA	March 26-27, 2011

This 16 hour *Hazmat Safety Officer* course is designed to provide the student with skills, knowledge and tools to effectively evaluate a hazardous materials incident for safety and ensure that recognized safe operational practices are followed. This class meets NFPA 472, 2002, Chapter 10 Competencies and will provide the student with knowledge to act as a Hazmat Branch Safety Officer.

As a prerequisite, students in this course are expected to have completed OSHA requirements for the Operations and/or Hazmat Technician Level and the National Incident Management System Courses ICS 100 and ICS 200.

Hazardous Materials Technician

Prerequisite: HazMat Operations

April 18-22, 2011	Fire Training Academy 50810 SE Grouse Ridge Rd North Bend WA
September 19-23, 2011	Fire Training Academy 50810 SE Grouse Ridge Rd North Bend WA

This 40 hour class which is compliant will WAC 296-824, OSHA 29 CFR 1910.120 and NFPA recommended competencies will include the following subjects:

Course Content

- Recognition and identification (review)
- Response chemistry
- Environmental regulations
- Radioactive materials
- Toxicology
- Medical surveillance
- Air monitoring and equipment
- Personal protective equipment
- Decontamination procedures
- Medical monitoring
- Spill control / containment
- Practical field exercise
- Written examination

Chemistry for Emergency Response

Tacoma Public Works June 13-17, 2011

This 1 week course is designed to prepare the responder to function safely at the scene of a hazardous materials incident by understanding the potential hazards. This is accomplished by gaining recognition of chemical nomenclature and basic principles of chemistry in order to assess risks to responders and the public. The course seeks to convey to first responders or prevention personnel a sound understanding of the basic chemistry of hazardous materials to permit them to correctly assess the threat posed by hazardous materials incidents that may occur accidentally or intentionally. Problem-solving sessions and interactive discussion cover topics such as salts and inorganic non-salts, hydrocarbons, hydrocarbon derivatives, and hydrocarbon radicals. Applying the science of chemistry to thermodynamics, volatility, and combustion provides real-world opportunities. **An understanding of basic chemistry is helpful to receive maximum benefit from the course.**

Awareness-Operations Train the Trainer

Prerequisite: Hazardous Materials Operations

Pending

This 24 hour course will prepare instructors to deliver hazardous materials response training at the Awareness and Operations Levels. It is designed to meet the training requirements for those trainers of individuals who respond to releases or potential releases of hazardous substances as part of the initial response for the purpose of protecting nearby persons, property or the environment and includes the new NFPA 472 competencies

Participants will be involved in both technical training and exercises to practice the skills needed to teach a safe and competent response to a hazardous materials emergency. Topics include Hazard and Risk Assessment, Selection and Use of Personal Protective Equipment, Basic Control Measures and Decontamination.

Hazardous Materials Operations

Fire Training Academy
50810 SE Grouse Ridge Rd
North Bend WA

December 4-5, 11-12, 2011 Testing on Dec 18, 2010

March 12-13, 19-20 Testing on March 26

June 4-5, 11-12 Testing on June 18

September 10-11, 17-18 Testing on September 24

December 3-4, 10-11 Testing on December 17

This 24-hour course is designed to provide the First Responder with understanding of and the skills necessary to detect presence of hazardous materials, identify the hazards associated with these materials, and to take defensive action against these materials. This course is for people who respond to releases of hazardous materials as part of the initial response for the purpose of protecting nearby persons, property, or the environment. This class will give the student the following:

Knowledge of the basic hazard and risk assessment techniques, how to select and use proper personal protective equipment, an understanding of basic hazardous materials terms, how to perform basic control, containment and/or confinement operations, how to implement basic decontamination procedures, an understanding of the relevant standard operating procedures and termination procedures and an understanding of Weapons of Mass Destruction and how to detect that they may have been used.

The Fire Training Academy classes will prepare the student for IFSAC Accreditation. The Skills testing will be held separate to the class and will involve a fee.

A registration form is available in Word or PDF format on the WSP website at: http://www.wsp.wa.gov/fire/hazmat.htm.

Our hazardous material course schedule will soon be available online for classes planned through September 2010.

For course content or registration information, contact Deputy State Fire Marshal Ron Bowen at 360.596-3923 or by email: ron.bowen@wsp.wa.gov.

DSFM Ron Bowen
Preparedness Division



Appendix 10

Methods/Schedules for Exercising HAZMAT 2010-2011

Type of Exercise	2010 1st Qtr Jan-Mar	2010 2nd Qtr Apr-Jun	2010 3rd Qtr Jul-Sep	2010 4th Qtr Oct-Dec	2011 1st Qtr Jan-Mar	2011 2nd Qtr Apr-Jun	2011 3rd Qtr Jul-Sep	2011 4th Qtr Oct-Dec
FSE		South Sound Water Rescue		Madigan Hospital & FCC		South Sound Water Rescue	Tacoma Mall	Region 5 MCI
FSE		Joint Base Lewis-McChord MARE		Homeless Connect & TPCHD POD	LEPC	Joint Base Lewis-McChord MARE		Health Dept. SNS
FSE		City of Tacoma Hazmat Spill		Sounder Tide Flats				
FCT		Hospitals and Health Dept.					Hospitals and Health Dept.	
Drill						Regional HAZMAT Drill		
TTX			IBRD Recovery	NDMS Patient Movement		NDMS Patient Movement		
TTX	RR Derailment & Hazmat spill	University of Puget Sound Earthquake	Gig Harbor MACC	CPFR Hospital Evac				
TTX			State Radiological Response Plan			Tacoma Mall		
WSP		Franklin Pierce Schools	WSEMA (Sept.)	CPFR Hospital Evac.		School Safety	WSEMA (Sept.)	
WSP		Puyallup Schools		WhiteRiver Schools				
WSP		Gig Harbor MACC Earthquake			Tacoma Mall	Region 5 MCI	Region 5 MCI	
Seminar		Mt. Tahoma Lockdown	PLU (x2)		Region 5 MCI			
Seminar			OpCom EX		Tacoma Mall			
Legend	SHSP/ODP exercises		Supported by other funds		SHSP/ODP funds		No funds requested	

HAZMAT Incident Command Designation

Jurisdiction	Designee	
Bonney Lake	East Pierce Fire & Rescue	
Buckley	Buckley Fire Department	
Carbonado	Washington State Patrol	
Dupont	Dupont Fire Department	
Edgewood	East Pierce Fire and Rescue	
Eatonville	Eatonville Fire Department	
Fife	Tacoma Fire Department/PCFD #10	
Fircrest	Tacoma Fire Department	
Gig Harbor	Pierce County Fire District #5	
Lakewood	Lakewood Fire District #2	
Milton	East Pierce Fire and Rescue	
Orting	Pierce County Fire District #18	
Port of Tacoma	Tacoma Fire Department	
Puyallup	Central Pierce Fire and Rescue	
Roy	Pierce County Fire Protection District #17	
Ruston	Washington State Patrol	
South Prairie	East Pierce Fire and Rescue	
Steilacoom	Steilacoom Public Safety Dept	
Sumner	East Pierce Fire and Rescue	
Tacoma	Tacoma Fire Department	
University Place	Pierce County Fire Protection District #3	
Wilkeson	Washington State Patrol	
Unincorporated Pierce County	Pierce County DEM	
Pierce County Fire Protection District #2	Pierce County Fire Protection District #2	
Pierce County Fire Protection District #3	Pierce County Fire Protection District #3	
Pierce County Fire Protection District #5	Pierce County Fire Protection District #5	
Pierce County Fire Protection District #6	Central Pierce Fire & Rescue	
Pierce County Fire Protection District #10	Tacoma Fire Department/PCFD #10	
Pierce County Fire Protection District #13	Pierce County Fire Protection District #13	
Pierce County Fire Protection District #14	Washington State Patrol	
Pierce County Fire Protection District #15	Washington State Patrol	
Pierce County Fire Protection District #16	Pierce County Fire Protection District #16	
Pierce County Fire Protection District #17	Pierce County Fire Protection District #17	
Pierce County Fire Protection District #18	Pierce County Fire Protection District #18	
Pierce County Fire Protection District #21	Pierce County Fire Protection District #21	
Pierce County Fire Protection District #22	East Pierce Fire & Rescue	
Pierce County Fire Protection District #23	Pierce County Fire Protection District #23	
Pierce County Fire Protection District #25	Washington State Patrol	
Pierce County Fire Protection District #26	Washington State Patrol	
Pierce County Fire Protection District #27	Pierce County Fire Protection District #27	

Cleanup Site Details

PIERCE COUNTY

SITE ID:	**Amtrak Derailment**			Cleanup Site ID: 14580	FS ID: 43056
	Alternate Name(s):	Amtrak Derailment			
LOCATION:		WRIA: 11	Lat/Long: 47.082	-122.676	View Vicinity Map
Address:	I-5 Railroad Bridge		Township	Range	Section / Legislative District: 28
	Dupont 98327		18N	1E	4 / Congressional District: 10
STATUS:	**Awaiting Cleanup**	Rank:	View Site Web Page		View Site Documents
	Responsible Unit: Southwest	Site Manager: Southwest Region	Statute: MTCA		
	Is Brownfield?	Has Environmental Covenant?	Is PSI Site?		
	NFA Received?	NFA Date:	NFA Reason:		

ASSOCIATED CLEANUP UNIT(s)

cuID	Cleanup Unit Name	Unit Type	Process Type	Unit Status	Size (Acres)	ERTS ID
15350	Amtrak Derailment Dupont	Upland	No Process	Awaiting Cleanup		677948

SITE ACTIVITIES:

Applies to:	Related ID (Unit-LUST-VCP)	Activity Display Name	Status	Start Date	End Date	Legal Mechanism	Performed By	Project Manager
CleanupSite		Site Discovery/Release Report Received	Completed	5/14/2018	5/14/2018			May, Heather
CleanupSite		Initial Investigation / Federal Preliminary Assessment	Completed	5/14/2018	5/14/2018		Ecology	Alvarez, Kirsten
Upland		Non-LUST Ind Report Received	Completed	5/14/2018	5/14/2018			

AFFECTED MEDIA & CONTAMINANTS:

Contaminant:	Media: Ground Water	Surface Water	Soil	Sediment	Air	Bedrock
Benzene	S		S			
Non-Halogenated Solvents	S		S			
Other Non-Halogenated Organics	S		S			
Petroleum-Diesel	S		C			

Key:
B - Below Cleanup Level
C - Confirmed Above Cleanup Level
S - Suspected
R - Remediated
RA - Remediated-Above
RB - Remediated-Below

CleanupSiteDetails2014

Facility/Site: DUPONT GROCERY
17157522

Also known as:



Address

100 BARKSDALE AVE

DUPONT WA 98327

Decimal Coordinates

Latitude: 47.09372

Longitude: -122.6255

Geographic Information

Ecology Region: SWRO	Legislative District: 28	WRIA: 12
County: Pierce	Congressional District: 10	Tribal Land: No

Ecology Interactions

Interaction Description	Ecology Program	Ecology Program Phone	Program ID	Start Date	End Date
Underground Storage Tank	TOXICS	(360) 407-7224	566685	4/18/2001	

Industrial Codes (External Links Below)

No NAICS information is available for this facility site.

No SIC information is available for this facility site.

Facility/Site: 14614 FORT LEWIS BUILDING 2055

Also known as: FORT LEWIS BUILDING 2055, JBLM Building 2055



Address

N 4TH ST & CRARY AVE

FT LEWIS WA 98374

Decimal Coordinates

Latitude: 47.09372

Longitude: -122.60506

Geographic Information

Ecology Region: SWRO	Legislative District: 28	WRIA: 11
County: Pierce	Congressional District: 10	Tribal Land: No

Ecology Interactions

Interaction Description	Ecology Program	Ecology Program Phone	Program ID	Start Date	End Date
State Cleanup Site	TOXICS	(360) 407-7224		2/25/2010	

Industrial Codes (External Links Below)

NAICS Code	NAICS Description
49319	Other Warehousing and Storage

No SIC information is available for this facility site.

PIERCE COUNTY

SITE ID:	**FORT LEWIS BUILDING 2055**		Cleanup Site ID: 11457	FS ID: 14614
	Alternate Name(s):	FORT LEWIS BUILDING 2055, JBLM Building 2055		

LOCATION:		WRIA: 11	Lat/Long:	47.094	-122.605	View Vicinity Map
Address:	N 4TH ST & CRARY AVE		Township	Range	Section	Legislative District: 28
	FT LEWIS 98374		19N	2E	31	Congressional District: 10
STATUS:	**Awaiting Cleanup**	Rank:	View Site Web Page			View Site Documents
	Responsible Unit: Southwest	Site Manager: Forson, Ben	Statute: MTCA			
	Is Brownfield?	Has Environmental Covenant?	Is PSI Site?			
	NFA Received?	NFA Date:	NFA Reason:			

ASSOCIATED CLEANUP UNIT(s)

cuID	Cleanup Unit Name	Unit Type	Process Type	Unit Status	Size (Acres)	ERTS ID
12066	FORT LEWIS BLDG 2055	Upland	No Process	Awaiting Cleanup		618316

SITE ACTIVITIES:

Applies to:	Related ID (Unit-LUST-VCP)	Activity Display Name	Status	Start Date	End Date	Legal Mechanism	Performed By	Project Manager
CleanupSite		Initial Investigation / Federal Preliminary Assessment	Completed	1/6/2011	1/6/2011		Ecology w/ Contractor	County Health-SW
CleanupSite		Early Notice Letter(s)	Completed	1/6/2011	1/6/2011			Cross, Kim

AFFECTED MEDIA & CONTAMINANTS:

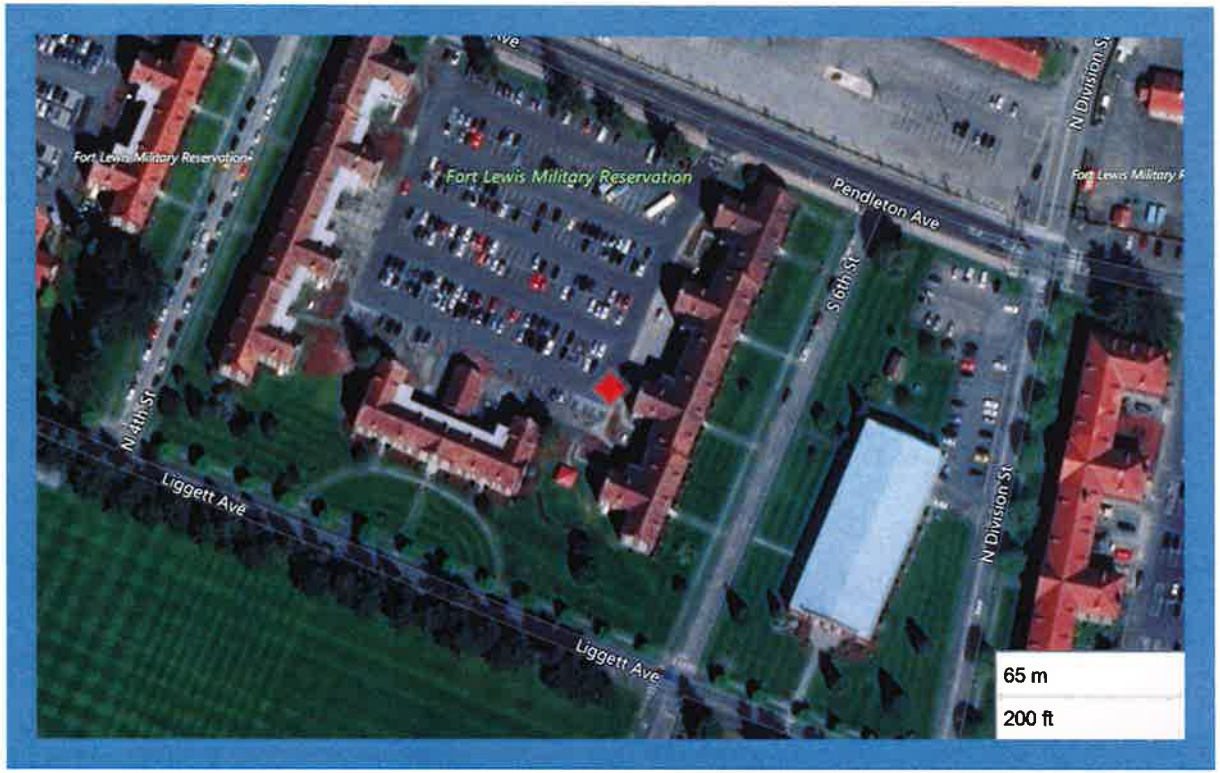
Contaminant:	Media: Ground Water	Surface Water	Soil	Sediment	Air	Bedrock
Petroleum-Other			C			

Key:
B - Below Cleanup Level
C - Confirmed Above Cleanup Level
S - Suspected
R - Remediated
RA - Remediated-Above
RB - Remediated-Below

CleanupSiteDetails2014

Facility/Site: 25778176 US ARMY HQ I Corps & Fort Lewis

Also known as: FT LEWIS RANGE FACILITY KAUFMAN AVE BLDG 4074, FT LEWIS, 11 MILES S OF TACOMA, I CORP & FORT LEWIS, Joint Base Lewis McChord, US ARMY HQ I Corps & Fort Lewis



Address

BLDG 2012 LIGGETT AVE,
BOX 339500 MS 17

Decimal Coordinates

Latitude: 47.09004

JBLM WA 98433-5000 Longitude: -122.6058

Geographic Information

Ecology Region: SWRO Legislative District: 28 WRIA: 11

County: Pierce Congressional District: 10 Tribal Land: No

Ecology Interactions

Interaction Description	Ecology Program	Ecology Program Phone	Program ID	Start Date	End Date
Haz Treatment Storage Facility	HAZWASTE	(360) 407-6734	WA9214053465	12/31/2004	12/31/2007
Hazardous Waste Generator	HAZWASTE	(360) 407-6734	WA9214053465	6/19/1997	
Haz Treatment Storage Facility	HAZWASTE	(360) 407-6734	WA9214053465	6/19/1997	12/7/2004
Emergency/Haz Chem Rpt TIER2	HAZWASTE	(360) 407-6171	WA9214053465	1/1/1994	
Toxics Release Inventory	HAZWASTE	(360) 407-6171	WA9214053465	1/1/1994	
Hazardous Waste Planner	HAZWASTE	(360) 407-6734	WA9214053465	1/1/1991	

Industrial Codes (External Links Below)

NAICS Code	NAICS Description
92811	National Security

SIC Code	SIC Description
9711	NATIONAL SECURITY

Facility/Site: 6157 JBLM Rainier Lodge

Also known as: JBLM Rainier Lodge



Address

2107 N 7TH ST

JBLM WA 98433

Decimal Coordinates

Latitude: 47.09049

Longitude: -122.59969

Geographic Information

Ecology Region: SWRO | Legislative District: 28 | WRIA: 11

County: Pierce | Congressional District: 10 | Tribal Land: No

Ecology Interactions

Interaction Description	Ecology Program	Ecology Program Phone	Program ID	Start Date	End Date
Underground Injection Control	WATQUAL	(360) 407-6400	33301	1/1/2007	

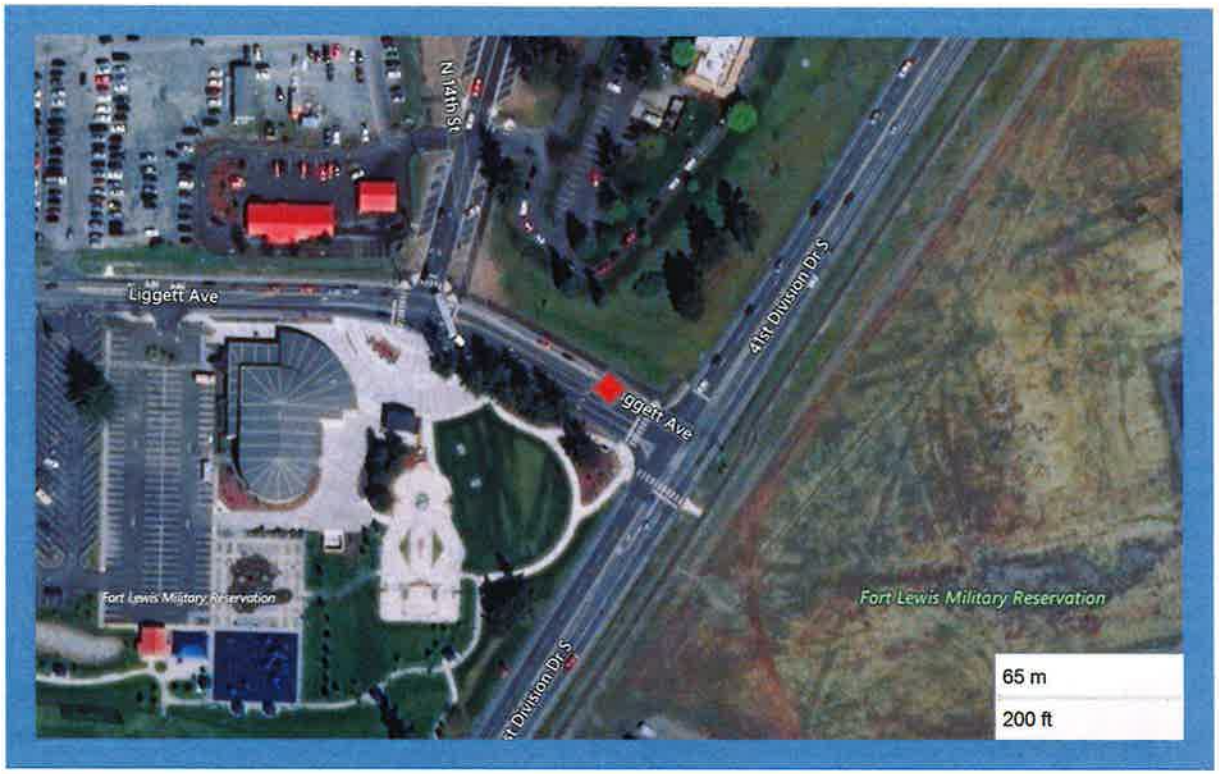
Industrial Codes (External Links Below)

No NAICS information is available for this facility site.

No SIC information is available for this facility site.

Facility/Site: Abdul Azim Khan Site
97898582

Also known as: Abdul Azim Khan Site



Address

FT LEWIS BLDGS 1206 & 1210

FT LEWIS WA 98433

Decimal Coordinates

Latitude: 47.0877

Longitude: -122.58963

Geographic Information

Ecology Region: SWRO | Legislative District: 28 | WRIA: 11

County: Pierce | Congressional District: 10 | Tribal Land: No

Ecology Interactions

Interaction Description	Ecology Program	Ecology Program Phone	Program ID	Start Date	End Date
Haz Waste Management Activity	HAZWASTE	(360) 407-6734	WAH000004069	12/31/1998	
Hazardous Waste Generator	HAZWASTE	(360) 407-6734	WAH000004069	1/20/1998	12/31/1998

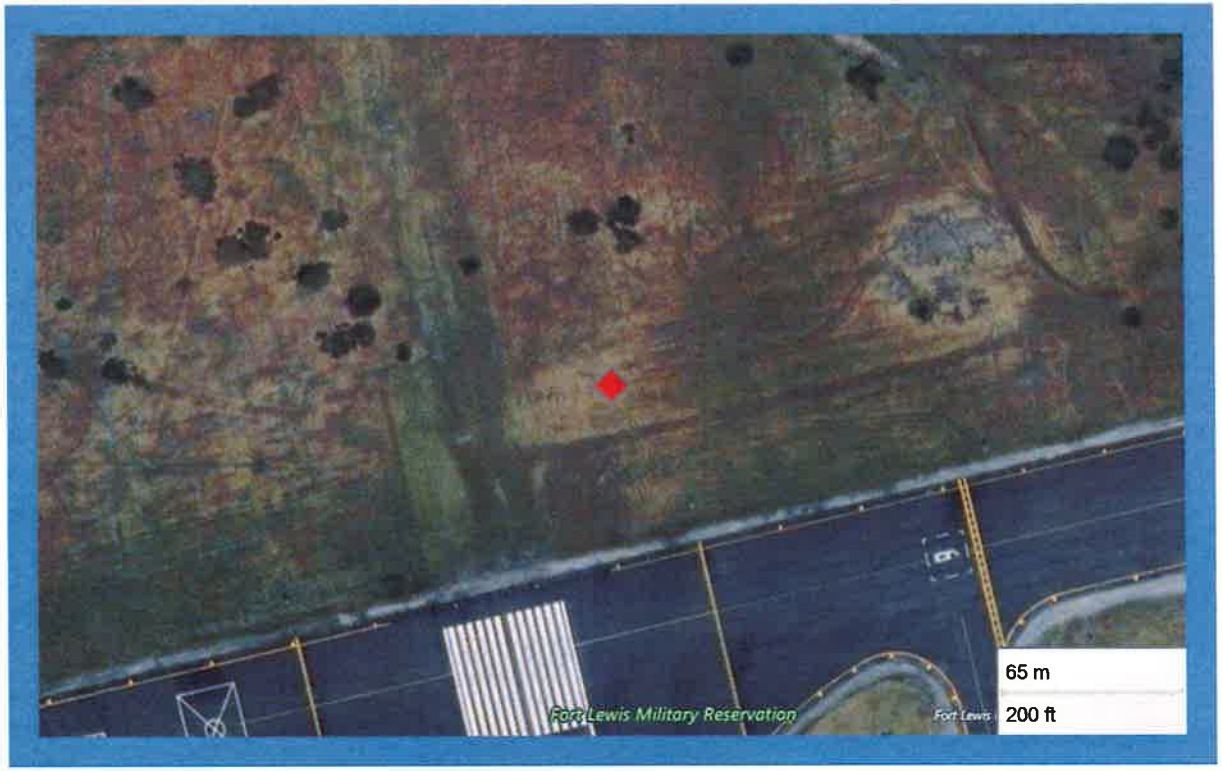
Industrial Codes (External Links Below)

No NAICS information is available for this facility site.

No SIC information is available for this facility site.

Facility/Site: 227 US ARMY FORT LEWIS LOG CENTER

Also known as: Tillicum Wells, US ARMY FORT LEWIS LOG CENTER



Address

T19N R2E 21 22 26 27

TACOMA WA 98433-5000

Decimal Coordinates

Latitude: 47.08815

Longitude: -122.5829

Geographic Information

Ecology Region: SWRO | Legislative District: 28 | WRIA: 11

County: Pierce | Congressional District: 10 | Tribal Land: No

Ecology Interactions

Interaction Description	Ecology Program	Ecology Program Phone	Program ID	Start Date	End Date
Federal (Superfund) Cleanup St	TOXICS	(360) 407-7224	WA7210090067	3/13/1996	

Industrial Codes (External Links Below)

No NAICS information is available for this facility site.

SIC Code	SIC Description
4953	HAZARDOUS WASTE MATERIAL DISPOSAL SI

Cleanup Site Details

PIERCE COUNTY

SITE ID:	**US ARMY FORT LEWIS LOG CENTER**			Cleanup Site ID: 655	FS ID: 227
	Alternate Name(s):	Tillicum Wells, US ARMY FORT LEWIS LOG CENTER			
LOCATION:		WRIA: 11	Lat/Long: 47.088	-122.583	View Vicinity Map
Address:	T19N R2E 21 22 26 27		Township	Range	Section / Legislative District: 28
	TACOMA 98433-5000		19N	2E	32 / Congressional District: 10
STATUS:	**Tracked by EPA**	Rank: 0	View Site Web Page		View Site Documents
	Responsible Unit: EPA	Site Manager: EPA	Statute: Federal -		
	Is Brownfield?	Has Environmental Covenant?	Is PSI Site?		
	NFA Received?	NFA Date:	NFA Reason:		

ASSOCIATED CLEANUP UNIT(s)

cuID	Cleanup Unit Name	Unit Type	Process Type	Unit Status	Size (Acres)	ERTS ID
140	US ARMY FORT LEWIS LOG CENTER	Upland	Federal-supervised or conducted	Cleanup Complete-Active O&M/Monitoring ongoing		

SITE ACTIVITIES:

Applies to:	Related ID (Unit-LUST-VCP)	Activity Display Name	Status	Start Date	End Date	Legal Mechanism	Performed By	Project Manager
CleanupSite		Hazardous Sites Listing/NPL	Completed	9/10/1990	9/10/1990			EPA
Milestone		Remedial Investigation and/or Feasibility Study	Completed	2/2/1988	6/10/1990			Liverman, Earl
Milestone		Cleanup Action Plan	Completed	5/2/1990	10/28/1990			Liverman, Earl
Milestone		Cleanup Action - Engineering Design	Completed	10/12/1990	9/24/1993			Maggi, Martha
Milestone		Cleanup - Construction	Completed	9/30/1993	6/30/1996			EPA

AFFECTED MEDIA & CONTAMINANTS:

Contaminant:	Media: Ground Water	Surface Water	Soil	Sediment	Air	Bedrock
Halogenated Organics	C					

Key:
B - Below Cleanup Level
C - Confirmed Above Cleanup Level
S - Suspected
R - Remediated
RA - Remediated-Above
RB - Remediated-Below

CleanupSiteDetails2014

Facility/Site: JBLM BLDG 6031 19765

Also known as: JBLM BLDG 6031, JBLM BLDG 6031 UST Site



Address

COLORADO AVE JOINT BASE LEWIS MCCHORD

Decimal Coordinates

Latitude: 47.09597

Longitude: -122.58221

McChord WA 98433

Geographic Information

Ecology Region: SWRO	Legislative District: 28	WRIA: 12
County: Pierce	Congressional District: 10	Tribal Land: No

Ecology Interactions

Interaction Description	Ecology Program	Ecology Program Phone	Program ID	Start Date	End Date
Federal (Superfund) Cleanup St	TOXICS	(360) 407-7224		8/17/2015	

Industrial Codes (External Links Below)

NAICS Code	NAICS Description
42271	Petroleum Bulk Stations and Terminal

No SIC information is available for this facility site.

DEPARTMENT OF ECOLOGY
State of Washington

Cleanup Site Details

6/28/2018

PIERCE COUNTY

SITE ID:	**JBLM BLDG 6031**			Cleanup Site ID: 12997	FS ID: 19765
	Alternate Name(s):	JBLM BLDG 6031, JBLM BLDG 6031 UST Site			
LOCATION:		WRIA: 12	Lat/Long: 47.096 -122.582		View Vicinity Map
Address:	Colorado Ave Joint Base Lewis McChord		Township	Range	Section	Legislative District: 28
	McChord 98433		19N	2E	32	Congressional District: 10
STATUS:	**Cleanup Started**	Rank:		View Site Web Page	View Site Documents
	Responsible Unit: Headquarters	Site Manager: Forson, Ben		Statute: MTCA	
	Is Brownfield?	Has Environmental Covenant?		Is PSI Site?	
	NFA Received?	NFA Date:	NFA Reason:		

ASSOCIATED CLEANUP UNIT(s)

cuID	Cleanup Unit Name	Unit Type	Process Type	Unit Status	Size (Acres)	ERTS ID
13675	BLDG 6031	Upland	Ecology-supervised or conducted	Cleanup Started		

SITE ACTIVITIES:

Applies to:	Related ID (Unit-LUST-VCP)	Activity Display Name	Status	Start Date	End Date	Legal Mechanism	Performed By	Project Manager
Milestone		Remedial Investigation and/or FS Work Plan	In Process	8/15/2015	8/15/2016			Forson, Ben

AFFECTED MEDIA & CONTAMINANTS:

Contaminant:	Media: Ground Water	Surface Water	Soil	Sediment	Air	Bedrock
Petroleum-Gasoline	C		C			

Key:
B - Below Cleanup Level
C - Confirmed Above Cleanup Level
S - Suspected
R - Remediated
RA - Remediated-Above
RB - Remediated-Below

CleanupSiteDetails2014

Facility/Site: 70491 FY12 RSU & Faith Avenue Improvements

Also known as: FY12 RSU & Faith Avenue Improvements



Address

FAITH AVE & 2ND DIVISION DR

Decimal Coordinates

Latitude: 47.08472

Longitude: -122.56956

Joint Base Lewis McChord WA
98388

Geographic Information

Ecology Region: SWRO	Legislative District: 28	WRIA: 11
County: Pierce	Congressional District: 10	Tribal Land: No

Ecology Interactions

Interaction Description	Ecology Program	Ecology Program Phone	Program ID	Start Date	End Date
Underground Injection Control	WATQUAL	(360) 407-6400	33865	1/1/2018	

Industrial Codes (External Links Below)

No NAICS information is available for this facility site.

No SIC information is available for this facility site.

Facility/Site: JBLM BLDG 3292 24078

Also known as: JBLM BLDG 3292



Address

3292 BLDG JECELIN ST

FT LEWIS WA 98433

Decimal Coordinates

Latitude: 47.08147

Longitude: -122.56647

Geographic Information

Ecology Region: SWRO	Legislative District: 28	WRIA: 11
County: Pierce	Congressional District: 10	Tribal Land: No

Ecology Interactions

Interaction Description	Ecology Program	Ecology Program Phone	Program ID	Start Date	End Date
State Cleanup Site	TOXICS	(360) 407-7224		9/1/2010	

Industrial Codes (External Links Below)

NAICS Code	NAICS Description
334416	Electronic Coil, Transformer, and Ot

No SIC information is available for this facility site.

DEPARTMENT OF ECOLOGY
State of Washington

Cleanup Site Details

6/28/2018

PIERCE COUNTY

SITE ID:	**JBLM BLDG 3292**			Cleanup Site ID: 11475	FS ID: 24078
	Alternate Name(s):	JBLM BLDG 3292			
LOCATION:		WRIA: 11	Lat/Long: 47.081	-122.566	View Vicinity Map
Address:	3292 BLDG JECELIN ST		Township	Range	Section	Legislative District: 28
	FT LEWIS 98433		18N	2E	4	Congressional District: 10
STATUS:	**Awaiting Cleanup**		Rank:	View Site Web Page		View Site Documents
	Responsible Unit: Southwest	Site Manager: Southwest Region		Statute: MTCA	
	Is Brownfield?	Has Environmental Covenant?		Is PSI Site?	
	NFA Received?	NFA Date:	NFA Reason:		

ASSOCIATED CLEANUP UNIT(s)

cuID	Cleanup Unit Name	Unit Type	Process Type	Unit Status	Size (Acres)	ERTS ID
12084	JBLM BLDG 3292	Upland	No Process	Awaiting Cleanup		622087

SITE ACTIVITIES:

Applies to:	Related ID (Unit-LUST-VCP)	Activity Display Name	Status	Start Date	End Date	Legal Mechanism	Performed By	Project Manager
CleanupSite		Initial Investigation / Federal Preliminary Assessment	Completed	2/2/2011	2/2/2011		Ecology w/ Contractor	County Health-SW
CleanupSite		Early Notice Letter(s)	Completed	2/2/2011	2/2/2011			Cross, Kim

AFFECTED MEDIA & CONTAMINANTS:

Contaminant:	Media: Ground Water	Surface Water	Soil	Sediment	Air	Bedrock
Petroleum-Other			C			

Key:
B - Below Cleanup Level
C - Confirmed Above Cleanup Level
S - Suspected
R - Remediated
RA - Remediated-Above
RB - Remediated-Below

CleanupSiteDetails2014

Burlington Northern Rail Road

Subject: City of DuPont Wellhead Protection Area

Dear Burlington Northern Rail Road:

We are writing to let you know the location and extent of our public water system wellhead protection areas. In responding to spills or discharges in or near these areas please see that all reasonable steps are taken to ensure that any spills or discharges to ground within or near these areas do not contaminate our drinking water sources.

The City of DuPont has approximately 3,800 service connections, and serves approximately 8,200 people. The Washington State Department of Health rated our water sources as "Low" to "Moderate" susceptibility to groundwater contamination."

The enclosed map shows the 6-month and 1-, 5- and 10-year time-of-travel boundaries for our wellhead protection area. We're also sending you a list of the facilities or activities of concern. Any groundwater contamination that occurs within or near these wellhead protection areas has a potential to reach our wells.

Thank you for your support in protecting our drinking water. If you have any questions or need to contact the City regarding groundwater protection concerns, please contact the City's Public Works Director, Mr. Gus Lim at (253) 912-5380.

Sincerely,

Mike Courts, Mayor
City of DuPont

DuPont Grocery

Subject: City of DuPont Wellhead Protection Area

Dear DuPont Grocery

To protect the drinking water supply for the customers of the City of DuPont Water System, we are developing a wellhead protection program as required by state law. As part of our wellhead protection program, we mapped the area overlying the recharge zone of our drinking water supply wells. This is called our wellhead protection area.

Following the mapping of the wellhead protection area, we conducted an inventory of potential groundwater contamination sources within the area. The nature of your business, which includes underground fuel tanks, and its location within our wellhead protection area means that your activities have the potential to affect our customers' drinking water supply.

We have notified the agency or agencies that regulate(s) your type of business/facility that you are in our wellhead protection area. You should contact them to request technical assistance to help manage your business in a way that will best prevent groundwater contamination. We realize you are already careful to protect the environment as you conduct your business. We hope that learning that you are in our wellhead protection area will result in more precautions to ensure that your activities will not affect our drinking water quality.

If you have any questions or need to contact the City regarding groundwater protection concerns, please contact the City's Public Works Director, Mr. Gus Lim at (253) 912-5380.

Thank you.

Mike Courts, Mayor
City of DuPont

Washington State Department of Ecology

Subject: City of DuPont Wellhead Protection Area

Dear Washington State Department of Ecology:

We are writing to let you know the location and extent of our public water system wellhead protection areas. In responding to spills or discharges in or near these areas please take all reasonable steps to ensure that any spills or discharges to ground within or near these areas do not contaminate our drinking water sources.

The City of DuPont has approximately 3,800 service connections, and serves approximately 8,200 people. The Washington State Department of Health rated our water sources as "Low" to "Moderate" susceptibility to groundwater contamination."

The enclosed map shows the 6-month and 1-, 5- and 10-year time-of-travel boundaries for our wellhead protection area. We're also sending you a list of the facilities or activities of concern. Any groundwater contamination that occurs within or near these wellhead protection areas has a potential to reach our wells.

Thank you for your support in protecting our drinking water. If you have any questions or need to contact the City regarding groundwater protection concerns, please contact the City's Public Works Director, Mr. Gus Lim at (253) 912-5380.

Sincerely,

Mike Courts, Mayor
City of DuPont

DuPont Fire Department

Subject: City of DuPont Wellhead Protection Area

Dear DuPont Fire Department:

We are writing to let you know the location and extent of our public water system wellhead protection areas. In responding to spills or discharges in or near these areas please see that all reasonable steps are taken to ensure that any spills or discharges to ground within or near these areas do not contaminate our drinking water sources.

The City of DuPont has approximately 3,800 service connections, and serves approximately 8,200 people. The Washington State Department of Health rated our water sources as "Low" to "Moderate" susceptibility to groundwater contamination."

The enclosed map shows the 6-month and 1-, 5- and 10-year time-of-travel boundaries for our wellhead protection area. We're also sending you a list of the facilities or activities of concern. Any groundwater contamination that occurs within or near these wellhead protection areas has a potential to reach our wells.

Thank you for your support in protecting our drinking water. If you have any questions or need to contact the City regarding groundwater protection concerns, please contact the City's Public Works Director, Mr. Gus Lim at (253) 912-5380.

Sincerely,

Mike Courts, Mayor
City of DuPont

Letter to JBLM

Subject: CITY OF DUPONT WELLHEAD PROTECTION AREA NOTIFICATION

Dear Sirs:

This letter is being provided pursuant to the requirements of WAC 246-290 135 to inform JBLM facilities management personnel regarding the City of DuPont wellhead protection area. The City is updating their Water System Plan as required under WAC 246-290-100, which includes updating their Wellhead Protection Program. The most recent previous Wellhead Protection Program update was completed in 2011 in conjunction with the 2011 Water System Plan update. The current Wellhead Protection Program update is similar to the 2011 Wellhead Protection Program. The current wellhead protection area remains unchanged from the 2011 Wellhead Protection Program.

Enclosed is the City's current wellhead protection area map together with a table that briefly describes the sites identified on the map. As can be seen from the map, there are many sites of concern on JBLM in or near the City's wellhead protection area. Based on records available through the Washington State Department of Ecology, these sites fall into several categories, including sites with a potential to contribute to groundwater contamination, such as stormwater injection wells, sites where soils contamination has been identified and cleaned up, sites where soils contamination has been identified and is in the process of being cleaned up, sites where groundwater contamination has been identified and is in the process being cleaned up, and sites where contamination has been identified or is suspected and cleanup is in the planning process.

We believe that JBLM staff are aware of these sites and are doing everything within reason to prevent contamination from any of these sites from reaching the City's water supply wells. We hope that this letter will serve as a reminder to JBLM staff of the City's concerns for groundwater protection, and the need for continued vigilance to protect the City's public water supply.

We wish to thank JBLM for historical and ongoing efforts to protect our groundwater supplies. Protection of groundwater is a task that is never completed, but must be continuously and diligently pursued.

If you have any questions or need to contact the City regarding groundwater protection concerns, please contact the City's Public Works Director, Mr. Gus Lim at (253) 912-5380.

Thank you.

Mike Courts, Mayor
City of DuPont

Pierce County Emergency Management

Subject: City of DuPont Wellhead Protection Area

Dear County Emergency Management:

We are writing to let you know the location and extent of our public water system wellhead protection areas. In responding to emergencies in or near these areas please take all reasonable steps to ensure that any spills or discharges to ground within or near these areas do not contaminate our drinking water sources.

The City of DuPont has approximately 3,800 service connections, and serves approximately 8,200 people. The Washington State Department of Health rated our water sources as "Low" to "Moderate" susceptibility to groundwater contamination."

The enclosed map shows the 6-month and 1-, 5- and 10-year time-of-travel boundaries for our wellhead protection area. We're also sending you a list of the facilities or activities of concern. Any groundwater contamination that occurs within or near these wellhead protection areas has a potential to reach our wells.

Thank you for your support in protecting our drinking water. If you have any questions or need to contact the City regarding groundwater protection concerns, please contact the City's Public Works Director, Mr. Gus Lim at (253) 912-5380.

Sincerely,

Mike Courts, Mayor
City of DuPont

Pierce County Planning

Subject: City of DuPont Wellhead Protection Area

Dear County Planning:

We are writing to let you know that businesses or facilities you regulate are in our public water system wellhead protection area. Please take all reasonable steps to ensure that land use activities within this area do not contaminate our drinking water sources.

The City of DuPont has approximately 3,800 service connections, and serves approximately 8,200 people. The Washington State Department of Health rated our water sources as "Low" to "Moderate" susceptibility to groundwater contamination."

The enclosed map shows the 6-month and 1-, 5- and 10-year time-of-travel boundaries for our wellhead protection area. We're also sending you a list of the facilities or activities of concern. Any groundwater contamination that occurs within this wellhead protection area has a potential to reach our wells.

Thank you for your support in protecting our drinking water. If you have any questions or need to contact the City regarding groundwater protection concerns, please contact the City's Public Works Director, Mr. Gus Lim at (253) 912-5380.

Sincerely,

Mike Courts, Mayor
City of DuPont

Washington State Department of Transportation

Subject: City of DuPont Wellhead Protection Area

Dear Washington State Department of Transportation:

We are writing to let you know the location and extent of our public water system wellhead protection areas. In responding to spills or discharges in or near these areas please take all reasonable steps to ensure that any spills or discharges to ground within or near these areas do not contaminate our drinking water sources. We are particularly concerned about any spills or discharges that may reach any of the several stormwater catch basins along Interstate 5, which may drain to groundwater.

The City of DuPont has approximately 3,800 service connections, and serves approximately 8,200 people. The Washington State Department of Health rated our water sources as "Low" to "Moderate" susceptibility to groundwater contamination."

The enclosed map shows the 6-month and 1-, 5- and 10-year time-of-travel boundaries for our wellhead protection area. We're also sending you a list of the facilities or activities of concern. Any groundwater contamination that occurs within or near these wellhead protection areas has a potential to reach our wells.

Thank you for your support in protecting our drinking water. If you have any questions or need to contact the City regarding groundwater protection concerns, please contact the City's Public Works Director, Mr. Gus Lim at (253) 912-5380.

Sincerely,

Mike Courts, Mayor
City of DuPont

Washington State Patrol

Subject: City of DuPont Wellhead Protection Area

Dear Washington State Patrol:

We are writing to let you know the location and extent of our public water system wellhead protection areas. In responding to spills or discharges in or near these areas please see that all reasonable steps are taken to ensure that any spills or discharges to ground within or near these areas do not contaminate our drinking water sources. We are particularly concerned about any spills or discharges that may reach any of the several stormwater catch basins along Interstate 5, which may drain to groundwater.

The City of DuPont has approximately 3,800 service connections, and serves approximately 8,200 people. The Washington State Department of Health rated our water sources as "Low" to "Moderate" susceptibility to groundwater contamination."

The enclosed map shows the 6-month and 1-, 5- and 10-year time-of-travel boundaries for our wellhead protection area. We're also sending you a list of the facilities or activities of concern. Any groundwater contamination that occurs within or near these wellhead protection areas has a potential to reach our wells.

Thank you for your support in protecting our drinking water. If you have any questions or need to contact the City regarding groundwater protection concerns, please contact the City's Public Works Director, Mr. Gus Lim at (253) 912-5380.

Sincerely,

Mike Courts, Mayor
City of DuPont

APPENDIX I

O&M MATERIALS

CITY OF DUPONT BELL HILL PUMP STATION YEAR_____

MONTHLY MAINTENANCE CHECKLIST

Operator's Initials:	JAN. ____	FEB. ____	MAR. ____	APR. ____	MAY ____	JUN. ____	JLY. ____	AUG. ____	SEP. ____	OCT. ____	NOV. ____	DEC. ____
INSTRUMENTATION												
Annunciator Panel												
A. Audible Alarms												
EMERGENCY POWER SYSTEM												
Battery System												
A. Inspect charger operation and charge rate												
B. Check recharge after engine start												
AC Electrical												
A. Check circuit breakers and fuses												
Engine												
A. Check governor operation and lubrication												
B. Run engine under load:												
1. Record oil pressure												
2. Record water temperature												
3. Record charge rate												
4. Record Hertz												
5. Record Volts												
6. Record Amps												
MECHANICAL												
Motors												
A. Check oil level												
Surge Controller												
A. Check Y-strainer/filter element and clean or replace, as necessary												
B. Check hydraulic cylinder and hand control valve												
C. Check cable tension (adjust if necessary)												
Pumps												
A. Test efficiency Annually												

CITY OF DUPONT
BELL HILL PUMP STATION
WEEKLY MAINTENANCE CHECKLIST

	Month_____ Year_____				Month_____ Year_____			
	WK. 1	WK. 2	WK. 3	WK.4	WK. 1	WK. 2	WK. 3	WK.4
Operator's Initials:								
INSTRUMENTATION								
Annunciator Panel								
A. Status Lights								
B. Clean Panel								
EMERGENCY POWER SYSTEM								
Exhaust Line								
A. Check drain condensate level								
Fuel System								
A. Check main tank level								
B. Check day tank level								
C. Inspect and test fuel level switch								
D. Inspect and test transfer pump operation								
E. Inspect and test solenoid valve operation								
Lubrication								
A. Check oil level								
Cooling System								
Check coolant level								
B. Visually inspect water pumps								
C. Inspect hoses and connections								
D. Check block heater operations								
MECHANICAL								
Piping								
A. Visually check piping alignment, paint/protective coating, corrosion, general condition								
Motors								
A. Check temperature								
B. Visually inspect alignment and vibration								
Pumps								
A. Check bearing temperature								
B. Check discharge pressure								
C. Visually inspect vibration, leaks and mechanical seals								
Surge Controller								
A. Inspect Cylinder rods for dust or dirt. Clean with fine steel wool and spray with lubricant								
B. Inspect hydraulic hose, piping and cylinder								

STORAGE INSPECTION REPORT

Elevated Tank/Reservoir Name or Location _____

		YES	NO	N/A
1.	Capacity: _____ Gallons			
2.	Ventilation provided			
3.	Ventilation screen ok?			
4.	Tank outlet through bottom			
5.	Tank inlet and outlet insulated			
6.	Overflow pipe flushed			
7.	Angle flap valve screen on overflow pipe ok?			
8.	Tank drain operated and flushed			
9.	Tank drain separate from inlet and outlet piping			
10.	Screen at discharge end of drain pipe ok?			
11.	Manhole cover			
	a. Lockable			
	b. Watertight			
	c. Overhanging			
12.	Exterior ladder(s) usable and access controlled			
13.	Interior ladder			
	a. Provided			
	b. Usable			
14.	Roof watertight			
15.	Steel tanks			
	a. Interior paint adequate			
	b. Exterior paint adequate			
16.	Liquid level controls checked			
17.	Low and high level alarm checked			
18.	Recent trespass or vandalism observed			
19.	Does drain/overflow discharge to storm system?			
20.	Does drain/overflow discharge to sewer?			
21.	Does drain/overflow discharge adequately?			

Other possible source of contamination: _____

_____

Improvements needed: _____

_____

Remarks: _____

_____

MAIN REPAIR REPORT

Main # _____ Main Size _____ Section _____ _____/4 Map # _____

Node # _____ (Valve/Main # _____) to Node # _____ (Valve/Main # _____)

Date Installed ____/____ Type _____ Manufacturer _____

Length of Main _____ ft. Number of Connections on Main _____

Valves to Isolate _____, _____, _____, _____, _____, _____, _____

Location:

_____ side of _____

From _____ St. to _____

Other Location Information:

_____

_____

Specific Location:

_____ ft. _____ of _____

_____ ft. _____ of _____

Site Map:

Last corrected ____/____/____ dBase enter ____/____/____ Map ____/____/____

Remarks on back of page _____ Yes _____ No

VALVE MAINTENANCE / INSPECTION REPORT

Valve #_____, Valve Size _____, Section _____/_____/4, Map #_____

Location:
Principle St:_____ _____ ft. _____ of center line

Intersecting St:_____ _____ ft. _____ of center line

Specific Location: Checked OK _____ or measured as follows:

_____ ft. _____ of _____

_____ ft. _____ of _____

_____ ft. _____ of _____

Found: _____, # of turns: _____, Left: _____

Packing: OK _____, Leaking: _____

Stem: OK _____, Bent / Broken: _____

Nut: OK _____, Missing / Damaged: _____

Gears: OK _____, Faulty: _____

Lid: OK _____, Missing / Broken: _____, Replaced _____

Box: OK _____, Cold mixed *Yes / No* needed? *Yes / No*

Buried *Yes / No* _____, Protruding *Yes / No* _____"

Too Close to Operating Nut *Yes / No*

Other Problems / Work Needed: _____

_____

_____

Work / Repairs Completed:

_____ By: _____ Date ___/___/___

_____ By: _____ Date ___/___/___

_____ By: _____ Date ___/___/___

Inspection/Maintenance Completed by: _____ Date ___/___/___

Remarks on back of page ___ Yes ___ No

VALVE REPAIR REPORT

Valve #_____ Valve Size _____ Section _____ _____/4 Map #_____

Connecting Pipe #_____ to Pipe/Node #_____, Installed____/____

Type _____, Connecting ends _____ x _____, Make _____

Opens _____, # of turns _____, Depth to operate nut _____

Normally _____, Valve box cold-mixed? _____ needed? _____

General Location:

Principle St:_____ _____ ft. _____ of center line

Intersecting St:_____ _____ ft. _____ of center line

Specific Location:

_____ ft. _____ of _____

_____ ft. _____ of _____

_____ ft. _____ of _____

Valve/Site Map:

Last corrected ____/____/____ dBase enter ____/____/____ CAD Map ____/____/____

Remarks on back of page _____ Yes _____ No

HYDRANTS MAINTENANCE / INSPECTION REPORT

Hydrant #_____, Valve Size _____, Section ____/____/4, Map #_____

Location:
Principle St:_____ _____ ft. _____ of center line

Intersecting St:_____ _____ ft. _____ of center line

Specific Location: Checked OK _____ or measured as follows:

_____ ft. _____ of _____

_____ ft. _____ of _____

_____ ft. _____ of _____

Caps Missing: _____, Replaced: _____, Greased:_____

Chains Missing: _____, Replaced: _____, Freed: _____

Paint: OK _____, Repaint: _____

Oper. Nut: OK _____, Greased: _____ Replaced: _____

Nozzles: OK _____, Caulked: _____ Replaced: _____

Valve & Seat: OK _____, Replaced; _____

acking: OK _____, Tightened: _____ Replaced:_____

Drainage: OK _____, Corrected: _____

Flushed: _____ Minutes _____ Nozzle Open

Pressure: Static: _____ Residual: _____ Flow _____ gpm

Branch Valve: Condition: _____

Other Problems / Work Needed: _____

_____

_____

Work / Repairs Completed:

_____ By: _____ Date ___/___/___

_____ By: _____ Date ___/___/___

_____ By: _____ Date ___/___/___

Inspection/Maintenance Completed by: _____ Date ___/___/___

marks on back of page _____ Yes _____ No

APPENDIX J

CROSS CONNECTION PROGRAM

CITY OF DUPONT

ORDINANCE NO. 394

AN ORDINANCE relating to water services and adopting Rules and Regulations of the State Board of Health relating to regulating backflow prevention devices and cross-connections in the City of Dupont public water systems.

THE CITY COUNCIL OF THE CITY OF DUPONT, STATE OF WASHINGTON, DOES ORDAIN AS FOLLOWS:

Section 1. The following Articles are hereby adopted by the DuPont City Council:

1.10 Purpose. It is the purpose of Article I to protect the health of customers receiving water from the City of DuPont by protecting the public water system of the City of DuPont from contamination.

1.20 Definitions. Whenever used in this Article:

(A) "Cross-connection" shall mean any physical arrangement whereby a public water supply is connected, directly or indirectly, with any other water supply system, sewer, drain, conduit, pool storage reservoir, plumbing fixture, or other device which contains or may contain contaminated water, sewer, or other waste or liquid of unknown or unsafe quality which may be capable of imparting contamination to the public water supply system of the City as a result of backflow.

(B) "Backflow" shall mean the flow, other than the intended direction of flow, of any foreign liquids, gases or substances into the City public water supply or distribution system.

(C) "Backflow prevention device" shall mean a device to counteract back pressure or to prevent siphonage.

(D) "City Engineer" shall mean a registered professional engineer designated by the City of DuPont to act as City Engineer.

(E) "Maintenance Supervisor" shall mean the person designated by the City of DuPont to be responsible for maintenance of the City's water system.

(F) Upon the filing of one copy with the City Clerk

all definitions contained in the State of Washington Administrative Code (WAC) 248-54-285, as now or hereafter amended, shall by this reference be considered definitions within this Article.

1.30 Service Restrictions.

(A) No water service connection from the City of DuPont's water system to any premise shall be installed or maintained unless the water supply is protected by backflow prevention devices as required by the City Engineer or his/her designee and the rules and regulations of the State Board of Health and this Article. The installation or maintenance of a cross-connection which will endanger the City's water quality is prohibited. Any such cross-connection now existing or hereafter installed is hereby declared a nuisance and shall be abated. The control and/or elimination of cross-connections within the City of DuPont shall be in accordance with WAC 248-54-285 or superseding WAC.

(B) Service to any property, landowner, or water user receiving its water supply from the City of DuPont water supply system shall be contingent upon compliance with all requirements of the rules and regulations of the State Board of Health and of this Article. Service shall be discontinued to any premise, water user or property owner for failure to comply and any discontinued service will not be reestablished until the City Engineer has approved compliance with such requirement of the rules and regulations contained herein.

1.40 City Engineer To Administer. The City Engineer shall be responsible for administering this Article including the development of the necessary procedures and practices to accomplish same, consistent with the standards in this Article and WAC 248-54-285.

1.50 Inspection - Right Of Entry. The City Engineer, the Maintenance Supervisor, and other duly authorized employee(s) bearing proper credentials and identification shall be permitted to enter upon all properties receiving water service from the City of DuPont for the purposes of inspection, observation and testing in accordance with the provisions of this Article.

1.60 Administrative Code Adopted. The provisions of WAC 248-54-285 as now or hereafter amended relating to cross-connection control and elimination and the use of backflow prevention devices

when such are considered to be advisable, are hereby adopted and made a part hereof, and all provisions of said WAC may be executed and applied by the City Engineer and the Utilities Maintenance Department in determining when cross-connection are prohibited and when backflow prevention devices shall be required.

Section 2. The following Article is hereby adopted by the Dupont City Council:

2.10 Penalty For Violations. Any person who shall violate or fail to comply with any provisions of this chapter shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine in any sum not exceeding three hundred dollars or by imprisonment for a term not exceeding thirty days, or by both such fine and imprisonment.

Section 3. This ordinance shall be published and become effective as provided by law.

ADOPTED this 9 day of August, 1989.

CITY OF DUPONT

By: _____
MARK S. JACKSON, Mayor

ATTEST:

_____
PATRICIA SKINNER, City Clerk

PUBLISHED: _____

POSTED: _____

APPROVED AS TO FORM:

_____
JAMES MASON, City Attorney

CITY OF DUPONT
ORDINANCE NO. 488

AN ORDINANCE RELATING TO THE MUNICIPAL WATER SUPPLY SYSTEM OF THE CITY OF DUPONT; REGULATING THE USE OF WATER THEREFROM; PROVIDING FOR THE SALE OF THE SAME; PROVIDING PENALTIES FOR VIOLATIONS OF THIS ORDINANCE; REPEALING ORDINANCE NO. 427

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF DUPONT AS FOLLOWS:

CHAPTER 1
DEFINITIONS

Section 1 Interpretation of Definitions. For the purpose of this ordinance the following words or phrases have the meaning set forth herein, unless the context indicates otherwise.

Section 2 "City". The City of DuPont.

Section 3 "Mayor". Mayor of the City of DuPont or Mayor's authorized representative.

Section 4 "Commercial Services". Water services to multiple dwelling units or businesses engaged in the manufacture and/or sale of a commodity or commodities, or the rendering of a service, such as hotels, motels and hospitals.

Section 5 "Council". The City Council of the City of DuPont.

Section 6 "Cross Connection". Any connection between any part of the water system used or intended to supply water for drinking purposes and any source or system containing water or substance that is not or cannot be approved as safe, wholesome, and potable for human consumption.

Section 7 "Customer". All persons obtaining water service from the water supply system of the City of DuPont.

Section 8 "G.I.S." The City of DuPont's computer based Geographic Information System which will be used for tracking and maintaining current information on all of the utility systems and roadways within the City.

Section 9 "Industrial Services". Water Service connections to a business enterprise engaged in the manufacture of products, materials, equipment, machinery and supplies on a substantial or major scale.

Section 10 "Main". A water line designed or used to serve more than one premises.

Section 11 "Multiple Dwelling Units". Duplexes, apartment buildings, condominiums, mobile home parks, trailer courts, etc.

Section 12 "Person". Natural persons of either sex, and associations, co-partnerships and corporations, whether acting by themselves or by a servant, agent or employee.

Section 13 "Premises". A private home, building apartment house, condominium, trailer court, mobile home park, a group of adjacent buildings or property utilized under one ownership and under a single control with respect to use of water and responsibility for payment therefore.

Section 14 "Residential Services". A water service connection to a single family dwelling unit.

Section 15 "Service Installation, Service Connection, or Connection. All pipings and fittings from the main to the property owner's side of the water meter assembly.

Section 16 "System". All water source and supply facilities, transmission pipelines, and storage facilities, pumping plants, distribution mains and appurtenances, vehicles, and materials storage facilities.

Section 17 "Temporary Main". Mains which do not conform to City standards with respect to size, location, type of material and/or method of installation.

Section 18 "Treasurer". The City Treasurer of the City of DuPont.

Section 19 "Water Service Area". That area consisting of the corporate limits of the City of DuPont and those areas that have been or may be designated for water service by the City Council.

Section 20 "Water Standards". The City's latest revision of "Conditions and Standards for Construction of Developer Extensions to the Water System".

CHAPTER 2
GENERAL PROVISIONS

Section 1 Purpose. The purpose of this ordinance is to establish general rules and regulations for the service and extension of service from the water system of the City of DuPont; and to promote the public health, safety, and general welfare of the users of the water system, in accordance with standards established by the City, County, State and Federal governments.

Section 2 Applicability. The provisions of this ordinance shall apply to all water services provided by, and to all work performed by the City.

Section 3 Inspection.

A. Authorized employees of the City, properly identified, shall have access, at reasonable hours of the day, to all parts of a premises or buildings to which water is supplied by the City, for the purpose of assuring conformity to these regulations, as required by the Department of Health.

B. Whenever the owner or the occupant of any premises provided service by the City restrains authorized City employees from making such necessary inspections, water service may be refused or discontinued.

Section 4 Unlawful Acts Defined.

A. Any person causing damage to any property belonging to the City shall be liable to the City for any and all damages resulting either directly or indirectly therefrom.

B. It shall be unlawful for any person to willfully disturb, break, deface, damage or trespass upon any property belonging to or connected with the water system of the City of DuPont, an any manner whatsoever.

C. It shall be unlawful for any person to store, maintain or keep any goods, merchandise, materials or rubbish within a distance of five (5) feet of, or to interfere with, the access or operation of any water meter, gate valve, fire hydrant, or other appurtenance in use on any water service, connection, water main, or fire protection service.

Section 5 Hydrant - Authorized Use. It shall be unlawful for any person, other than authorized employees of the City, to operate fire hydrants, valves and hose outlets, unless proper arrangements have been made for payment therefor and permission has been granted by the City.

Section 6 Emergency Interruption of Service.

A. In case of emergency, or whenever the public health safety, or the equitable distribution of water so demands, the City may change, reduce or limit the time for, or temporarily discontinue the use of water. Water service may be temporarily interrupted for the purposes of making repairs, extension or doing other necessary work.

B. Before so changing, reducing, limiting or interrupting the use of water, the City shall notify, insofar as practicable, all water consumers affected.

C. The City shall not be responsible for any damage resulting from interruption, change or failure of the water supply system.

Section 7 Cross Connections Prohibited.

A. The installation or maintenance of a cross connection is prohibited.

B. Any such cross connection now existing or hereafter installed is hereby declared a nuisance and shall be abated immediately. The control or elimination of cross connections shall be in accordance with the State of Washington Administrative Board of Health Code (WAC 246-290-490) as now enacted or hereafter amended, together with any future manuals of standard practice pertaining to

cross connection control approved by the Director of the State of Washington Department of Social and Health Services.

C. Water service will be discontinued to any premises upon failure to comply with the provisions of this section.

D. For protecting the City's water supply from backflow, furnishing of water service shall be contingent upon the customer providing cross connection control approved by the appropriate Health Authority and the City.

Section 8 City Not Liable for Damages. The City shall not be liable for damages in case the operation of the City's source of water supply or means of distribution fails or is curtailed, suspended, interrupted or interfered with, or for any cause reasonably beyond its control. Such failure, curtailment, suspension, interruption or interference shall not be held to constitute a breach of contract on the part of the City, or in any way affect any liability for payment for water made available or for money due on or before the date of such occurrence.

Section 9 Discontinuance of Service.

A. The City may discontinue service by reason of a failure to pay a bill for service or the failure to comply with the terms of this ordinance, in accordance with the procedures established by state law, this ordinance, and other City ordinances.

B. Service to any premises upon which a private water supply system is used or operated contrary to the provisions of this Ordinance may be discontinued or refused.

Section 10 Administration.

A. The Mayor may make such administrative determinations for the proper operation of this ordinance that are not inconsistent with its provisions.

B. The Mayor shall promulgate and enforce such customer service policies and related additional rules as may be deemed necessary from time to time to encourage and facilitate the use of water, pursuant to City Council resolution approving the same.

Section 11 Violations - Penalty. Any person willfully violating any of the provisions of this ordinance shall be guilty of a misdemeanor, and shall be punished as set forth in the City of DuPont Municipal Code.

CHAPTER 3
SERVICE CONNECTIONS AND CHARGES

Section 1 Application for Service.

A. An application shall be made for all service connections, for the use of fire hydrants, and for work to be performed by the City. Such application shall be on forms provided by the City.

B. An application shall be accompanied by all fees or deposits required by this ordinance.

C. An application shall provide all information required by this ordinance, as well as all other information determined by the Mayor to be necessary for consideration and action upon the application.

D. The application, when approved by the Mayor, shall constitute an agreement whereby the applicant agrees to conform to the provisions of the ordinance, as now enacted or hereafter amended.

E. A change of use of the served premises will require that a new application for service be made.

Section 2 Conditions Applicable To All Water Service Connections

A. All service connections shall be metered.

B. Each served premise must have a separate connection to a main, unless otherwise approved by the Mayor when impossible or impractical.

C. Water will not be provided to more than one customer or dwelling through a single service connection, and separate service applications are required for each dwelling. When two customers are being served by a single service connection on the effective date of this ordinance, the Mayor may require the installation of

a new service, when necessary, for efficient operation of the system, at the cost of the customer.

D. When the premises for which service is sought does not abut a main with sufficient pressure and capacity to provide the required flow at the property line, the application for service shall be rejected.

E. No application for water service shall be accepted or approved for locations outside of the City water service area.

F. The furnishing of water by a customer to premises other than that served by the customer's service is prohibited, except as may be approved by the Mayor, and except during emergencies, provided that emergency service cannot continue for more than 30 days and an application for emergency service shall be made to the City within 48 hours of the onset of the emergency.

G. A request for a change in the size of service connection shall be treated as a request for a new service installation.

H. A change of use of the served premises will require a new service connection, unless the existing service is adequate for the changed use, as determined by the Mayor.

Section 3 Conditions Applicable to All Connections

A. All water service connections shall be made by the City unless approved otherwise by the Mayor. Water service connections may be installed by a City approved contractor during construction of water main extensions.

B. The cost of such connections shall be paid by the customer at the time of application.

C. When buildings are replaced by new buildings, the existing water service connection shall not be used, when the Mayor determines that such connection is not acceptable. In such an instance, the customer shall be required to install a new water service connection, in accordance with the terms of this ordinance.

Section 4 New Residential Service Connection Fee.

A. The fee for new residential water service connections and inspections, up to and including the meter, shall be set by the City Council by ordinance, as may be necessary.

B. This fee shall cover the cost of tapping the City's water main for the necessary size of service, provide and install pipe saddle, installing the copper tubing, type "K" necessary to reach the meter box to be installed within the right-of-way, and provide and install a yoke, shut-off, meter and meter box.

Section 5 New Commercial, or Industrial Service Connection Fee.

A. For all commercial and/or industrial services, and for all residential services larger than 2 (two) inch diameter irrespective of meter size, the owner or applicant shall pay a deposit in an amount of the City estimate of cost for the construction work and the work shall be thereafter billed on the basis of actual cost of installation plus administrative overhead (15%). The applicant shall be refunded any under-run or billed any overrun of the actual cost difference in the estimated cost including administrative overhead.

B. In no event shall the charge be less than the charge for a 3/4 inch diameter residential service with a 3/4 inch meter.

Section 6 Ownership of Permanent Facilities.

A. The ownership of all water mains, easements, and the water services from the main to the meter box in public rights-of-way shall be solely vested in the City, except for those mains which are designated as private mains.

B. The ownership and responsibility for the maintenance of individual services from the meter to the premises served shall be that of the owner of the premises served and the City shall not be liable for any part thereof.

Section 7 Non-Standard Water Service Extension.

A. Where the premises of one customer only is located near or abuts upon a street in which there is no water main, a non-standard water service extension no greater than 150 feet in length may be installed and connected, as approved by the Mayor to the nearest available water main.

B. The City will maintain the non-standard water service extension beneath and along the public street, from the main to the water meter. Whenever any improvement within the public right-of-way within which any non-standard water service extension is located requires the removal or readjustment of such pipe, the cost and responsibility therefor shall be that of the owner of the premises served and the City shall not be liable for any operation of the cost thereof.

C. Upon acceptance of a new permanent main where the customer is being served by a non-standard water service, the customer shall discontinue the use of said service and the City shall connect the service line to the permanent main at its own expense.

Section 8 Owner's Service Piping Specifications.

A. Water mains, service lines and appurtenances shall be installed per the City's Water Standards.

B. Service connections and extension pipes laid underground shall be sized in conformance with the applicable provisions of the Uniform Building Code as adopted by the City.

C. The City may require any customer to install a pressure reducing valve, backflow preventive device, pressure relief valve or similar device at any location where the City determines a need, to protect the water system.

Section 9 Plumbing Specifications.

A. All persons installing fixtures or appliances to be supplied with water from the City water mains shall be subject to the requirements of the applicable Plumbing Code of the City. Persons installing plumbing in new buildings shall leave the valve at the meter in the "Off" position upon completion of their work.

B. Persons making additions or repairs to existing plumbing systems shall leave the valve at the meter in the position in which it was found on beginning their work.

C. The Mayor shall have the right to refuse water service or discontinue water service in any situation where it is discovered that applicable City standards and Codes have not been complied with in making the installation.

Section 10 Lawn Sprinkler Specifications.

A. A lawn sprinkler system connected to a domestic, or commercial connection shall be equipped with an approved backflow prevention device placed between the sprinkler stop and waste valve and the first sprinkler outlet. The approved backflow prevention device shall be placed at a height as provided in the applicable City Plumbing Code. The stop and waste valve and approved backflow prevention device shall be in the sprinkler line after it branches from the water service pipe or the building plumbing.

B. The stop and waste valve for a lawn sprinkler system shall be at the same depth as the water service pipe, however, the lawn sprinkler system proper may be laid to a lesser depth at the option of the owner.

C. Such additional stop and waste valves, as are required to properly drain the sprinkler piping, shall also be installed.

D. All backflow prevention devices shall be inspected by an authorized City employee prior to utilization of the system.

E. Water service may be refused on existing lawn sprinkler systems which are not equipped with a stop and waste valve and an approved backflow prevention device.

Section 11 Fire Protection Service.

A. A water main to be used solely for fire protection purposes may be installed, servicing any premises, subject to the provisions of this section.

B. Fire protection systems shall be provided in accordance with Insurance Services Office (I.S.O.) Guidelines.

C. A plan of the proposed required fire protection system showing the general installation detail shall be required and shall be approved by the Mayor and the Fire Marshall prior to construction.

D. Service of more than one premise by a fire service shall not be permitted.

E. Fire Protection systems shall be installed and maintained by the customer in a manner approved by the City and the system shall contain an approved, tested backflow prevention device.

F. Fire protection systems shall be installed with, at a minimum, a detection check meter of a size and type approved by the Engineer.

G. Indication of unauthorized use of water through a detector check meter or other backflow prevention device more than once per calendar year shall be cause for installation of a fire line meter at the expense of the customer.

H. Delinquency in payment of expense for fire protection service or failure of the customer to make changes in meter installation as herein provided, after notice from the City, shall be sufficient cause for filing a lien on the property and/or discontinuance of the service.

CHAPTER 4
TURN ONS AND TURN OFFS

Section 1 Turn On - New Installation. When new water service connections are installed by the City for any premises, the valve at the meter shall be turned to the "Off" position and remain off until a "turn on" is applied for and an order shall be issued by the City upon written application therefor by the owner of the premises to be supplied after inspection and approval by the City, and after the Plumbing Inspector has issued a certificate that all provisions of the applicable Plumbing Code have been complied with.

Section 2 Turn Off - No Charge. After written application or verbal request, any water service will be turned off without charge where such "turn off" can be

accomplished at a time convenient to the Department. The City's monthly base service rate will remain in effect during the turn-off period.

Section 3 Turn On Charge.

A. "Turn On" charges are for expenses incurred to take meter readings, administrative, accounting, data processing, and overhead charges incurred in transferring or establishing a new or existing account. The "turn on" fee shall be deemed fully earned if all or any part of the above activities are accomplished.

B. "Turn On" charges shall not be pro-rated for services started during a billing period. These charges shall be as outlined in the latest revision of the City's Water System Charges and Fee Ordinance.

C. All unpaid water service charges and penalties against the premises shall be required to be paid by the Owner at the time of application for turn on, or an arrangement for payment satisfactory to the City shall be made before water is supplied to the premises.

Section 5 Turn On - Unauthorized.

A. It shall be unlawful for any person, except duly authorized employees of the City, to "turn on" the water supply to the premises after a "turn off" is made at the meter by the City.

B. A water service to any premise turned on by an unauthorized person, after said water supply had been turned off by the City, may, upon discovery, be disconnected by the City from the water main in the street, and shall not be connected again until all fees due as a result of the disconnecting and reconnecting of such service are paid.

Section 6 Turn Off, Turn On - Liability Disclaimer. The City shall not be liable for any damage to persons or property resulting from a properly performed and authorized "turn off" or "turn on" of the water service including, but not limited to, situations where water service is left on between a change of customers occupying the premises, at the request of one of the customers, or the services disconnected for "non-payment" or "no contract".

Section 7 Disconnection of Service - Condemned Buildings. Whenever a premise supplied with water has been found by the proper authorities to be dangerous to human life and unfit for human habitation, and notice of such finding has been received by the City from said authorities, the Mayor shall cause the water service to such premise to be turned off. Water service to such premise shall not be restored until the owner and/or his agent has secured a release or clearance from the proper authorities.

CHAPTER 5
WATER METERS

Section 1 Meter Ownership and Installation. All meters installed on water service connections shall be and remain the property of the City and shall be removed only by the City.

Section 2 Meters - Exchange and Reinstallation.

A. Whenever the owner of any premises desires to change the size of a meter, an application shall be made to the City, and, upon approval, the exchange will be made at the expense of the owner, less credit for the usable value of the meter removed.

B. Overload Meters. Whenever demand periodically exceeds the rated capacity of a meter to the extent that the meter may be damaged, the City shall notify the owner of this fact. After evaluating the owner's requirements, the City shall advise what size meter is necessary to give proper service without damage to the meter. The estimate of cost covering such change shall be furnished by the City, upon request by the owner, without charge. If the owner does not make the required deposit for the installation of the larger meter within thirty days after the date of the notice, then the City shall install the proper size meter, charging the total cost to the owner, or the City may discontinue service.

Section 3 Meter - Maintenance and Repair.

A. The City shall maintain and repair all domestic, commercial and industrial service meters and shall replace meters periodically, when necessary, if rendered unserviceable by ordinary use.

B. When replacement or repairs to any meter are made necessary by the willful act, neglect or carelessness of the owner or occupant of the premises serviced, all expenses of such replacement shall be borne by the owner or occupant of the premise.

Section 4 Meter Tests and Adjustment of Bill.

A. Upon request from a customer, based upon a complaint that the water bill for any period has been excessive, the City shall have the meter re-read.

B. Should the customer then request that the meter be tested for accuracy, he shall make a deposit, as prescribed per City ordinance, with the City Clerk. In case the test discloses an error of more than three percent in favor of the City, the deposit shall be refunded to the customer, a correct registering meter shall be installed and the customer's account shall be credited with the excess consumption over the average consumption for the last previous reading, unless otherwise approved by the Mayor. When the test discloses either no error or an error of three percent or less, the amount deposited will be retained by the City to cover a part of the cost of such test.

CHAPTER 6
WATER RATES

Section 1 Monthly Water Service Rates. Monthly water service rates shall be charged to all users of public water facilities operated and maintained by the City.

Section 2 Service Rates

A. The monthly rates set forth in the most current City of DuPont "Water System Rates and Charges" Ordinance for properties or buildings to which water service is available shall commence (60) days after such water service becomes available and formal notice of such availability is given to the owner of record, or upon connection to such water facilities whichever occurs first.

B. Service rates once imposed on any property or building shall continue until the serviced building is demolished, torn down, removed or no longer in existence for any reason, or unless it can be shown by affidavit that the building could not be serviced because of lack of water. Water service rates for any structure

disconnected or to be disconnected shall continue until such disconnection is approved by the City.

C. The City shall cause to be made and delivered to each consumer of water a statement of the rates every two months. All billings shall be made in accordance with the City of DuPont's Water System Rates and Charges and Uniform Utility Billing and Collection Procedure Ordinances applicable to the type of facility and location of water system serving the user.

D. After water services have been shut off because of a delinquency in paying utility charges, service shall not be resumed until all charges, penalties and service fees have been paid. Service fees shall include a fee for each service trip which has been made to the premises relative to the delinquent charges at rate established by resolution of the city council.

E. If a trip is made by service personnel to the premises of a customer for the purpose of shutting off services due to delinquency, and the customer wishes to pay the delinquent bill and delinquency penalty at that time, a service fee for said trip at rates established by resolution of the city council shall be assessed. If the delinquent charges, penalty and such service fee are paid at the time, the water service shall not be discontinued.

Section 3 Service Trip Charge. Whenever the City responds to a request outside of regular working hours for assistance to investigate a deficiency in water service to any premises and it is determined that the deficiency is the result of improper operation or maintenance of the customer's plumbing, a charge per the City's "Water System Charges and Fees" ordinance will be made to defray a portion of the cost of responding to the request.

CHAPTER 7
MAIN EXTENSIONS

Section 1 When Required. A main extension shall be required whenever more than one (1) residence or customer is provided service, and the property to be served does not abut a water main, or the existing water main is not adequate to provide the necessary water pressure or flow characteristics.

Section 2 Application

A. The person desiring a main extension shall apply to the Mayor requesting permission to extend the City's water system.

B. The Mayor shall review the application, and if the requested extension is determined to be a proper extension of the water system, shall provide the petitioner with the design requirements for the extension.

C. If the requested main extension is determined to be an improper extension of the water system, the application shall be denied.

Section 3 Preparation of Plans and Specifications. Upon receipt of the design requirements from the City, the petitioner shall cause plans and specifications for the extension to be prepared. All design and construction plans and specifications shall be in accordance with the City of DuPont's Water Standards. The completed plans and specifications, having a valid Professional Engineer's seal and endorsement, shall be submitted to the City for review and approval.

Section 4 Plan Review and Inspection, Fee & Deposits Required.

A. Along with a water line extension plan submittal to the City, the owner shall pay to the City a non-refundable deposit of five hundred (500) dollars. The Plan Review fee provides for the costs of service performed by the City included but not limited to planning, engineering review of plans, legal services, inspection of construction, and all other technical and administrative services provided relative to extensions to the existing City water system. The Owner will be charged on a time and material basis for Plan review. Should the cost exceed $500, the Owner will be charged the additional fees.

B. After approval of the plans and specifications, the City shall provide the petitioner with an estimate of the construction inspection fee. A permit for construction will be issued after review fees and the estimated inspection fees have been deposited with the City Treasurer. At such time as the Mayor determines the remaining funds are not adequate to provide necessary inspection for project completion, the petitioner shall be notified of such and an estimate of additional inspection fee required will be provided. The additional fees shall be

deposited with the City Treasurer prior to depletion of the funds on deposit. Any monies unexpended from the inspection deposit upon completion of the project shall be returned to the petitioner.

Section 5 Construction of Main Extensions.

A. All work in the City right-of-way shall be subject to the approval of the City Engineer.

B. Main extensions may be made by private contract or by City forces.

C. Any main extension done other than the City's forces shall be done by a licensed and bonded contractor of the State of Washington.

D. Extension by the City's forces shall be at the expense of the person requesting construction of the main.

E. All main extensions must be on the City's frontage of the applicant's property and other public rights-of-way and easements.

Section 7 Acceptance of Main Extensions.

A. The City reserves the right to reject any installation not inspected and approved by the City.

B. Upon satisfactory completion of all required tests and acceptance of the main extension, the Contractor may, upon the City's approval, cause the extension to be connected to the City system. All costs incurred in such connection(s) including overhead and administrative charges, shall be the responsibility of the petitioner. Any adjustment on the actual cost of installation because of variance between the estimate and the actual cost shall be adjusted by refund upon completion of the job by the petitioner, or by payment by the petitioner to the City of any additional expense above the estimate.

C. No main extension shall be energized other than for test purposes by duly authorized personnel until the main extension has been accepted by the City and all fees and charges have been paid. If energizing a main is necessary to restore

service to existing customers, fire hydrants will not be activated until acceptance of the main extension.

Section 8 Construction Drawings.

A. Upon completion of a main extension, the petitioner shall provide the City reproducible mylar drawings that accurately indicate the main extension and appurtenances as actually installed in plan and profile. The petitioner shall also provide the City with a GIS file, per the City requirements, indicating the main extension and appurtenances as actually installed in plan. If the GIS files are not submitted per the City requirements, the City will create the files and charge the Developer on a time and materials basis.

B. No main extension will be accepted until satisfactory "as built" drawings and GIS files are provided, or the City is reimbursed for their creation.

Section 9 Main Extensions Deeded to City.

A. The permit holder shall provide the City with a deed of conveyance for all main extensions as a condition of acceptance of the main extension by the City.

B. The transfer of any main to the City shall be on the condition that the owner, district, company, contractor, or contributor shall transfer or provide for any necessary and proper franchise.

Section 10 Temporary Mains.

A. No temporary main shall be permitted to be installed as a part of the City's water system.

B. Temporary mains and main extensions, however, may be acquired, maintained and operated by the City where provisions have been made by the owners of such mains to standardize such installations, in compliance with the standards for permanent mains, under terms of an agreement entered into with the Council. Where necessary, said agreement may provide for a surcharge rate or charge to be levied by the City for a specified period of time to provide sufficient revenues to assure compliance with City standards. The Mayor shall, before recommending the acceptance, delineate the temporary mains included in

such installations, which are to be brought up to the City standards, on a map to be included as an exhibit under the aforementioned agreement.

CHAPTER 8
MISCELLANEOUS

Section 1 Severability. If any provisions of this ordinance, or its application to any person or circumstance, is held invalid, the remainder of the ordinance, or application of the provisions of the ordinance to other persons or circumstances, is not affected.

Section 2 Violation--Penalty. Violation of any portion of this chapter is a misdemeanor and is subject to a penalty of not more than $500 and for any costs incurred by the City relative to any violation or as otherwise provided in this ordinance.

Section 3 Effective Date. This ordinance shall take effect as provided by law.

PASSED by the City Council of the City of DuPont at a regular meeting of the Council held on this 9th day of Nov, 1993.

Marian H. Gorgensen
MAYOR

Catherine Haustad-Everett
ATTESTED, CLERK

City of DuPont
Cross Connection Control Program

Chapter 1 – Introduction

PURPOSE AND SCOPE

The City of DuPont Water System (20500P), "the Purveyor", has the responsibility to protect the public water system from contamination due to cross connections. A cross connection may be defined as *"any actual or potential physical connection between a* public water system or the consumer's water system and any source of nonpotable liquid, solid, or gas that could contaminant the potable water supply by backflow."

This document contains the Cross Connection Control Program (Program) for the City of DuPont. The purpose of the Program is to meet the cross connection control requirements of Group A Public Water Supplies, WAC 246-290-490, provide a clear direction for program implementation activities, describe policies and procedures, and summarize current City, state, and federal requirements regarding cross connection control. The Program is structured such that it may be supplemented with published documents and materials developed by City of DuPont Public Works for its specific use. The authority to enforce the practices and policies is established in the City of DuPont Municipal Code DMC Chapter 21.03.

Cross connection control is an integral part of the multiple-barrier approach to ensuring safe drinking water. The mission of City of DuPont Pubic Works Water Quality personnel is to provide and protect nature's water for a healthy community. Implementation of the Program results in protecting the City's water system from contamination from the customer's plumbing supply/system through proper installation of the correct backflow prevention assembly and annual testing of these assemblies by a Washington State Department of Health (DOH) certified Backflow Assembly Tester (BAT).

DEFINITIONS

The following words are frequently used throughout the Program and their definitions are as follows:

"Approved air gap (AG): means a physical separation between the free flowing end of a potable water supply pipeline and the overflow rim of an open or non-pressurized receiving vessel. This separation must be at least:

- Twice the diameter of the supply piping measured vertically from the overflow rim of the receiving vessel, and in no case be less than one inch, when unaffected by vertical surfaces (sidewalls); and:

- Three times the diameter of the supply piping if the horizontal distance between the supply pipe and a vertical surface (sidewall) is less than or equal to three times the diameter of the supply pipe, or if the horizontal distance between the supply pipe and intersecting vertical surfaces (sidewalls) is less than or equal to four times the diameter of the supply pipe and in no case less than one and one-half inches.

"Approved atmospheric vacuum breaker (AVB)" means an AVB of make, model, and size that is approved by the DOH. AVBs that appear on the current approved backflow prevention assemblies list developed by the University of Southern California Foundation for Cross Connection Control and Hydraulic Research or that are listed or approved by other nationally recognized testing agencies (such as IAPMO, ANSI, or UL) acceptable to the authority having jurisdiction are considered approved by the DOH.

"Approved backflow prevention assembly" means a reduced pressure backflow assembly (RPBA), a reduced pressure detector assembly (RPDA), a double check valve assembly (DCVA), a double check detector assembly (DCDA) a pressure vacuum breaker assembly (PVBA), or a spill resistant vacuum breaker (SVBA) of make, model, and size that is approved by DOH. Assemblies that appear on the current approved backflow prevention assemblies list developed by the University of Southern California Foundation for Cross Connection Control and Hydraulic Research are considered approved by the DOH.

"Authority having jurisdiction" (or 'local administrative authority') means the local official, board, department, or agency authorized to administer and enforce the plumbing provisions of the state building codes as adopted under chapter 19.27 RCW. The City of DuPont Building Services Division (building department) is the applicable authority having jurisdiction for the purposes of this definition.

"Backflow" means the undesirable reversal of flow of water or other substances through a cross connection into the public water system or consumer's potable water system.

"Cross connection" means any actual or potential physical connection between a public water system or the consumer's water system and any source of nonpotable liquid, solid, or gas that could contaminant the potable water supply by backflow.

"Category of contaminant" means a communicable disease, chemical, or physical hazard. Communicable diseases and chemical hazards can cause illness and in some cases death and are high health hazards. Physical hazards such as gasoline, propane, hot water and steam are examples of both low and high health hazards.

"Degree of hazard" means either a low cross connection hazard or a high health cross connection hazard.

"High health cross connection hazard" means a cross connection involving any

substance that could impair the quality of potable water and create and actual public health hazard through injury, poisoning, or spread of disease. WAC 246-290-490 refers to these types of hazards as Table 9 hazards.

"In-premises protection" means a method of protecting the health of consumers served by the consumer's potable water system, located within the property lines of the consumer's premises by the installation of an approved air gap or backflow prevention assembly at the point of hazard, which is generally a plumbing fixture/appliance.

"Low cross connection hazard" means a cross connection that could impair the quality of potable water to a degrees that does not create a hazard to the public health, but does adversely and unreasonably affect the aesthetic qualities of potable waters for domestic use.

"Premises isolation" means a method of protecting a public water system by installation of approved air gaps or approved backflow prevention assemblies at or near the service connection or alternative location acceptable to the purveyor (City of DuPont, Public Works Department) to isolate the consumer's water system from the purveyor's water distribution system.

"Purveyor" means an agency, subdivisions of the state, municipal corporation, firm, company, mutual or cooperative association, institution, partnership, or person or other entity owning or operating a public water system. Purveyor also means the authorized agents or these entities.

See Appendix A for a copy of DOH's publication which contains extracts of chapter 246-290 WAC, which covers minimum cross connection control requirements as well as additional definitions.

CITY, STATE, AND FEDERAL PROGRAM HISORY

State regulations administered by DOH, dating back to 1970 require the City's water system be protected from backflow and cross connection contamination. Though the federal Safe Drinking Water Act (SDWA) passed by Congress in 1974 does not specifically address the topic of cross connection control, it does state that water purveyors are responsible for the water quality delivered to the customer's meter. The Environmental Protection Agency, which administers the SDWA, developed a series of nine "white papers" on distribution system issues of potentially significant public health concern. One was on the potential of contamination due to cross connections and backflow and the associated health risks. Water industry experts expect future federal rule making will require water purveyors develop and implement a cross connection control program.

For many years, City municipal codes, water system plans, and plumbing codes have contained provisions addressing the protection of water systems from potential backflow

and cross connection contamination. City, state, and federal regulations together with industry best practices are the foundation for the Cross Connection Control Program.

Chapter 2 - Program Implementation and Administration

RESPONSIBILITIES / COORDINATION

The City's Public Works Department carries out the functions of the City's public water supply system as the purveyor. All public water systems have a person who is the primary operator in responsible charge of operating the water system. The purveyor's primary operator position resides in the Public Works Department. WAC 246-290-490, states the water purveyor has the responsibility for cross connection control and it shall begin at the water supply source, include all the public water treatment, storage, and distribution facilities, and end at the point of delivery to the consumer's water system, which begins at the downstream end of the service connection or water meter (e.g. premises isolation). The regulation further requires the water purveyor ensure at least one individual is certified as a Cross Connection Control Specialist (CCCS) in order to develop and implement the Program. The City's Cross Connection Control Specialist (CCCS) position resides in the Public Works Department, as the senior Water Quality Specialist, MW III.

The water purveyor has the responsibility of implementing premises isolation when deemed necessary to ensure protection of the water system. The practice of premises isolation is used to protect against cross connections on the customer's premise where actual or potential hazards exist. Under this philosophy, the customer's premise is separated from the City's water system by means of an approved backflow prevention assembly installed at the service connection, immediately downstream of the water meter.

The City's Building Official, residing in the Community Development Department, Building Services Division, has the authority and jurisdiction for ensuring that appropriate cross connection controls and backflow protection assemblies are installed on the consumer's water system (plumbing system), per chapter 19.27 RCW. This type of protection is often referred to as "in-premise" isolation. In-premise isolation protects the health of the consumers served by their water/plumbing system by the installation of an approved air gap or approved backflow prevention assembly at the point of hazard. As part of the CCC Program, the Building Official collaborates with and relies on the expertise of the Public Works CCCS for: guidance on determining applicable degree(s) of hazard and appropriate backflow prevention assemblies associated with the consumer's water system; for tracking of known in-premises backflow prevention assemblies and coordination for customer compliance to assure annual testing of assemblies installed within the building is completed to ensure that the assemblies are maintained in compliance with all applicable codes and regulations related to cross connection control and backflow prevention.

The water customer is responsible for eliminating cross connections or controlling them through the installation, regular testing, and maintenance of approved backflow prevention assemblies as a condition of receiving, or continuing to receive water service supply from the City's public water system. The water customer is also responsible for providing the necessary information, scheduling, and providing access for inspection of cross connection potential and the necessary control methods. The water customer is responsible for notifying the Building Services Division of any plumbing modification, including installation of new fixtures/appliances connected the plumbing system, or for review of any assembly the customer believes is no longer required. Finally, the water customer is responsible for all costs associated with the inspection, testing, repair, and replacement of backflow prevention assemblies.

The City's CCC Program is currently a combination program* that is in transition to expanding the premises isolation element of the program to require all new commercial water services supplying building piping greater than 30' in elevation above the water meter to have premises isolation backflow preventers at or near the water meter.

*A combination program relies on both premises and in-premises isolation to protect the City's water system from contamination.

ENFORCEMENT AUTHORITY

The control or elimination of cross connections shall be done according to the most current revisions of state and local rules and regulations. State regulations include:

Chapters 51-56 and 51-57 WAC, Uniform Plumbing Code and Standards
RCW 18.106, Washington State Plumbers Code
RCW 19.27, Washington State Building Code
RCW 43.20.050, Washington State Powers and Duties of the State Board of Health
RCW 70.119A.060, Washington State Public Water Systems Mandate
WAC 246-290-490, Cross Connection Control

Local rules and regulations include DuPont Municipal Code (DMC), which is the authority for the Drinking Water Utility to enforce the City's Program. DMC Chapter 21.03 , states that cross connections are prohibited and gives the City authority to discontinue water service until correction is made. Where cross connections cannot be eliminated, they are controlled by the installation of an approved backflow assembly preventer(s) which is appropriate to the degree of hazard it is protecting against. DMC Chapter 21.03 details the penalties for noncompliance, which are a misdemeanor and/or civil penalty.

The City's development guidelines and construction standards contain the requirements for civil engineering infrastructure as adopted by the City. The standards are comprised of both written text and standard details that specify how infrastructure is constructed. These improvements include streets, driveways, sidewalks, curbs, street lighting, street trees, water and storm drainage. Compliance with the requirement to provide adequate

cross connection controls associated with all new construction and remodels is reviewed for each project as a condition of approval at the time of their construction.

ADMINISTRATION

The functions of the Program are primarily carried out by the CCCS and include survey, inspection, testing, notification, enforcement, and record keeping. The minimum City certification requirements for the position include DOH certifications as a CCS and BAT.

This position works closely with other City departments and inspectors regarding new and remodeled structures and properties and capital improvement projects; with Washington State Department of Health, Office of Drinking Water on high health hazard premises and backflow incidents; with Tacoma-Pierce County Health Department on backflow incidents; and with contractors and BATs doing work on structures and properties within the City. The inspection, repair, and annual testing of backflow prevention assemblies for City owned backflow preventers is done by DOH certified staff in the Public Works Department.

GUIDANCE, POLICIES, AND PROCEDURES

Several guidance manuals, policies, and procedures exist for determining the appropriate level of protection for cross connection controls. The evaluation for the appropriate level of protection shall be in accordance with the most current editions of the following:

- *Cross Connection Control Manual, Accepted Procedure and Practice* published by the Cross Connection Control Committee of the Pacific Northwest Section of the American Water Works Association
- *Manual of Cross Connection Control* published by the Foundation for Cross Connection Control and Hydraulic Research, University of Southern California
- *Recommended Practice for Backflow Prevention and Cross Connection Control, AWWA M14,* published by the American Water Works Association
- *Group A Design Standards,* Washington State Department of Health

The City has also enacted various policies to ensure the safety and quality of drinking water for all its customers. Many of these policies are referenced in the Water System Plan. As previously mentioned, the City's construction standards and guidelines contain the requirements and policies for new connection or remodels. Through continued collaboration between the Public Works and Building Departments, existing premises which require backflow protection assemblies, but currently do not have them installed, are addressed during remodels, when there is a change in building occupancy, or when program staff becomes aware of them as part of the City's ongoing Cross Connection Control Program efforts.

The Program also developed several standard operating procedures (SOPs), which are associated with determining the level of protection needed based on the degree of hazard plus several other SOPs associated with connections which receive both potable water and non potable water. These SOPs include determining unauthorized connection to non potable water, inspection and testing of backflow assemblies of water services supplying premises with an auxiliary non potable water supply.

PUBLIC EDUCATION

As part of the Cross Connection Control Program, the City is continually striving to develop and distribute information and brochures to its customers to educate them on the need for providing backflow protection, such as on home irrigation systems. Standardized newsletter articles and other mailings have been developed and are utilized at various times throughout the year as part of this ongoing effort. Inclusion of an article regarding backflow protection in the City Administrator's Friday Letter has become a common occurrence in the spring. In addition, the City's website continues to be a valuable source for communicating cross connection control information as well as the annual Drinking Water Report (e.g. Consumer Confidence Report).

Chapter 3 - Assembly Requirements, Notification, Testing, Record Keeping and Reporting

BACKFLOW PREVENTION ASSEMBLIES

Approved backflow prevention assemblies are those which appear on the current approved backflow prevention assemblies list developed by the University of Southern California Foundation for Cross Connection Control and Hydraulic Research. This institute is currently the only one which the DOH recognizes as having the authority to approve backflow prevention assemblies. The backflow prevention assemblies include:

1. Atmospheric Vacuum Breakers (AVB)
2. Reduced Pressure Principle Backflow Assembly (RPBA)
3. Double Check Valve Assembly (DCVA)
4. Pressure Vacuum Breaker Assembly (PVBA)
5. Spill-Resistant Vacuum Breakers (SVBA)

BACKFLOW PREVENTION ASSEMBLY REQUIREMENTS FOR NEW AND EXISTING SERVICES

The City prioritizes its backflow prevention efforts based on a variety of factors, including acceptable risk (probability of occurrence), category of contaminant, degree of hazard and the reliability of the backflow preventer. Efforts over the last few years have

been focused on severe and high health risk premises (commonly referred to as Table 9 hazards) listed in WAC246-290-490(4). See Appendix A for a copy of DOH's publication which contains extracts from chapter 246-290-490 pertaining to cross connection control. City resources are being focused on these Table 9 hazards due to the inherent potential for contamination of drinking water that these types of cross connection hazards can cause.

For customers requesting new service connections, an initial evaluation of the premises' planned or future water service is done by the CCCS during the permit review process. Proper selection and installation of a backflow prevention assembly, as determined by the CCCS, shall be a condition of allowing new water service connection. All backflow assemblies installed must be tested immediately upon installation by a Washington State certified backflow assembly tester (BAT). If the initial test fails, it is the responsibility of the applicant, contractor, customer (as may be applicable) to have the assembly repaired and retested by a Washington State certified BAT. Water service will not be provided until backflow devices have passed. All assemblies must be tested at least annually thereafter by a Washington State certified BAT as a condition of continuing to receive water service from the City's water supply system.

For existing service connections, periodic reevaluations are done by the CCCS in response to plumbing permits, notification by city inspectors, fire department personnel, water quality complaints. An emphasis is placed on high health premises (Table 9) followed by low hazard premises.

Below is a summary of cross connection control requirements based on the evaluation of acceptable risk, degree of hazard, and the reliability of the backflow preventer:

Commercial/Industrial Service
The degree of hazard for these types of services is a high health cross connection hazard. An approved premises isolation cross connection control assembly of a RPBA, RPDA or approved AG is required.

Multi-Family Service
The degree of hazard for this type of service is a low health cross connection hazard. A residential development having one or more metered connections serving more than two living units per meter will be treated as a Multi-Family Service and no premises isolation is required provided it is limited to 2 stories in height.

Fire Service
The degree of hazard for this type of service may be high or low, depending on the type of system installed. For example, backflow protection is not required for residential flow through or combination fire protection systems. However, dry fire suppression systems will require a DCDA while a fire suppression system using chemicals requires an RPDA.

Single-Family Residential Service
The degree of hazard for this type of service is generally low and premises isolation is

discouraged when a flow through or combination fire protection system is present. Typically, individual fixture or piping connection protection is required only as needed (such as at a connection for underground irrigation systems) however, premises isolation with a RPBA is required if high health hazards exists.

Irrigation Only Service
The degree of hazard for this type of service is generally low. An approved DCVA is required as long as no chemicals are involved, otherwise an RPBA is required.

Reclaimed Water
The degree of hazard for this type of service is high. An RPBA will be required for premises isolation on water service to properties which have both potable and reclaimed water systems, in addition to any other backflow prevention devices on site.

Premises Isolation
Where required, installation of a backflow prevention assembly is to be installed as close to the meter as possible. Any deviation from this must be pre-approved by the CCCS. Detailed information pertaining to the backflow prevention assembly installation requirements can be found online in Chapter 8 of the Public Works Standards.

TESTING AND NOTIFICATION

There are about 1,500 backflow assemblies installed in the City's service area which require annual testing. The due date for testing is based on the installation date of the assembly or scheduled month, not necessarily when the assembly was last tested. Annual testing shall be done within 30 days of the original test due date. The Drinking Water Utility uses XC_2 software to maintain an inventory of all these devices. This database also generates custom reports (e.g., DOH Annual Summary Report statistics), annual testing notifications, and follow-up letters to customers.

Backflow prevention assemblies shall be inspected and tested at the time of:

- Initial installation
- After the assembly is repaired or moved
- Immediately after a backflow incident occurs
- Annually after the initial installation
- As required by the CCCS, if testing indicates repeated failures

The CCCS may require more frequent testing of certain facilities such as a severe health hazard premise (e.g., wastewater treatment plant) or with premises with repeated annual failures. All testing procedures shall be in accordance with requirements of the Washington State Department of Health.

A water customer will receive up to three notification letters when annual testing is due.

1. The first letter notifies the customer that annual backflow assembly testing is due and gives customers approximately 30 days from the receipt of the letter to have

the assembly(s) tested and submit passing test results from a certified BAT.

2. The second notice gives the customers approximately 20 days from the receipt of the letter to submit passing test results; a courtesy copy is mailed the occupant.
3. The third and final letter, w/door hanger gives the customer 10 days before water service is terminated.

- ❖ If the premises involve a separate irrigation line, the meter shall be locked (monthly minimum water service charges do not stop) or the hazard eliminated by removing piping so a connection is not possible.

No appeals process is necessary prior to turning off water service because customers are given adequate notification of testing requirements and staff is flexible in working out schedules with them.

BATs can use their own test report form provided it includes the minimum test reporting elements identified in the City's standard test report form found in Appendix B. Test results are to be delivered to the attention of "Water Quality", emailed to the CCCS, or mailed (USPS) or faxed to the City with a cover sheet to the attention of "Water Quality", within five working days and contain the signature and printed name of the BAT. The results are then hand entered into the XC_2 database. When the field test report shows an assembly has failed its test, the City mails a repair notice requiring the customer to repair the assembly and return it to proper working condition as soon as possible or in an amount of time to be determined on a case by-case basis, depending on the hazard.

Failure to provide the minimum backflow prevention assembly test report information located in Appendix B will result in the test report being rejected and may require the re-testing of the assembly in the presence of the City of DuPont's CCCS.

Multiple failures of an assembly will result in the property owner having the assembly repaired or replaced by a certified BAT with an assembly appropriate for the degree of hazard.

The City will notify the Washington State Department of Health, Office of Drinking Water when it suspects a test report is falsified in order for their follow-up.

Retesting may be required, at the City's discretion, on backflow assemblies which have questionable test results or on assemblies which have test report information which has changed (e.g., the serial number, model number, location, or other information does not match information provided at the time of installation) and no prior notice was given.

RECORD KEEPING AND REPORTING

Records are kept both in paper and electronic format. As mentioned previously, annual test results are emailed, mailed or faxed and the results entered into the XC_2 database. The City also tracks testing, repairing, or installing an assembly associated with City facilities. Notification and violation letters along with emails are records which are also

kept. These records will form the basis of any enforcement action or legal defense by the City. The master list, inventory information, list of approved AVBs, and ASR records are available to DOH upon request.

Tester List
The city maintains a list a prequalified testers for the convenience of the customer and is distributed with testing notices. In order for testers/contractors to be included on the list they must make a written request providing all of the following information (which must be maintained current): BAT Certification, test equipment certification, City of DuPont Business License, Washington State Contractor's License and complete contact information.

Documentation of a BAT Quality Control Assurance Program
The City requires BATs to submit current copies of their DOH certification (or renewal) and test kit verification of accuracy every January. The City also requires minimum test report content to be on all test forms submitted, which can be found in Appendix B.

DOH Annual Summary Report (ASR) Reporting
2001 was the first reporting year of ASR data to DOH. DOH efforts are focused on larger utilities reporting this information (greater than 1,000 connections) and compliance with Table 9 high health hazards (primarily sewage treatment facilities, sewer lift stations, radioactive plants and medical facilities). The City continues to make great strides in proactively isolating these high health hazards through collaborative involvement in the permit review process prior to their construction.

Master List
The XC_2 database maintains a master list of service connections of high and low hazards for as long as the hazard exists. It is from this database that the annual notification letters are generated and sent.

Inventory of Backflow Prevention Assemblies
The XC_2 database maintains the inventory of active assemblies including the exact assembly location, assembly description (type, manufacturer/ model, size and serial number), assessed degree of hazard, installation date history or inspection, tests and repairs, test results and the person performing the inspection.

Annual Test Report Records
Though state regulations require retention of all test results for five years, currently, all electronic test reports are being kept indefinitely because the City currently has the capacity to store these records.

Responding to Backflow Incidents
In the event of a cross connection incident which contaminates the City's water supply, or occurs within the premises of a consumer served by the City, the City will notify DOH, other City departments as appropriate (building, fire, etc), and the Pierce County Health Department as soon as possible after the incident, but no later than the end of the next

business day. If the incident occurs after hours, staff will contact DOH using their emergency after hours phone number (1-877-481- 4901). The City will document the details of the backflow incident using the *Backflow Incident Report Form* found in Appendix C. The City will include all backflow incident report(s) as part of the ASR.

Legal Actions

Letters, emails, summary reports, civil infractions, etc., are elements used to document non-compliance actions when a customer fails to eliminate or control a high health hazard. These documents become permanent records and are kept in accordance with standard retention schedules.

Appendix A
Extracts from Chapter 246-290 Group A Drinking Water Rules

WAC 246-290-490

Cross-connection control.

(1) Applicability, purpose, and responsibility.

(a) All community water systems shall comply with the cross-connection control requirements specified in this section.

(b) All noncommunity water systems shall apply the principles and provisions of this section, including subsection (4)(b) of this section, as applicable to protect the public water system from contamination via cross-connections. Noncommunity systems that comply with subsection (4)(b) of this section and the provisions of WAC **51-56-0600** of the UPC (which addresses the installation of backflow preventers at points of water use within the potable water system) shall be considered in compliance with the requirements of this section.

(c) The purpose of the purveyor's cross-connection control program shall be to protect the public water system, as defined in WAC **246-290-010**, from contamination via cross-connections.

(d) The purveyor's responsibility for cross-connection control shall begin at the water supply source, include all the public water treatment, storage, and distribution facilities, and end at the point of delivery to the consumer's water system, which begins at the downstream end of the service connection or water meter located on the public right of way or utility-held easement.

(e) Under this section, purveyors are not responsible for eliminating or controlling cross-connections within the consumer's water system. Under chapter **19.27** RCW, the responsibility for cross-connection control within the consumer's water system, i.e., within the property lines of the consumer's premises, lies with the authority having jurisdiction.

(2) General program requirements.

(a) The purveyor shall develop and implement a cross-connection control program that meets the requirements of this section, but may establish a more stringent program through local ordinances, resolutions, codes, bylaws, or operating rules.

(b) Purveyors shall ensure that good engineering and public health protection practices are used in the development and implementation of cross-connection control programs. Department publications and the most recently published editions of references, such as, but not limited to, those listed below, may be used as guidance for cross-connection program development and implementation:

(i) *Manual of Cross-Connection Control* published by the Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California (USC Manual);

(ii) *Cross-Connection Control Manual, Accepted Procedure and Practice* published by the Pacific Northwest Section of the American Water Works Association (PNWS-AWWA Manual); or

(iii) Guidance document: *Cross-Connection Control for Small Water Systems* published by the department.

(c) The purveyor may implement the cross-connection control program, or any portion thereof, directly or by means of a contract with another agency or party acceptable to the department.

(d) The purveyor shall coordinate with the authority having jurisdiction in all matters concerning cross-connection control. The purveyor shall document and describe the coordination, including delineation of responsibilities, in the written cross-connection control program required in (e) of this subsection.

(e) The purveyor shall include a written description of the cross-connection control program in the water system plan required under WAC **246-290-100** or the small water system management program required under WAC **246-290-105**. The cross-connection control program shall include the minimum program elements described in subsection (3) of this section.

(f) The purveyor shall ensure that cross-connections between the distribution system and a consumer's water system are eliminated or controlled by the installation of an approved backflow preventer commensurate with the degree of hazard. This can be accomplished by implementation of a cross-connection program that relies on:

(i) Premises isolation as defined in WAC **246-290-010**; or

(ii) Premises isolation and in-premises protection as defined in WAC **246-290-010**.

(g) Purveyors with cross-connection control programs that rely both on premises isolation and in-premises protection:

(i) Shall comply with the premises isolation requirements specified in subsection (4)(b) of this section; and

(ii) May reduce premises isolation requirements and rely on in-premises protection for premises other than the type addressed in subsection (4)(b) of this section, only if the following conditions are met:

(A) The in-premises backflow preventers provide a level of protection commensurate with the purveyor's assessed degree of hazard;

(B) Backflow preventers which provide the in-premises backflow protection meet the definition of approved backflow preventers as described in WAC **246-290-010**;

(C) The approved backflow preventers are installed, inspected, tested (if applicable), maintained, and repaired in accordance with subsections (6) and (7) of this section;

(D) Records of the backflow preventers are maintained in accordance with subsections (3)(j) and (8) of this section; and

(E) The purveyor has reasonable access to the consumer's premises to conduct an initial hazard evaluation and periodic reevaluations to determine whether the in-premises protection is adequate to protect the purveyor's distribution system.

(h) The purveyor shall take appropriate corrective action as authorized by the legal instrument required by subsection (3)(b) of this section, when:

(i) A cross-connection exists that is not controlled commensurate to the degree of hazard assessed by the purveyor; or

(ii) A consumer fails to comply with the purveyor's requirements regarding the installation, inspection, testing, maintenance or repair of approved backflow preventers required by this chapter.

(i) The purveyor's corrective action may include, but is not limited to:

(i) Denying or discontinuing water service to a consumer's premises until the cross-connection hazard is eliminated or controlled to the satisfaction of the purveyor;

(ii) Requiring the consumer to install an approved backflow preventer for premises isolation commensurate with the degree of hazard; or

(iii) The purveyor installing an approved backflow preventer for premises isolation commensurate with the degree of hazard.

(j) Except in the event of an emergency, purveyors shall notify the authority having jurisdiction prior to denying or discontinuing

water service to a consumer's premises for one or more of the reasons listed in (h) of this subsection.

(k) The purveyor shall prohibit the intentional return of used water to the purveyor's distribution system. Used water includes, but is not limited to, water used for heating, cooling, or other purposes within the consumer's water system.

(3) Minimum elements of a cross-connection control program.

(a) To be acceptable to the department, the purveyor's cross-connection control program shall include the minimum elements identified in this subsection.

(b) Element 1: The purveyor shall adopt a local ordinance, resolution, code, bylaw, or other written legal instrument that:

(i) Establishes the purveyor's legal authority to implement a cross-connection control program;

(ii) Describes the operating policies and technical provisions of the purveyor's cross-connection control program; and

(iii) Describes the corrective actions used to ensure that consumers comply with the purveyor's cross-connection control requirements.

(c) Element 2: The purveyor shall develop and implement procedures and schedules for evaluating new and existing service connections to assess the degree of hazard posed by the consumer's premises to the purveyor's distribution system and notifying the consumer within a reasonable time frame of the hazard evaluation results. At a minimum, the program shall meet the following:

(i) For connections made on or after April 9, 1999, procedures shall ensure that an initial evaluation is conducted before water service is provided;

(ii) For all other connections, procedures shall ensure that an initial evaluation is conducted in accordance with a schedule acceptable to the department; and

(iii) For all service connections, once an initial evaluation has been conducted, procedures shall ensure that periodic reevaluations are conducted in accordance with a schedule acceptable to the department and whenever there is a change in the use of the premises.

(d) Element 3: The purveyor shall develop and implement procedures and schedules for ensuring that:

(i) Cross-connections are eliminated whenever possible;

(ii) When cross-connections cannot be eliminated, they are controlled by installation of approved backflow preventers commensurate with the degree of hazard; and

(iii) Approved backflow preventers are installed in accordance with the requirements of subsection (6) of this section.

(e) Element 4: The purveyor shall ensure that personnel, including at least one person certified as a CCS, are provided to develop and implement the cross-connection control program.

(f) Element 5: The purveyor shall develop and implement procedures to ensure that approved backflow preventers relied upon to protect the public water system are inspected and/or tested (as applicable) under subsection (7) of this section.

(g) Element 6: The purveyor shall develop and implement a backflow prevention assembly testing quality control assurance program, including, but not limited to, documentation of BAT certification and test kit calibration, test report contents, and time frames for submitting completed test reports.

(h) Element 7: The purveyor shall develop and implement (when appropriate) procedures for responding to backflow incidents.

(i) Element 8: The purveyor shall include information on cross-connection control in the purveyor's existing program for educating consumers about water system operation. The public education program may include periodic bill inserts, public service announcements, pamphlet distribution, notification of new consumers and consumer confidence reports.

(j) Element 9: The purveyor shall develop and maintain cross-connection control records including, but not limited to, the following:

(i) A master list of service connections and/or consumer's premises where the purveyor relies upon approved backflow preventers to protect the public water system from contamination, the assessed hazard level of each, and the required backflow preventer(s);

(ii) Inventory information on backflow preventers that protect the public water system including:

(A) Approved air gaps installed in lieu of approved assemblies including exact air gap location, assessed degree of hazard, installation date, history of inspections, inspection results, and person conducting inspections;

(B) Approved backflow assemblies including exact assembly location, assembly description (type, manufacturer, model, size, and serial number), assessed degree of hazard, installation date, history of inspections, tests and repairs, test results, and person performing tests; and

(C) Approved AVBs used for irrigation system applications including location, description (manufacturer, model, and size), installation date, history of inspection(s), and person performing inspection(s).

(iii) Cross-connection program summary reports and backflow incident reports required under subsection (8) of this section.

(k) Element 10: Purveyors who distribute and/or have facilities that receive reclaimed water within their water service area shall meet any additional cross-connection control requirements imposed by the department in a permit issued under chapter **90.46** RCW.

(4) Approved backflow preventer selection.

(a) The purveyor shall ensure that a CCS:

(i) Assesses the degree of hazard posed by the consumer's water system upon the purveyor's distribution system; and

(ii) Determines the appropriate method of backflow protection for premises isolation as described in Table 8.

TABLE 8

APPROPRIATE METHODS OF BACKFLOW PROTECTION FOR PREMISES ISOLATION

Degree of Hazard	Application Condition	Appropriate Approved Backflow Preventer
High health cross-connection hazard	Backsiphonage or backpressure backflow	AG, RPBA, or RPDA
Low cross-connection hazard	Backsiphonage or backpressure	AG, RPBA, RPDA, DCVA, or DCDA

(b) Premises isolation requirements.

(i) The purveyor shall ensure that an approved air gap, RPBA, or RPDA is installed for premises isolation for service connections to premises posing a high health cross-connection hazard including, but not limited to, those premises listed in Table 9, except those premises identified as severe in (b)(ii) of this subsection.

(ii) For service connections to premises posing a severe health cross-connection hazard including wastewater treatment plants, radioactive material processing plants, and nuclear reactors, the purveyor shall ensure that either an:

(A) Approved air gap is installed for premises isolation; or

(B) Approved RPBA or RPDA is installed for premises isolation in combination with an in-plant approved air gap.

(iii) If the purveyor's CCS determines that no hazard exists for a connection serving premises of the type listed in Table 9, the purveyor may grant an exception to the premises isolation requirements of (b)(i) of this subsection.

(iv) The purveyor shall document, on a case-by-case basis, the reasons for granting an exception under (b)(i) of this subsection and include the documentation in the cross-connection control program annual summary report required in subsection (8) of this section.

TABLE 9
SEVERE* AND HIGH HEALTH CROSS-CONNECTION HAZARD PREMISES REQUIRING PREMISES ISOLATION BY AG OR RPBA

Agricultural (farms and dairies)
Beverage bottling plants
Car washes
Chemical plants
Commercial laundries and dry cleaners
Premises where both reclaimed water and potable water are provided
Film processing facilities
Food processing plants
Hospitals, medical centers, nursing homes, veterinary, medical and dental clinics, and blood plasma centers
Premises with separate irrigation systems using the purveyor's water supply and with chemical addition+
Laboratories
Metal plating industries
Mortuaries
Petroleum processing or storage plants
Piers and docks
Radioactive material processing plants or nuclear reactors*
Survey access denied or restricted
Wastewater lift stations and pumping stations
Wastewater treatment plants*
Premises with an unapproved auxiliary water supply interconnected with the potable water supply

\+ For example, parks, playgrounds, golf courses, cemeteries, estates, etc.

* RPBAs for connections serving these premises are acceptable only when used in combination with an in-plant approved air gap; otherwise, the purveyor shall require an approved air gap at the service connection.

(c) Backflow protection for single-family residences.

(i) For single-family residential service connections, the purveyor shall comply with the premises isolation requirements of (b) of this subsection when applicable.

(ii) If the requirements of (b) of this subsection do not apply and the requirements specified in subsection (2)(g)(ii) of this section are met, the purveyor may rely on backflow protection provided at the point of hazard in accordance with WAC **51-56-0600** of the UPC for hazards such as, but not limited to:

(A) Irrigation systems;

(B) Swimming pools or spas;

(C) Ponds; and

(D) Boilers.

For example, the purveyor may accept an approved AVB on a residential irrigation system, if the AVB is properly installed under the UPC.

(d) Backflow protection for fire protection systems.

(i) Backflow protection is not required for residential flow-through or combination fire protection systems constructed of potable water piping and materials.

(ii) For service connections with fire protection systems other than flow-through or combination systems, the purveyor shall ensure that backflow protection consistent with WAC **51-56-0600** of the UPC is installed. The UPC requires minimum protection as follows:

(A) An RPBA or RPDA for fire protection systems with chemical addition or using unapproved auxiliary water supply; and

(B) A DCVA or DCDA for all other fire protection systems.

(iii) For connections made on or after April 9, 1999, the purveyor shall ensure that backflow protection is installed before water service is provided.

(iv) For existing fire protection systems:

(A) With chemical addition or using unapproved auxiliary supplies, the purveyor shall ensure that backflow protection is installed

within ninety days of the purveyor notifying the consumer of the high health cross-connection hazard or in accordance with an alternate schedule acceptable to the purveyor.

(B) Without chemical addition, without on-site storage, and using only the purveyor's water (i.e., no unapproved auxiliary supplies on or available to the premises), the purveyor shall ensure that backflow protection is installed in accordance with a schedule acceptable to the purveyor or at an earlier date if required by the code official administering the State Building Code as defined in chapter **51-04** WAC.

(C) When establishing backflow protection retrofitting schedules for fire protection systems that have the characteristics listed in (d)(iv)(B) of this subsection, the purveyor may consider factors such as, but not limited to, impacts of assembly installation on sprinkler performance, costs of retrofitting, and difficulty of assembly installation.

(e) Purveyors may require approved backflow preventers commensurate with the degree of hazard as determined by the purveyor to be installed for premises isolation for connections serving premises that have characteristics such as, but not limited to, the following:

(i) Complex plumbing arrangements or plumbing potentially subject to frequent changes that make it impracticable to assess whether cross-connection hazards exist;

(ii) A repeated history of cross-connections being established or reestablished; or

(iii) Cross-connection hazards are unavoidable or not correctable, such as, but not limited to, tall buildings.

(5) Approved backflow preventers.

(a) The purveyor shall ensure that all backflow prevention assemblies relied upon by the purveyor are models included on the current list of backflow prevention assemblies approved for use in Washington state. The current approved assemblies list is available from the department upon request.

(b) The purveyor may rely on testable backflow prevention assemblies that are not currently approved by the department, if the assemblies:

(i) Were included on the department and/or USC list of approved backflow prevention assemblies at the time of installation;

(ii) Have been properly maintained;

(iii) Are commensurate with the purveyor's assessed degree of hazard; and

(iv) Have been inspected and tested at least annually and have successfully passed the annual tests.

(c) The purveyor shall ensure that an unlisted backflow prevention assembly is replaced by an approved assembly commensurate with the degree of hazard, when the unlisted assembly:

(i) Does not meet the conditions specified in (b)(i) through (iv) of this subsection;

(ii) Is moved; or

(iii) Cannot be repaired using spare parts from the original manufacturer.

(d) The purveyor shall ensure that AVBs meet the definition of approved atmospheric vacuum breakers as described in WAC **246-290-010**.

(6) Approved backflow preventer installation.

(a) The purveyor shall ensure that approved backflow preventers are installed in the orientation for which they are approved (if applicable).

(b) The purveyor shall ensure that approved backflow preventers are installed in a manner that:

(i) Facilitates their proper operation, maintenance, inspection, in-line testing (as applicable), and repair using standard installation procedures acceptable to the department such as those in the USC Manual or PNWS-AWWA Manual;

(ii) Ensures that the assembly will not become submerged due to weather-related conditions such as flooding; and

(iii) Ensures compliance with all applicable safety regulations.

(c) The purveyor shall ensure that approved backflow assemblies for premises isolation are installed at a location adjacent to the meter or property line or an alternate location acceptable to the purveyor.

(d) When premises isolation assemblies are installed at an alternate location acceptable to the purveyor, the purveyor shall ensure that there are no connections between the point of delivery from the public water system and the approved backflow assembly, unless the installation of the connection meets the purveyor's cross-connection control requirements and is specifically approved by the purveyor.

(e) The purveyor shall ensure that approved backflow preventers are installed in accordance with the following time frames:

(i) For connections made on or after April 9, 1999, the following conditions shall be met before service is provided:

(A) The provisions of subsection (3)(d)(ii) of this section; and

(B) Satisfactory completion of the requirements of subsection (7) of this section.

(ii) For existing connections where the purveyor identifies a high health cross-connection hazard, the provisions of (3)(d)(ii) of this section shall be met:

(A) Within ninety days of the purveyor notifying the consumer of the high health cross-connection hazard; or

(B) In accordance with an alternate schedule acceptable to the purveyor.

(iii) For existing connections where the purveyor identifies a low cross-connection hazard, the provisions of subsection (3)(d)(ii) of this section shall be met in accordance with a schedule acceptable to the purveyor.

(f) The purveyor shall ensure that bypass piping installed around any approved backflow preventer is equipped with an approved backflow preventer that:

(i) Affords at least the same level of protection as the approved backflow preventer that is being bypassed; and

(ii) Complies with all applicable requirements of this section.

(7) Approved backflow preventer inspection and testing.

(a) For backflow preventers that protect the public water system, the purveyor shall ensure that:

(i) A CCS inspects backflow preventer installations to ensure that protection is provided commensurate with the assessed degree of hazard;

(ii) Either a BAT or CCS inspects:

(A) Air gaps installed in lieu of approved backflow prevention assemblies for compliance with the approved air gap definition; and

(B) Backflow prevention assemblies for correct installation and approval status.

(iii) A BAT tests approved backflow prevention assemblies for proper operation.

(b) The purveyor shall ensure that inspections and/or tests of approved air gaps and approved backflow assemblies that protect the

public water system are conducted:

(i) When any of the following occur:

(A) Upon installation, repair, reinstallation, or relocation of an assembly;

(B) Upon installation or replumbing of an air gap;

(C) After a backflow incident involving the assembly or air gap; and

(ii) Annually thereafter, unless the purveyor requires more frequent testing for high hazard premises or for assemblies that repeatedly fail.

(c) The purveyor shall ensure that inspections of AVBs installed on irrigation systems are conducted:

(i) At the time of installation;

(ii) After a backflow incident; and

(iii) After repair, reinstallation, or relocation.

(d) The purveyor shall ensure that approved backflow prevention assemblies are tested using procedures acceptable to the department, such as those specified in the most recently published edition of the USC Manual. When circumstances, such as, but not limited to, configuration or location of the assembly, preclude the use of USC test procedures, the purveyor may allow, on a case-by-case basis, the use of alternate (non-USC) test procedures acceptable to the department.

(e) The purveyor shall ensure that results of backflow prevention assembly inspections and tests are documented and reported in a manner acceptable to the purveyor.

(f) The purveyor shall ensure that an approved backflow prevention assembly or AVB, whenever found to be improperly installed, defective, not commensurate with the degree of hazard, or failing a test (if applicable) is properly reinstalled, repaired, overhauled, or replaced.

(g) The purveyor shall ensure that an approved air gap, whenever found to be altered or improperly installed, is properly replumbed or, if commensurate with the degree of hazard, is replaced by an approved RPBA.

(8) Recordkeeping and reporting.

(a) Purveyors shall keep cross-connection control records for the following time frames:

(i) Records pertaining to the master list of service connections and/or consumer's premises required in subsection (3)(j)(i) of this section shall be kept as long as the premises pose a cross-connection hazard to the purveyor's distribution system;

(ii) Records regarding inventory information required in subsection (3)(j)(ii) of this section shall be kept for five years or for the life of the approved backflow preventer whichever is shorter; and

(iii) Records regarding backflow incidents and annual summary reports required in subsection (3)(j)(iii) of this section shall be kept for five years.

(b) Purveyors may maintain cross-connection control records in original form or transfer data to tabular summaries.

(c) Purveyors may maintain records or data in any media, such as paper, film, or electronic format.

(d) The purveyor shall complete the cross-connection control program summary report annually. Report forms and guidance on completing the report are available from the department.

(e) The purveyor shall make all records and reports required in subsection (3)(j) of this section available to the department or its representative upon request.

(f) The purveyor shall notify the department, authority having jurisdiction, and local health jurisdiction as soon as possible, but no later than the end of the next business day, when a backflow incident is known by the purveyor to have:

(i) Contaminated the public water system; or

(ii) Occurred within the premises of a consumer served by the purveyor.

(g) The purveyor shall:

(i) Document details of backflow incidents contaminating the public water system on a backflow incident report form available from the department; and

(ii) Include all backflow incident report(s) in the annual cross-connection program summary report referenced in (d) of this subsection, unless otherwise requested by the department.

[Statutory Authority: RCW **70.119A.180** and **43.20.050**. WSR 08-03-061, § 246-290-490, filed 1/14/08, effective 2/14/08. Statutory Authority: RCW **43.20.050** (2) and (3) and **70.119A.080**. WSR 03-08-037, § 246-290-490, filed 3/27/03, effective 4/27/03. Statutory Authority: RCW **43.02.050** [43.20.050]. WSR 99-07-021, § 246-290-490, filed 3/9/99, effective 4/9/99. Statutory Authority: RCW **43.20.050**. WSR 91-02-051 (Order 124B), recodified as § 246-290-490, filed 12/27/90, effective 1/31/91. Statutory Authority: P.L. 99-339. WSR 89-21-020 (Order 336), § 248-54-285, filed 10/10/89, effective 11/10/89. Statutory Authority: RCW **34.04.045**. WSR 88-05-057 (Order 307), § 248-54-285, filed 2/17/88. Statutory Authority: RCW **43.20.050**. WSR 83-19-002 (Order 266), § 248-54-285, filed 9/8/83.]

Appendix B
City of DuPont Standard BAT Report Form(s)

Backflow Prevention Assembly Test/Air Gap Inspection Report

PWS ID _____ WATER SYSTEM NAME _____ COUNTY _____

ACCOUNT # _____ BACKFLOW PREVENTER ID _____ TEST REPORT ID _____

NAME OF PREMISES _____ Commercial ☐ Residential ☐

SERVICE ADDRESS _____ CITY _____ ZIP _____

CONTACT PERSON _____ PHONE ( ) _____ FAX ( ) _____

LOCATION OF ASSEMBLY _____

DOWNSTREAM PROCESS _____ DCVA ☐ RPBA ☐ PVBA ☐ OTHER _____

NEW INSTALL☐ EXISTING☐ REPLACEMENT☐ OLD SER. # _____ PROPER INSTALLATION? YES ☐ NO ☐

MAKE OF ASSEMBLY _____ MODEL _____ SERIAL NO. _____ SIZE _____

INITIAL TEST PASSED ☐ FAILED ☐	DCVA / RPBA CHECK VALVE NO.1 LEAKED ☐ _____ PSID	DCVA / RPBA CHECK VALVE NO.2 LEAKED ☐ _____ PSID	RPBA OPENED AT _____ PSID #1 CHECK _____ PSID AIR GAP OK? _____	PVBA/SVBA AIR INLET OPENED AT _____ PSID DID NOT OPEN ☐
NEW PARTS AND REPAIRS	CLEAN REPLACE PART ☐ ☐ _____ ☐ ☐ _____ ☐ ☐ _____ ☐ ☐ _____	CLEAN REPLACE PART ☐ ☐ _____ ☐ ☐ _____ ☐ ☐ _____ ☐ ☐ _____	CLEAN REPLACE PART ☐ ☐ _____ ☐ ☐ _____ ☐ ☐ _____ ☐ ☐ _____	CHECK VALVE HELD AT _____ PSID LEAKED ☐ _____ CLEANED ☐ REPAIRED ☐
TEST AFTER REPAIRS PASSED ☐ FAILED ☐	LEAKED ☐ _____ PSID	LEAKED ☐ _____ PSID	OPENED AT _____ PSID #1 CHECK _____ PSID	AIR INLET _____ PSID CHK VALVE _____ PSID

AIR GAP INSPECTION: Required minimum air gap separation provided? Yes ☐ No☐ Detector Meter Reading _____

REMARKS: _____ LINE PRESSURE _____ PSI

_____ CONFINED SPACE? _____

I certify that this report is accurate, and I have used WAC 246-290-490 approved test methods and test equipment.

TESTERS SIGNATURE: _____ CERT. NO. _____ DATE ____/____/____

TESTERS NAME PRINTED: _____ TESTERS PHONE # ( ) _____

REPAIRED BY: _____ DATE ____/____/____

FINAL TEST BY: _____ CERT. NO. _____ DATE ____/____/____

CALIB/VERIF DATE __ /__ /___ GAUGE # _____ MODEL _____ SERVICE RESTORED? YES ☐ NO ☐

(SPECIALTY) PLUMBER CERT. NO. _____ CONTRACTOR LICENSE NO. _____

Backflow Prevention Assembly Test/Air Gap Inspection Report
File Record

PWS Assigned Inventory Number: _____

Name of Premises:
Premises Address:
Location of Assembly:
Type of Hazard Isolated:
Assembly Type: **Assembly Size (inches):**
Make: **Model:** **Serial No.:**
Date Installed: **DOH-Approved?** **Y** **N**

Date Test Notice Issued	Date of Test Report	Name of Certified Tester (BAT)	BAT Certification Number	Results Satisfactory? Y/N[+]	Repairs Made? Y/N*

[+]Attach all ***Backflow Assembly Test/AG Inspection Report*** forms.
*Include retest after repairs as a separate line.

Comments/Notes (attach additional sheets if necessary):

_____

_____

_____

_____

Appendix C
Backflow Incident Report Form

City of DuPont
Backflow Incident Report Form

Report Date: _____ Reported By: _____

Date of Incident: _____ Time of Incident: _____

General Location: _____

Backflow Originated From:

Location/Business Name: _____

Street Address: _____

Contact Person: _____ Contact Number: _____

Description of Contaminant (attach MSDS or sample results if available):

_____

Distribution of Contaminant:

Number of persons affected: _____ Pressure Zone: _____

Contained within customer's premise? (check one) Yes: __ No: __ Unsure: ____

Effect of Contamination:

Illness Reported: _____

Symptoms Reported: _____

Source of Contamination (irrigation system, pump, etc.):

_____

Cause of Backflow (backsiphonage, backpressure):

_____

Corrective Action Taken:

Water Service Terminated: Yes: _____ No: _____

Meter Pulled: _____ Point of Connection/Service Disconnected: _____

City of DuPont Backflow Incident Form (continued)

Flushed Main: _____ Length of Flushing Time: _____

Disinfection: _____

Comments: _____

_____

Corrective Action ordered to Eliminate or Protect from Cross Connection:

_____

Previous Cross Connection Survey of Premises:

Date: _____ Inspected By: _____

Type of Backflow Preventer Isolating Premises (if applicable): None: _____

RPBA: _____ RPDA: _____ DCVA: _____ DCDA: _____

Type of Internal Premises Backflow Preventer:

RPBA: _____ RPDA: _____ DCVA: _____ DCDA: _____

PVBA: _____ AVB: _____ Air Gap: _____ None: _____

Date of Last Test of Assembly:

Tested by: _____ Cert No. _____ Date: _____

Notification to Washington State Department of Health: Yes: _____ No: _____

Date: _____ Time: _____ Person Notified: _____

Notified By: _____

Other Entities/Departments Notified:

_____

_____

Additional Follow Up Required: Yes: _____ No: _____

Additional Comments: _____

_____

Cross-Connection Control Activities (Blue)
Annual Summary Report (ASR) for 2017

PWS ID: **20500P** PWS Name: **DUPONT WATER SYSTEM, CITY OF** County: **PIERCE**

Part 1: Designated Cross-Connection Control Specialist (CCS) Information

CCS Name	Frederick D. Foreman	CCS Phone	253-912-5381 ext- 2533774971	CCS Cert. #	002854	BAT Cert. #	B5778
CCS is: PWS owner or employee							

Part 2: Status of Cross-Connection Control (CCC) Program at End of 2017

Provide information about the status of your CCC Program at the end of the reporting year.

PWS has:			
	A written CCC Program Plan[1]	◉ Yes ○ No	**Program Plan Last Updated**[3] 10/25/2011
	CCC implementation activities[2]	◉ Yes ○ No	

[1] Enter "Yes" if PWS has **any** type of written CCC Program Plan, policies, or procedures. Written CCC Program Plan must be part of a Water System Plan (WSP) or Small Water System Management Program (SWSMP).
[2] Enter "Yes" if PWS implemented **any** CCC Program activities during the reporting year, such as establishing legal authority, conducting hazard evaluations, requiring installation of backflow assemblies to protect the PWS, requiring assembly testing, maintaining CCC records, or enforcing the PWS's or CCC Program requirements.
[3] PWS can update the CCC Program Plan at any time (independent of WSP or SWSMP update).

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:	
		Included in Written Program Plan	Being Implemented or Is Completed
1	**Legal Authority Established**	◉ Yes ○ No	◉ Yes ○ No
2	**Hazard Evaluation Procedures and Schedules**	◉ Yes ○ No	◉ Yes ○ No
3	**Procedures/Schedules for Ensuring Installation of Backflow Preventers**	◉ Yes ○ No	◉ Yes ○ No
4	**Certified CCS Provided**	◉ Yes ○ No	◉ Yes ○ No
5	**Backflow Preventer Inspection and Testing**	◉ Yes ○ No	◉ Yes ○ No
6	**Assembly Testing Quality Assurance/Quality Control (QA/QC) Program**	◉ Yes ○ No	◉ Yes ○ No
7	**Backflow Incident Response Procedures**	◉ Yes ○ No	◉ Yes ○ No
8	**Public Education Program**	◉ Yes ○ No	◉ Yes ○ No
9	**CCC Records**	◉ Yes ○ No	◉ Yes ○ No
10	**Reclaimed Water Permit**	○ Yes ○ No ◉ N/A	○ Yes ○ No ◉ N/A

Part 3A: PWS Characteristics at End of 2017

Enter the number of connections (new and existing) served by the PWS by type.

Type of Service Connection	Number
Residential (As defined by PWS)	2859
All Other (include dedicated fire lines, dedicated irrigation lines, and PWS-owned facilities such as water and wastewater treatment plants and pumping stations, parks, piers, and docks)	292
Total Number of Connections	3151

Part 3B: Cross-Connection Control for Severe and High-Hazard Premises and High-Hazard Dedicated Lines Served by the PWS

Answer the following questions carefully. These answers control your access to pages 2 and 3 for data entry.

1. Does your PWS serve any severe or high-hazard premises or any high-hazard dedicated fire or irrigation lines? (•) Yes ( ) No

2. Does PWS serve any high-hazard medical premises? (•) Yes ( ) No

- If you answer Yes to both questions, you must enter data in at least one row on page 2 and one row on page 3.
- If you answer Yes to Question 1 and No to Question 2, you must enter data on page 2 only.
- If you answer No to both questions, pages 2 and 3 will be grayed out to prevent data entry.

- Count only premises PWS serves water to.
- Report data as accurately as possible. **DOH currently bases CCC compliance actions on this information.**

Type of Severe or High-Hazard Premises or Dedicated Lines [WAC 246-290-490(4)(b)]	Number of Connections at end of 2017			
	A. Being Served Water by PWS[1]	B. With Premises Isolation by AG/RP[2]	C. With Column B AG Inspected or RP Tested[3]	D. Granted Exception from Premises Isolation
Agricultural (farms and dairies)				
Beverage bottling plants (including breweries)				
Car washes	1	1	1	0
Chemical plants				
Commercial laundries and dry cleaners	3	3	3	0
Both reclaimed water and potable water provided				
Film processing facilities				
Dedicated fire lines with chemical addition or using unapproved auxiliary supplies				
Food processing plants (including canneries, slaughter houses, rendering plants)				
Hospitals, medical centers, medical, dental and veterinary clinics, mortuaries, nursing homes, etc., reported on Part 3C page 3 (totals imported from page 3)	7	6	6	1
Dedicated irrigation systems using purveyor's water supply and chemical addition[4]	1	1	1	0
Laboratories				
Metal plating industries				
Petroleum processing or storage plants				
Piers and docks				
Radioactive material processing plants or nuclear reactors				
Survey access denied or restricted				
Wastewater lift/pump stations (non-residential only)	3	3	3	0
Wastewater treatment plants				
Unapproved auxiliary water supply interconnected with potable water supply	1	1	1	0
Totals	16	15	15	1

[1] Count multiple connections or parallel installations to the same premises as **separate** connections.

[2] Count only connections with premises isolation AGs or RPs. Don't include connections with in-premises preventers only or connections with DCVAs or DCDAs installed for premises isolation. The number in Column B can't be larger than the number in Column A in the same row.

[3] Count only connections whose premises isolation preventers were inspected (AGs) or tested (RPs) during the reporting year.

[4] For example, dedicated irrigation lines to parks, playgrounds, golf courses, cemeteries, estates, etc.

[5] Premises with hazardous materials or processes (requiring isolation by AG or RP), 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, for example:"Other manufacturing" or "Other commercial".

Part 3C: Cross-Connection Control for High-Hazard Medical Premises Served by the PWS

- Count only medical premises PWS serves water to.
- Don't count the same premises more than once. If you serve different medical category premises through a single connection, count the connection under the medical category you consider to pose the highest hazard to PWS.
- Report data as accurately as possible. **DOH currently bases CCC compliance actions on this information**

Type of High-Hazard Medical Premises [WAC 246-290-490(4)(b)]	Number of Connections at end of 2017			
	A. Being Served Water by PWS[1]	B. With Premises Isolation by AG/RP[2]	C. With Column B AG Inspected or RP Tested[3]	D. Granted Exception from Premises Isolation
Hospitals				
Hospitals (include psychiatric hospitals and alcohol and drug treatment centers)				
Facilities for Treatment and Care of Patients Not Located in Hospitals Counted Above				
Same day surgery centers				
Out-patient clinics and offices				
Alternative health out-patient clinics and offices				
Psychiatric out-patient clinics and offices				
Chiropractors with water-connected X-ray equipment	0	0	0	0
Hospice care centers				
Childbirth centers				
Kidney dialysis centers				
Blood centers				
Dental clinics and offices	5	5	5	0
Facilities for Housing Patients				
Nursing homes				
Assisted Living Facilities (formerly Boarding Homes)	1	0	0	1
Residential treatment centers				
Other Medical-Related Facilities				
Mortuaries with embalming equipment				
Morgues and autopsy facilities (not in hospitals)				
Veterinarian offices, clinics and hospitals	1	1	1	0
Totals	7	6	6	1

[1] Count multiple connections or parallel installations to the same premises as **separate** connections.

[2]Count only connections with premises isolation AGs or RPs. Don't include connections with in-premises preventers only or connections with DCVAs or DCDAs installed for premises isolation. The number in Column B can't be larger than the number in Column A in the same row.

[3]Count only connections with premises isolation AGs or RPs. Don't include connections with in-premises backflow preventers only or connections with premises isolation DCVAs or DCDAs isolation.

Part 4A: Backflow Preventer Inventory and Testing Information for 2017

- Complete all fields. Enter **zero (0)**, if no backflow preventers in a specific category.
- Count only backflow preventers relied on to protect the PWS.
- Count AVBs on *irrigation systems only*. Select No to AVB question above Table 2 if PWS doesn't track AVBs.
- Count multiple tests (or failures) for the same backflow preventer as one test (or failure) for that backflow preventer.
- For multiple service connections or parallel installations, count each assembly separately.
- Count RPDAs and DCDAs as ***single*** assemblies. Count the tests of the mainline assembly and bypass assembly as ***one test***. Count the failure of either the mainline or bypass assembly (or the failure of both) as ***one failure***. Count an entire detector assembly taken out of service as ***one assembly removed from service***.
- Count assemblies installed on dedicated fire or irrigation lines as **Premises Isolation Assemblies** in Table 1.

	Backflow Preventer Category and Inspection/Testing Information	Air Gap	RPBA	RPDA	DCVA	DCDA	PVBA	SVBA	AVB
Table 1: Premises Isolation Preventers (include preventers isolating PWS-owned facilities)									
Existing Premises Isolation Backflow Preventers									
1	In service at beginning of 2017	0	18	0	273	65			
2	Inspected and/or tested in 2017[1]	0	16	0	273	65			
3	Failed inspection or test in 2017	0	1	0	9	0			
New Premises Isolation Backflow Preventers									
4	Installed in 2017[2]	0	0	0	2	2			
5	Inspected and/or tested in 2017[1]	0	0	0	2	2			
6	Failed inspection or test in 2017	0	0	0	0	0			
Premises Isolation Backflow Preventers (existing or new)									
7	Removed from service in 2017[3]	0	0	0	0	0			
Total Premises Isolation Preventers at End of 2017		0	18	0	275	67	0	0	0

Does PWS track AVBs on irrigation systems? ○ Yes ◉ No

	Table 2: In-Premises Preventers (include preventers within PWS-owned facilities)								
Existing In-Premises Backflow Preventers									
8	In service at beginning of 2017	0	47	0	804	0	0	0	unk
9	Inspected and/or tested in 2017[1]	0	47	0	792	0	0	0	unk
10	Failed inspection or test in 2017	0	8	0	22	0	0	0	unk
New In-Premises Backflow Preventers									
11	Installed in 2017[2]	0	0	0	18	0	0	0	unk
12	Inspected and/or tested in 2017[1]	0	0	0	18	0	0	0	unk
13	Failed inspection or test in 2017	0	0	0	1	0	0	0	unk
In-Premises Backflow Preventers (existing or new)									
14	Removed from service in 2017[3]	0	0	0	0	0	0	0	unk
Total In-Premises Preventers at End of 2017[4]		0	47	0	822	0	0	0	0
Grand Totals at End of 2017		0	65	0	1097	67	0	0	0

[1] Initial and/or routine annual inspection (for proper installation and approval status) and/or test (for testable assemblies only, using DOH-approved USC field test procedures).

[2] Includes preventers installed on connections where backflow prevention was not previously required and any preventers that replaced those in service at the beginning of the reporting year. Replacement preventers may be of a different type than the originals.

[3] Existing or new preventers taken out of service, whether or not they were replaced by the same or a different type of preventer.

Part 4B: Other Implementation Activities in 2017

Complete all cells. Enter zero if not applicable.

Water Use Questionnaires	
Did your PWS send any water use questionnaires to customers during 2017?	○ Yes ◉ No

On-site Hazard Surveys			
Did your CCS conduct any on-site hazard surveys during 2017?			◉ Yes ○ No
	Service Connection Type		
	New	**Existing**	**Total**
1. Number of connections surveyed for cross-connection hazards to PWS.	22	0	22
2. Number of connections requiring backflow prevention to protect PWS.[1,2]	20	0	20

New Exceptions to Premises Isolation	
Did your CCS grant any new premises isolation exceptions in 2017 to high-hazard premises?[3]	○ Yes ◉ No

CCC Enforcement Actions	
Did your PWS take any enforcement actions during 2017?[4]	◉ Yes ○ No Number 2

[1] Include services where either premises isolation or in-premises preventers were required to protect the PWS.
[2] Include existing services that need new, additional or higher level backflow prevention.
[3] Submit a completed DOH Exception Form (green) for each new exception granted in the reporting year.
[4] "Enforcement actions" means actions taken by the PWS (such as water shut-off, PWS installation or testing of backflow preventer, assessment of fines, etc.) when the customer fails to comply with the PWS's CCC requirements.

Part 5: Backflow Incidents and "Off-Normal" Events in 2017

	Backflow Incidents, Risk Factors, and Indicators during 2017	Number
Backflow Incidents during 2017		
1	Backflow incidents that contaminated the PWS[5].	0
2	Backflow incidents that contaminated the customer's drinking water system ***only***[5].	0
Risk Factors for Backflow during 2017		
3	Distribution main breaks per 100 miles of pipe.	0.00
4	Low pressure events (<20 psi in PWS distribution system).	1
5	Water outage events.	0
Indicators of Possible Backflow during 2017		
6	Total health-related complaints received by PWS.[6]	0
7	Received during BWA or PN events.[7]	0
8	Received during low pressure or water outage events.	0
9	Total aesthetic complaints (color, taste, odor, air in lines, etc.).	3
10	Received during BWA or PN events.[7]	0
11	Number of these complaints received during low pressure or water outage events.	0

[5] Purveyors must submit a Backflow Incident Report form for each backflow incident known to have contaminated the public water system. DOH is also interested in receiving incident report forms for backflow incidents that contaminated the customer's drinking water system only.
[6] Such 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 to:
  - Explain or clarify information in this report.
  - Describe challenges faced or accomplishments made in this reporting year.
  - Share your goals and objectives for the coming reporting year.
- Delete comments that are no longer valid.

No Comments

Part 7: Report Certification and Contact Information

I, [Certified by] , certify that the information in this form is true, complete and accurate to the best of my knowledge.

Last Saved	04/26/2018	**All ASR Forms Certified/Submitted**	

Designated CCS/CCC Program Manager[1]					
Name	Frederick D. Foreman	**Title**	Water Quality Spec. MW III	**CCS Cert #**	002854
Email Address	fforeman@dupontwa.gov	**Phone**	253-912-5381	**Phone Ext**	2533774971

PWS Manager[2]					
Name	Scott Hein	**Title**	Public Works Supervisor	**Operator Cert #**	007319
Email Address	shein@dupontwa.gov	**Phone**	253-964-8121	**Phone Ext**	

[1] The CCS responsible for developing and implementing the PWS's CCC program (CCC Program Manager).
[2] The person the designated CCS/CCC Program Manager reports to or other manager having direct oversight of the CCC Program.

Cross-Connection Control Program Summary (Cream)
Annual Summary Report (ASR) for 2017

PWS ID: **20500P** PWS Name: **DUPONT WATER SYSTEM, CITY OF** County: **PIERCE**

Describe the characteristics of the PWS's Cross-Connection Control (CCC) Program at the end of 2017.

Part 1: CCC Program Characteristics

A. Type of Program Implemented

Type of Program	Check One
Premises isolation only.	○
Combination program: reliance on both premises isolation and in-premises prevention.	○
In transition from a combination program to a premises isolation only program.	◉

B. Coordination with Authority Having Jurisdiction (AHJ) on CCC Issues

Indicate the status of coordination with AHJs in your service area. The AHJ is the entity that enforces the Uniform Plumbing Code at the local level. The AHJ is usually your county or city building department. Don't list DOH as an AHJ.

AHJ #	Name of AHJ (City or County Building Department)[1]	PWS		AHJ Declined to Coordinate
		Coordinates with AHJ	Has Written Agreement with AHJ	
1	City of DuPont Building Dept.	Yes ◉ No ○	Yes ◉ No ○	Yes ○ No ○

[1] Do not enter an individual's name.

C. Corrective/Enforcement Actions Available to the Purveyor

Type of Corrective Action/Enforcement Action	Indicate Whether Available	Most Often Used (Check One)
Purveyor denies or discontinues water service.	Yes ◉ No ○	◉
Purveyor installs backflow assembly and bills customer.	Yes ○ No ◉	○
Purveyor assesses fines (in addition to eliminating or controlling cross connection).	Yes ○ No ◉	○
Purveyor tests backflow assembly and bills customer.	Yes ○ No ◉	○

[1] Enter detailed description of other enforcement actions available to PWS. Don't enter "None", "Not Applicable", or "Not Available."

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	○	◉
Backflow preventer (BP) ownership	◉	○
BP installation	◉	○
BP *initial* inspection (for proper installation - all BPs)	○	◉
BP *initial* test (for testable assemblies)	◉	○
BP *annual* inspection (Air Gaps and AVBs)	◉	○
BP *annual* test (for testable assemblies)	◉	○
BP maintenance and repair	◉	○

E. Backflow Prevention for Fire Protection Systems
Please remember to enter number of days allowed if you require retrofitting.

PWS coordinates with *AHJ* on CCC issues for fire sprinkler systems (FSSs)	Yes ◉ No ○ N/A ○
PWS coordinates with *local Fire Marshal* on CCC issues for FSSs.	Yes ◉ No ○ N/A ○
PWS ensures backflow prevention is installed before serving *new* connections with FSSs.	Yes ◉ No ○
PWS requires retrofits to *high*-hazard FSSs.	Yes ○ No. of days allowed: No ○ N/A ◉
PWS requires retrofits to *low*-hazard FSSs.	Yes ○ No. of days allowed: No ○ N/A ◉

F. Backflow Prevention for Irrigation Systems

Minimum level of backflow prevention required on irrigation systems *without* chemical addition.	Not Addressed ○ AVB ◉ PV/SVBA ○ DCVA ○ RPBA ○
PWS currently inspects AVBs upon *initial* installation.	Yes ◉ No ○ N/A ○
PWS currently inspects AVBs upon repair, reinstallation or relocation.	Yes ◉ No ○ N/A ○

G. Used Water

Does PWS prohibit, by ordinance, rules, policy, by-laws or agreement, the intentional return of used water (e.g. for heating or cooling) into the distribution system?	Yes ◉ No ○
If not prohibited at present, date plan to prohibit use.	N/A
Current number of service connections returning used water to distribution system.	0

H. Backflow Prevention for Unapproved Auxiliary Water Supplies[1] NOT Interconnected with PWS
Show 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.*

***Existing* service connections.**	None ○ DCVA ◉ RPBA ○ AG ○
Type of protection required.	N/A ○ In-premises prevention ○ Premises isolation ◉
***New* service connections.**	None ○ DCVA ◉ RPBA ○ AG ○
Type of protection required.	N/A ○ In-premises prevention ○ Premises isolation ◉

[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 Prevention for Tanker Trucks and Temporary Water Connections

Minimum **level of backflow prevention (installed on or associated with the truck) required for tanker trucks taking water from PWS.**	AG ○ DCVA ◉ RPBA ○ Not Specified ○ Tanker trucks not allowed ○
PWS requires tanker trucks to obtain water at designated fill sites each equipped with permanently installed backflow preventer(s).	Yes ○ (Minimum preventer: DCVA ○ RPBA ○) No ◉ N/A ○ No sites provided ○
PWS currently accepts tanker trucks approved by other PWSs without further inspection or testing.	Yes ○ No ◉ N/A ○
Minimum **level of backflow prevention required for temporary water connections (e.g., for construction sites).**	AG ○ DCVA ◉ RPBA ○ Not specified ○ Temp. connections not allowed ○
PWS provides approved backflow preventer for temporary connections.	Yes ○ No ◉ N/A ○ (Temp. connections not allowed)
PWS requires testing each time the temporary connection backflow preventer is relocated.	Yes ○ No ◉ N/A ○ (Temp. connections not allowed)

J. Backflow Prevention 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 prevention required (whether or not PWS currently has that type of customer).

Type of Connection	PWS has Customers of this Type	Minimum Premises Isolation Backflow Prevention Required
Commercial	Yes ◉ No ○	Not Required ○ DCVA ◉ RPBA ○
Industrial	Yes ◉ No ○	Not Required ○ DCVA ◉ RPBA ○
Institutional	Yes ◉ No ○	Not Required ○ DCVA ◉ RPBA ○

K. Backflow Prevention for Wholesale Customers

Indicate whether the PWS requires backflow prevention at interties with wholesale customers (other PWSs).

Type of Intertie	PWS has Customers of this Type	Minimum Backflow Prevention Required (if prevention is required, indicate minimum level).	
Existing	Yes ○ No ◉	Not specified / Not required ◉ Always required ○ Required only if purchaser's CCC program is inadequate ○	Minimum required (if applicable): DCVA ○ RPBA ○
New	Yes ○ No ◉	Not specified / Not required ◉ Always required ○ Required only if purchaser's CCC program is inadequate ○	Minimum required (if applicable): DCVA ○ RPBA ○

L. Exceptions to Mandatory Premises Isolation

PWS's written CCC Program Plan *allows* system to grant exceptions to mandatory premises isolation per WAC 246-290-490(4)(b)(iii)	Yes ○ No ○ Doesn't Address ◉
PWS currently grants new Exceptions.	Yes ○ No ◉
PWS granted Exceptions in past reporting years.	Yes ◉ No ○

Part 2: CCC Program Record-Keeping Software

Indicate the type or name of computer software the PWS uses to track CCC records.

BPMS ○	**Cross-Track (BMI)** ○	**Tokay** ○	**XC2** ◉	**Custom developed for or by PWS[1]** ○
Other non-CCC software (e.g. Excel) ○	**Other commercial CCC software (specify)** ○	**None Used** ○		

[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 3: Comments and Clarifications

- Enter comments to:
  - Explain or clarify information in this report.
  - Describe accomplishments made in this reporting year.
  - Identify challenges faced in this reporting year.
  - Share your goals and objectives for the coming reporting year.
- Delete comments that are no longer valid.

No Comments

Part 4: Report Certification and Contact Information

I,[Certified by], certify that the information in this form is true, complete and accurate to the best of my knowledge.

Last Saved	04/26/2018	**All ASR Forms Certified/Submitted**	

Designated CCS/CCC Program Manager[1]					
Name	Frederick D. Foreman	**Title**	Water Quality Spec. MW III	**CCS Cert #**	002854
Email Address	fforeman@dupontwa.gov	**Phone**	253-912-5381	**Phone Ext**	2533774971

PWS Manager[2]					
Name	Scott Hein	**Title**	Public Works Supervisor	**Operator Cert #**	007319
Email Address	shein@dupontwa.gov	**Phone**	253-964-8121	**Phone Ext**	

[1] The CCS responsible for developing and implementing the PWS's CCC program (CCC Program Manager).

[2] The person the designated CCS/CCC Program Manager reports to or other manager having direct oversight of the CCC Program.

List of Exceptions to High-Hazard Premises Isolation Requirements
Annual Summary Report for (ASR) for 2017

PWS ID: **20500P** PWS Name: **DUPONT WATER SYSTEM, CITY OF** County: **PIERCE**

Designated Cross-Connection Control Specialist (CCS) Information

CCS Name	Frederick D. Foreman	**CCS Phone**	253-912-5381	**CCS Cert. #**	002854

Use the table below to:

- **Edit, Renew, or Cancel** a saved exception (depending on the buttons listed under Available Actions).
- **Print** any saved Exception form.
- Re-sort the Exceptions List by any column heading (except Available Actions). Click once to sort from A to Z. Click a second time to sort from Z to A.

Important Reminder! You must **Renew** or **Cancel** all ***expired*** exceptions to submit your ASR Forms Package.

#	Premises Name	Premises Type	Status	Expiration Date	Last Saved
1	PATRIOTS LANDING OPERATIONS LLC	Hospitals, medical centers, nursing homes, veterinary, medical and dental clinics, and blood plasma centers	Renewed	05/31/2018	04/26/2018 4:04 PM

Return Test Reports To:
Attn: Water Quality
City of DuPont PW
1700 Civic Drive
DuPont WA 98327
•Fax 253-912-5102
•fforeman@dupontwa.gov

City of DuPont

Backflow Prevention Program

Device Type

Date Range: 01/01/2017 To : 12/31/2017 Print Date: August 2, 2018

Device Type	Active	Inactive	Tested	Test %	Pass	Fail	Fail %	Installs	Removed	Replaced	Entered	Total
DC	1,147		1,054	91.89%	1,025	29	2.75%	9		8	39	1,147
RP	96		88	91.67%	81	11	12.50%	7		6	11	96
DCDA	70		64	91.43%	64						2	70
PVB												
Totals	**1313**	**0**	**1206**	**91.85%**	**1170**	**40**	**3.32%**	**16**	**0**	**14**		**313**

Return Test Reports To:
Attn: Water Quality
City of DuPont PW
1700 Civic Drive
DuPont WA 98327
•Fax 253-912-5102
•fforeman@dupontwa.gov

City of DuPont

Backflow Prevention Program

Hazard Type

Date Range: 01/01/2017 To : 12/31/2017 Print Date: August 2, 2018

Hazard Type	Active	Inactive	Tested	Test %	Pass	Fail	Fail %	Installs	Remove	Replace	Entered	Total
Lawn Irrigation	833		782	93.88%	764	18	2.30%	8		6	33	833
Lawn Irrigation	833		782	93.88%	764	18	2.30%	8		6	33	833
Lawn Irrigation	833		782	93.88%	764	18	2.30%	8		6	33	833
Lawn Irrigation	833		782	93.88%	764	18	2.30%	8		6	33	833
Fire Suppression	159		138	86.79%	130	8	5.80%					159
Irrigation	103		82	79.61%	82			1		2	3	103
Irrigation	103		82	79.61%	82			1		2	3	103
Irrigation	103		82	79.61%	82			1		2	3	103
Fire Sprinkler	35		34	97.14%	34							35
Fire Sprinkler	35		34	97.14%	34							35
Premises Isolation	24		21	87.50%	21							24
Premises Isolation	24		21	87.50%	21							24
Premises Isolation	24		21	87.50%	21							24
Beverage Machine	20		19	95.00%	18	1	5.26%	2		1	3	20
Other	18		18	00.00%	17	2	11.11%			2	2	18
Domestic Premises	14		14	00.00%	14							14
Premises Isolation I	14		12	85.71%	11	1	8.33%				3	14
Fire Suppression Sy	11		10	90.91%	10						2	11
Chemical Injection	8		8	00.00%	6	2	25.00%					8
Fire System	7		7	00.00%	7							7
Ice Maker	6		4	66.67%	2	2	50.00%					6
Ice Maker	6		4	66.67%	2	2	50.00%					6
Spa, Hot Tub	6		6	00.00%	6			1			1	6
Boiler for Potable W	4		4	00.00%	4						2	4
Lift Station	4		4	00.00%	4							4
Boiler	3		3	00.00%	3	2	66.67%			2	1	3
Fire System by Pas	3		3	00.00%	3							3
Laundry W/Soap Inj	3		1	33.33%	1			1			1	3

Return Test Reports To:
Attn: Water Quality
City of DuPont PW
1700 Civic Drive
DuPont WA 98327
•Fax 253-912-5102
•fforeman@dupontwa.gov

City of DuPont

Backflow Prevention Program

Hazard Type

Date Range: 01/01/2017 To : 12/31/2017 Print Date: August 2, 2018

Hazard Type	Active	Inactive	Tested	Test %	Pass	Fail	Fail %	Installs	Remove	Replace	Entered	Total
Make up Water	3		3	00.00%	3							3
Pool-Hot Tub	3		3	00.00%	1	2	66.67%					3
Specialized	3		3	00.00%	3							3
Commercial Laundr	2		2	00.00%	2							2
Dental Facility	2		2	00.00%	2							2
Dishwasher	2		2	00.00%	2			1			1	2
EOC W/Auxiliary W	2		2	00.00%	1	1	50.00%					2
Fire Sprinkler Syste	2		2	00.00%	2							2
proccess water for (	2		2	00.00%	2	1	50.00%			1		2
Science Labs	2		2	00.00%	2							2
Wash Down Water	2		2	00.00%	2							2
Wash Down Water	2		2	00.00%	2							2
None Designated	2		1	50.00%	1			1				2
CL2 Generation	1		1	00.00%	1							1
HAVC	1		1	00.00%	1							1
Heating Boiler	1		1	00.00%	1							1
Industrial Domestic	1		1	00.00%	1							1
Machine Shop	1		1	00.00%	1							1
Office Building	1		1	00.00%	1							1
Premisis Isolation	1		1	00.00%	1							1
Reuse Water, Pump	1		1	00.00%	1							1
School	1		1	00.00%	1							1
Steam Generator	1											1
Veterinarian/Kennel	1		1	00.00%	1			1				1
Clinic												
Food & Bev. Proces												
Laboratory												
Pond With Auto Fill												
Totals	**4109**	**0**	**3798**	**92.43%**	**3706**	**96**	**2.53%**	**42**	**0**	**36**		**109**

Return Test Reports To:
Attn: Water Quality
City of DuPont PW
1700 Civic Drive
DuPont WA 98327
•Fax 253-912-5102
•fforeman@dupontwa.gov

City of DuPont

Backflow Prevention Program

Facility Type

Date Range: 01/01/2017 To : 12/31/2017 Print Date: August 2, 2018

Facility Type	Active	Inactive	Tested	Test %	Pass	Fail	Fail %	Installs	Removed	Replaced	Entered	Total
None Designa	1,135		1,041	91.72%	1,012	29	2.79%	12		8	39	1,135
Warehouse Fa	38		37	97.37%	34	5	13.51%			3	5	38
Restaurant/Ba	32		27	84.38%	27					1	4	32
Both reclaime	22		22	00.00%	22	1	4.55%			1		22
Boarding hom	21		21	00.00%	21	1	4.76%	2		1	2	21
Hotel/Motel	20		13	65.00%	12	1	7.69%	2			2	20
Other	17		17	00.00%	15	2	11.76%					17
Shopping Mall	12		12	00.00%	12							12
Dental	8		8	00.00%	8							8
Wastewater L	4		4	00.00%	4							4
Super Markets	3		3	00.00%	2	1	33.33%					3
Laundries and	1		1	00.00%	1							1
Totals	**1313**	**0**	**1206**	**91.85%**	**1170**	**40**	**3.32%**	**16**	**0**	**14**		**313**

Return Test Reports To:
Attn: Water Quality
City of DuPont PW
1700 Civic Drive
DuPont WA 98327
•Fax 253-912-5102
•fforeman@dupontwa.gov

City of DuPont

Backflow Prevention Program

Service Type

Date Range: 01/01/2017 To : 12/31/2017 Print Date: August 2, 2018

Service Type	Active	Inactive	Tested	Test %	Pass	Fail	Fail %	Installs	Removed	Replaced	Entered	Total
Residential	808		761	94.18%	744	17	2.23%	9		5	32	808
Commercial	222		199	89.64%	189	13	6.53%	5		6	14	222
TownHomes/(	115		89	77.39%	82	7	7.87%				2	115
Government	48		45	93.75%	44	1	2.22%	1		2	2	48
Industrial	39		36	92.31%	36	1	2.78%			1		39
Park Open Sp	33		29	87.88%	29							33
Multi-family	31		31	00.00%	30	1	3.23%				2	31
Golf Course	6		6	00.00%	6							6
Sewage	4		4	00.00%	4							4
Hospital	4		4	00.00%	4			1				4
None Designa	2		1	50.00%	1							2
Medical Office	1		1	00.00%	1							1
Totals	**1313**	**0**	**1206**	**91.85%**	**1170**	**40**	**3.32%**	**16**	**0**	**14**		**313**

Return Test Reports To:
Attn: Water Quality
City of DuPont PW
1700 Civic Drive
DuPont WA 98327
•Fax 253-912-5102
•fforeman@dupontwa.gov

BACKFLOW PREVENTION PROGRAM COMPLIANCE REPORT

City of DuPont

Supervisor: Fred Foreman
Report Dates: 01/01/2017 to 12/31/2017 **Printed:** 08/02/2018

Backflow Prevention Assemblies Due this Period			Activity This Period: # of Assemblies	
Tests Due This Period	1,318		New Installations	16
Assemblies Tested	1,207	91.58%	Replacements	15
Passed Initial Test	1,171	97.02%	Repairs	31
Failed Initial Test	40	3.31%	Removals	15
Pass:Fail Ratio	29.3 : 1		Inspections(Surveys) - Start	
Total Backflow Prevention Assemblies			Inspections(Surveys) - Complete	
Total Active Assemblies	1,318		Hazards Found	
Total Inactive Assemblies	71		Hazards Remain	

Notification vs. Compliance					
Tests Performed Within...		After 65 Days			
30 Days of Notice #1	1,196	Notice #1 Not Sent	11		
50 Days of Notice #1		90 Days Before Notice #1			
60 Days of Notice #1		Other			
65 Days of Notice #1		Total Tests	1,207		

Protection Type

Type	Count	RPDA-II	DCDA-II	RP	DC	DCDA	RPDA	PVB	SVB	AIRGAP
Containment	902			74	825					
Premises Isolation	357			19	272	66				

Return Test Reports To:
Attn: Water Quality
City of DuPont PW
1700 Civic Drive
DuPont WA 98327
•Fax 253-912-5102
•fforeman@dupontwa.gov

BACKFLOW PREVENTION PROGRAM NOTICE SUMMARY

City of DuPont

Tr

Supervisor: Fred Foreman **Printed:** 08/02/2018

Report Dates: 01/01/2017 to 12/31/2017

Backflow Assembly Inventory

Activity by Assembly Type (Those which were "Due" to be tested)

# of Assemblies			Activity this Period	01/01/2017 to 12/31/2017					
AssemblyType	Total	Due	Tests	Passed	Failed	Repairs	Installs	Replaced	Removed
RP	97	97	89	82	11	4	7	6	6
DC	1,148	1,148	1,054	1,025	29	27	9	9	9
DCDA	70	70	64	64					
PVB									
AVB	3	3							

Return Test Reports To:
Attn: Water Quality
City of DuPont PW
1700 Civic Drive
DuPont WA 98327
•Fax 253-912-5102
•fforeman@dupontwa.gov

BACKFLOW PREVENTION PROGRAM ACTIVITY SUMMARY

City of DuPont

Supervisor: Fred Foreman

Report Dates: 01/01/2017 to 12/31/2017 **Printed:** 08/02/2018

Event History Summary

Code	Type	Description	Count	Pct
PASS	PASS	Pass Test	1,183	90.79%
FAIL	FAIL	Fail Test	20	1.53%
FAIL/PASS	FAIL/PASS	Failed Initial/Passed Final Test	34	2.60%
INC	INC	Incomplete Test	1	0.07%
REPAIR	Repair	Repair Assembly	33	2.53%
INSTALL	Installation	Install Assembly	16	1.22%
REPLACE	Replacement	Replace Assembly	16	1.22%

Return Test Reports To:
Attn: Water Quality
City of DuPont PW
1700 Civic Drive
DuPont WA 98327
•Fax 253-912-5102
•fforeman@dupontwa.gov

BACKFLOW PREVENTION PROGRAM
NOTICE SUMMARY

Fa

City of DuPont

Supervisor: **Fred Foreman** **Printed:** **08/02/2018**

Report Dates: **01/01/2017 to 12/31/2017**

Code	Letter Name	Count
	Letters to: Facility	
LTR_1	1 Res Shut Off Notice Date Spec	**8**
LTR_1	1 Res #2	**145**
LTR_1	1 Res #1 Fire	**3**
LTR_1	1 Res #1 Fire & Lawn	**14**
LTR_1	1 Res #1	**813**
LTR_1	A Commercial Missing	**84**
LTR_1	Address Sheet Only	**1**
LTR_2	A Commercial #2	**4**
	Letters to: BFP Assembly	
LTR_1	A Commercial Failed #1	**9**
	Letters to: BFP Testers	
	Letters to: Test Kits	
	Total Letters Sent	**1,081**

ASR Feedback Report

Report Run Date: 04/26/2018

The ASR Feedback report card has been created to help utilities and Department of Health staff evaluate the effectiveness of Cross-Connection Control program efforts.

PWS ID: 20500P

PWS Name: DUPONT WATER SYSTEM, CITY OF

PWS Manager Name: Scott Hein

Email: shein@dupontwa.gov

CCS Manager Name: Frederick D. Foreman

Certification Number: 002854

Email: fforeman@dupontwa.gov

Phone: 253-912-5381 ext- 2533774971

Status of Written CCC Program

Reporting Year	Year Last Updated	Percentage of Elements in the Written Program	Percentage of Elements Implemented
2017	10/25/2011	100%	100%
2016	10/25/2011	100%	100%
2015	10/25/2011	100%	100%
2014	NULL	100%	100%
2013	NULL	100%	100%

PWS's are expected to have complete written programs and full implementation (WAC 246-290-490(3)). Written CCC Program must be updated at least every 10 years.

CCC for Severe Health Hazard Facilities

Reporting Year	Number Served	Protected	Unprotected	Percent Protected

PWS's are expected to have 100% protection of Severe Health Hazard Premises (WAC 246-290-490(4)).

CCC for High-Hazard Premises

Reporting Year	Number Served	Protected by AG or RP	Exceptions Granted	Unprotected	Percent Protected
2017	16	15	1	0	100%
2016	15	14	1	0	100%
2015	15	14	1	0	100%
2014	17	13	4	0	100%
2013	18	14	4	0	100%

PWS's are expected to have 100% protection of High Hazard Premises (WAC 246-290-490(4)).

Backflow Preventer Inspection and Testing Data

Reporting Year	Number of Assemblies	Assemblies Tested	Percentage Tested and Inspected
2017	1229	1215	98%
2016	1195	1179	98%
2015	1170	971	82%
2014	1929	1897	98%
2013	1132	1097	96%

Inspection and testing of backflow assemblies, air gaps, and AVB's is vital for proper operation and protection (WAC 246-290-490(7)). Public Health performance goal is 100% testing.

Hazard Surveys

Reporting Year	Number of Connections	On-Site Surveys	Questionnaires	Percentage of Connections Evaluated
2017	3151	22	0	1%
2016	3177	40	0	1%
2015	3165	26	0	1%
2014	3159	47	0	1%
2013	3116	47	0	1%

Periodic hazard evaluations are vital to ensure backflow protection is commensurate to the degree of hazard (WAC 246-290-490(3)(c)). Hazard survey frequency is specified in the CCC Program.

Backflow Incidents, Risk Factors, and Indicators

Reporting Year	Backflow Incidents	Main Breaks / 100 Miles	Low-Pressure Events	Water Outages
2017	0	0.00	1	0
2016	0	0.00	1	0
2015	0	0.00	2	0
2014	0	0.00	1	0
2013	0	0.00	1	0

Increased frequency of backflow incidents, risk factors, and indicators may determine changes in maintenance practices or operational strategies.

APPENDIX K

WATER QUALITY NOTIFICATIONS

March 2011

DOH 331-260-1

Coliform
Public Health Advisory Packet

We developed this packet to provide the tools you will use to manage fecal contamination in your water supply. We will work closely with you to help you identify the source of contamination, eliminate it, and determine if you need to issue a public health advisory.

You can get an electronic version of this packet—including all the templates and forms listed below —at http://www.doh.wa.gov/ehp/dw/Coliform/coliform.htm

Publications	Pub #
Public Health Advisory: Coliform Questions & Answers	331-179 *
Coliform Bacteria and Drinking Water Fact Sheet	331-181
Troubleshooting Checklist for Coliform Contamination Fact Sheet	331-180
Emergency Disinfection of Small Systems	331-242

Publications	Pub #
Emergency Water Supply Guidelines for Food Services Establishments Fact Sheet	331-182 *
Drinking Water After-Hours Emergency Hotline Brochure	331-133
Treatment of Drinking Water For Emergency Use Brochure	331-115
Office of Drinking Water authority over operators and water systems Fact Sheet	331-449

* Publication also available in Spanish.

Templates and Forms	Pub #
Boil Water Door Hanger (English and Spanish)	None
Coliform Public Notice Certification Form	331-264
Drinking Water Warning for community water systems	None

Templates and Forms	Pub #
News Release Template**:** Boil Water Advisory	331-260-2
News Release Template: Rescinding Boil Water Advisory	331-260-3
Drinking Water Warning for noncommunity water systems	None

Public Notification Templates and Forms

Page 2 has information and instructions on using the coliform public notification templates and forms.

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

HELPING TO ENSURE SAFE AND RELIABLE DRINKING WATER

Public notification templates and forms

You can choose from the *Drinking Water Warning* template or the *Door Hanger* template to provide public notice to your customers in an emergency. You must distribute one or both of these templates to all of your customers within 24 hours in the event of an acute maximum contaminant level (MCL) violation or other emergency that requires a health advisory.

1. ***Drinking Water Warning:*** This public notice template provides detailed information about health effects and instructions for your customers. You can download templates for community and noncommunity water systems in Microsoft Word or PDF from our website.*****

   You can use the Drinking Water Warning template to notify your customers in response to an *E. coli* or fecal coliform positive sample result. You may reformat this template, but the content must remain the same. Type or write all the information required to complete the template. Next, copy it on brightly colored paper and distribute it to all of your customers.

2. ***Door hanger:*** Use this template to inform your customers of contamination in the system and precautions they can take. Door hangers include information in English and Spanish. You can get door hangers from our regional offices, your local health office, or our website.*****

   Ways to use door hangers to inform customers quickly during a public health advisory:

   - Write information on each door hanger.
   - Fill in the top portion of the door hangers. Then print labels with the water system name, ID#, county, contact person's name and phone number, and the date you distribute the notice. Attach a label to the bottom of each notice.
   - Complete the Drinking Water Warning template, make photocopies, and then staple a copy to the door hanger. This will draw attention to the notice.

Coliform Public Notice Certification Form (331-264): You must complete this form and mail it to our regional office, along with a copy of the public notice you gave to your customers, within 10 days after notifying your customers about an acute MCL violation.

News Releases: We sometimes advise systems serving more than 100 connections to use a news release to communicate with customers through the news media. These templates will help you present information in a format suitable for the media. Visit our website for electronic copies of these news releases.***** If you need help contacting the media, call our nearest regional office.

- **Boil Water Advisory** (331-260-2): Send at the start of a boil water advisory. Gives advice to customers and explains what you're doing to resolve the problem.
- **Rescinding Boil Water Advisory** (331-260-3): Send at the end of a boil water advisory.

***Template available online at http://www.doh.wa.gov/ehp/dw/Coliform/coliform.htm**

For more information

Most of our publications are online at http://www.doh.wa.gov/ehp/dw/default.htm

If you have questions, call our regional office at:

Spokane Valley (509) 329-2100	Kent (253) 395-6750
Tumwater (360) 236-3030	After-hours Emergency (877) 481-4901

If you need this publication in an alternate format, call (800) 525-0127 or for TTY/TDD call (877) 833-6341.

April 2016
DOH 331-181
Revised

Questions & Answers

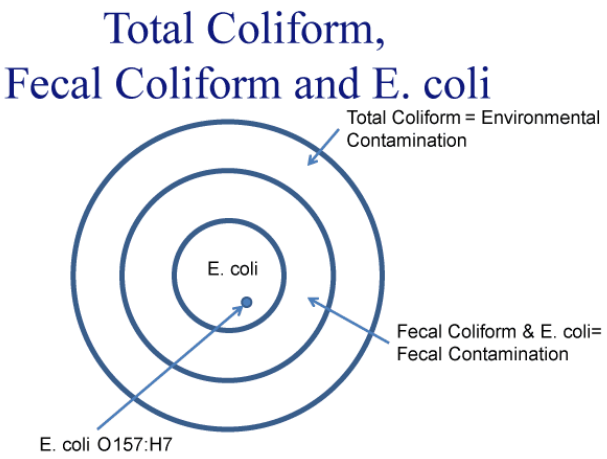
Coliform Bacteria and Drinking Water

Public water systems must deliver safe and reliable drinking water to their customers 24 hours a day, 365 days a year. If the water supply becomes contaminated, consumers can get seriously ill. Fortunately, public water systems take many steps to make sure drinking water is safe. One of the most important steps is regular testing for coliform bacteria.

What are coliform bacteria?

Coliform bacteria are present in the environment and feces of all warm-blooded animals and humans. Coliform bacteria are unlikely to cause illness. However, their presence in drinking water indicates that disease-causing organisms (pathogens) could be in the water system. Most pathogens that can contaminate water supplies come from the feces of humans or animals. Testing drinking water for all possible pathogens is complex, time-consuming, and expensive. It is easy and inexpensive to test for coliform bacteria. If testing detects coliform bacteria in a water sample, water systems search for the source of contamination and restore safe drinking water.

There are three groups of coliform bacteria. Each is an indicator of drinking water quality and each has a different level of risk. Total coliform is a large collection of different kinds of bacteria. Fecal coliform are types of total coliform that exist in feces. *E. coli* is a subgroup of fecal coliform. Labs test drinking water samples for total coliform. If total coliform is present, the lab also tests the sample for *E. coli*.



Total coliform bacteria are common in the environment (soil or vegetation) and are generally harmless. If a lab detects only total coliform bacteria in drinking water, the source is probably environmental and fecal contamination is unlikely. However, if environmental contamination can enter the system, pathogens could get in too. It is important to find and resolve the source of the contamination.

Fecal coliform bacteria are a subgroup of total coliform bacteria. They exist in the intestines and feces of people and animals.

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

E. coli is a subgroup of the fecal coliform group. Most *E. coli* bacteria are harmless and exist in the intestines of people and warm-blooded animals. However, some strains can cause illness. The presence of *E. coli* in a drinking water sample usually indicates recent fecal contamination. That means there is a greater risk that pathogens are present.

Note: *E. coli* outbreaks receive a lot of media coverage. A specific strain of *E. coli* bacteria known as ***E. coli O157:H7*** causes most of those outbreaks. When a drinking water sample is reported as "*E. coli* present," it does not mean that ***O157:H7*** is present. However, it does indicate recent fecal contamination. Boiling or disinfecting contaminated drinking water destroys all forms of *E. coli*, including *O157:H7*.

What if coliform bacteria are found in my water?

When coliform bacteria are found, water systems investigate to find out how the contamination got into the water. They collect additional water samples and often inspect the entire system. Collecting additional samples helps determine whether an actual problem exists. If the lab detects bacteria in any of the additional samples, the initial findings are "confirmed."

What if total coliform bacteria are confirmed in my water?

If a lab confirms total coliform bacteria in your drinking water, your water system must conduct an assessment to find out how the contamination got into the water. If the assessment identifies the cause of the contamination, the water system can usually correct the problem with repairs, treatment, or improved operation and maintenance practices. We help water systems resolve problems. When a lab confirms total coliform bacteria in drinking water, we recommend that the water system notify its customers as soon as possible. The notice will explain what the system is doing to correct the problem, when the problem will likely be resolved, and what customers may need to do until then.

What if *E. coli* are confirmed in my water?

Confirmation of *E. coli* in a water system indicates recent fecal contamination, which may pose an immediate health risk to anyone who consumes the water. The water system will issue a "health advisory" within 24 hours to alert all water users of a health risk associated with the water supply. The advisory usually recommends using boiled or bottled water for drinking, preparing food, and brushing teeth. It also outlines the steps underway to correct the problem and explains when the system expects to resolve the problem.

Responding to health emergencies is our highest priority. We will inspect the system as soon as possible to help the water system resolve the problem. More water samples will be collected to find and eliminate potential contamination sources, and a system not normally disinfected will most likely be chlorinated and flushed. The health advisory will remain in effect until the situation is resolved and the water is safe to drink.

For more information

Our publications are online at https://fortress.wa.gov/doh/odwpubs/

Call our nearest regional office

Northwest Region: Kent	Southwest Region: Tumwater	Eastern Region: Spokane Valley
253-395-6750	360-236-3030	509-329-2100

For people with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TDD/TTY call 711).

Your logo or company name here.

News Release

For Immediate Release: <DATE>
Contact: Water purveyor/system contact name and telephone number

<Water System> announces boil water advisory for all customers in <area>

CITY NAME – The <SYSTEM NAME> is advising all water customers to boil their drinking water after recent samples showed the presence of *E. coli*. The Washington State Department of Health (DOH) has been notified and <SYSTEM NAME> is working closely with the Office of Drinking Water to find the source of contamination and fix the problem, which may include disinfecting the system. The boil water advisory will remain in effect until further notice.

(Sample quote) "We are doing all we can to eliminate the bacteria from the water system. Safe and reliable drinking water is critical to good health and responding to this kind of emergency is our highest priority," said <System spokesperson>.

<NUMBER or NO> illnesses related to the community's drinking water have been reported. To correct the problem <WHAT IS BEING DONE> (e.g. Chlorine was applied to the entire system on DATE.)

The boil water advisory includes several precautionary steps for customers. These include using purchased bottled water or boiled water for drinking, brushing teeth, dishwashing, preparing food, and making ice. Water should come to a roiling boil for one minute, then cool to an appropriate temperature before using.

The advisory will remain in effect until <SYSTEM NAME> and DOH are confident the water is safe. When satisfactory results are reported, customers will be notified that the advisory has been lifted.

If you have questions, please call us at <TELEPHONE NUMBER>.

###

August 2017
DOH 331-179
Revised

Questions & Answers

Public Health Advisory
E. coli

Why must I boil my water?

Recent tests show that your water system is contaminated with organisms that can cause illness.

Who can be affected? Can I become ill?

Anyone who drinks contaminated water may become ill. Infants, young children, the elderly, and people with severely compromised immune systems are more at risk of illness.

Who are people with compromised immune systems?

People who are on chemotherapy, organ or bone marrow recipients, those with HIV or AIDS, malnourished children, infants, and some of the elderly have compromised or weakened immune systems. An infection from a disease-causing organism may lead to very serious health problems for these people.

Can these diseases be spread in ways other than drinking the water?

Yes. Many of these disease-causing organisms are shed in the feces of infected people. In fact, some infected people do not have any symptoms but still shed these organisms. Childcare workers, young children who attend childcare, and caregivers for people who are sick and shedding these organisms are at the greatest risk of becoming ill. Washing hands with soap and water after using the toilet and before preparing food prevents the spread of diseases to others.

What are the symptoms to watch for?
What should I do if I think I have a waterborne illness?

Disease-causing organisms in water can cause diarrhea, stomach cramps, bloating, gas, fatigue, weight loss, nausea, vomiting, and/or fever. Symptoms may appear as early as a few hours to several days after infection and may last more than two weeks. If you are ill with these symptoms, contact your health care provider.

How can I make the water safe?

Boiling is the best way to ensure water is free of illness-causing organisms. Bring the water to a rolling boil for one minute. When it cools, refrigerate the water in clean covered containers.

If you don't want to boil your water, you can disinfect the water using household bleach. Do not use bleach that contains perfume, dyes, or other additives. Use 1/4-teaspoon bleach per gallon of water, mix thoroughly, and then let stand for 60 minutes before using.

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

HELPING TO ENSURE SAFE AND RELIABLE DRINKING WATER

Can I use bottled water?

You can use purchased bottled water. If you choose to use bottled water, Department of Health recommends water that is:

- Reverse-osmosis treated.
- Distilled.
- Filtered through an "absolute" one-micron or smaller filter.

Carbonated water in cans or bottles is usually filtered or heated to remove illness-causing organisms.

During a health advisory, can I use tap water for...?

Drinking	No	Coffee or tea	No
Ice cubes	No	Showers/Baths	Yes
Brushing teeth	No	Washing clothes	Yes
Baby's formula	No	Baby's bath	See below
Washing vegetables/fruits	No	Washing dishes	See below
Preparing food	No	Pet's water bowl	Contact Veterinarian

Can I bathe my baby or child using tap water?

Yes, as long as they do not drink any of the water. Don't let babies suck on a washcloth, as they will be ingesting some of the water.

Can I wash dishes?

You can use your dishwasher if you use the sanitizing/heat cycle and commercial dishwashing detergent. You can hand wash dishes, rinse them in a diluted bleach solution—one teaspoon household bleach to one gallon of water—and then let dishes air dry.

What must be done to fix the problem?

Fixing the problem could be different in each situation depending on whether the problem is at the water source or in the water lines. Usually, in every case the water lines will need to be flushed and the whole system will need to be disinfected using chlorine. The water will then be tested to make sure it is free of coliform bacteria.

How long will this health advisory be in effect?

This health advisory will remain in effect until the water is tested and results show that it meets public health drinking water standards. Your water system will notify you when that occurs.

For more information:

Personal medical questions: Contact your health care provider (physician, nurse consultant, etc.)

Call your local health jurisdiction with general questions about infectious disease, communicable disease transmission, symptoms, causes and prevention of waterborne disease.

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

For people with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TDD/TTY call 711).

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 ____/____/_____

WARNING:
Do not drink tap water without boiling it first!

☐ **Fecal coliform**
☐ **E. coli bacteria**
☐ **Other: _____**

were detected in the water supply on:
(date) _____.

Boiling kills bacteria and other organisms in the water:

- **Bring water to a rolling boil for one minute**
- **Let water cool before using**

To avoid possible illness: use boiled or purchased bottled water for drinking, making ice, brushing teeth, washing dishes, and food preparation until further notice.

Contact your doctor, if you experience one or more of these symptoms: nausea, cramps, diarrhea, jaundice, headache and/or fatigue. People with chronic illnesses, infants and the elderly may be at higher risk and should seek medical advice.

Water System: _____
I.D.: _____
County: _____
Contact: _____
Telephone: _____
Date notice distributed: _____

What is fecal coliform and E. coli?

Fecal coliform and E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these waters can cause short-term effects, such as diarrhea, cramps, nausea, headaches or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.

How long will this warning be in effect?

We will consult with the Washington State Department of Health about this incident. We will notify you when you no longer need to boil the water.

Vea al reverso para la versión en Español.

October 2008

WARNING:
Do not drink tap water without boiling it first!

☐ **Fecal coliform**
☐ **E. coli bacteria**
☐ **Other: _____**

were detected in the water supply on:
(date) _____.

Boiling kills bacteria and other organisms in the water:

- **Bring water to a rolling boil for one minute**
- **Let water cool before using**

To avoid possible illness: use boiled or purchased bottled water for drinking, making ice, brushing teeth, washing dishes, and food preparation until further notice.

Contact your doctor, if you experience one or more of these symptoms: nausea, cramps, diarrhea, jaundice, headache and/or fatigue. People with chronic illnesses, infants and the elderly may be at higher risk and should seek medical advice.

Water System: _____
I.D.: _____
County: _____
Contact: _____
Telephone: _____
Date notice distributed: _____

What is fecal coliform and E. coli?

Fecal coliform and E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these waters can cause short-term effects, such as diarrhea, cramps, nausea, headaches or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.

How long will this warning be in effect?

We will consult with the Washington State Department of Health about this incident. We will notify you when you no longer need to boil the water.

Vea al reverso para la versión en Español.

October 2008

ADVERTENCIA:
¡No tome el agua de la llave sin antes hervirla!

☐ **Bacteria coliforme fecal**
☐ **Bacteria E. coli**
☐ **Otra: _____**

fueron encontradas en su sistema de agua:
(el día)_____.

Hervir el agua mata a las bacterias y otros organismos en el agua:

- **Ponga el agua en la estufa hasta que hierva y deje hervir el agua por un minuto**
- **Deje enfriar el agua antes de usarla**

Para evitar posibles enfermedades y hasta nuevo aviso: use agua hervida o agua potable embotellada para tomar, hacer hielo, limpiarse los dientes, lavar los platos y para preparar comidas.

Hable con su doctor si usted tiene uno o más de los siguientes síntomas: náusea, dolor estomacal, diarrea, ictericia, dolores de cabeza y/o cansancio. La gente con enfermedades crónicas, bebés y personas mayores de edad, pueden estar en situación de alto riesgo y deben consultar con su médico o proveedores de servicios médicos.

Sistema de agua: _____
I.D.: _____
Condado: _____
Contacto: _____
Teléfono: _____
Fecha de notificación: _____

¿Qué son las bacterias coliforme fecal y E. coli?

Coliformes fecales o E. coli son bacterias cuya presencia indica que el agua esta contaminada con desechos humanos o de animales. Microbios de esos desechos pueden causar diarrea, dolor estomacal, náusea, dolores de cabeza u otros síntomas. Pueden representar un peligro para la salud de bebés, niños y niñas de corta edad y personas con sistemas inmunológicos en alto riesgo.

¿Por cuánto tiempo va a estar en efecto esta advertencia?

Vamos a consultar con el Departamento de Salud del estado de Washington acerca de este incidente. Le vamos a notificar cuando ya no sea necesario hervir el agua.

See reverse side for English version.

ADVERTENCIA:
¡No tome el agua de la llave sin antes hervirla!

☐ **Bacteria coliforme fecal**
☐ **Bacteria E. coli**
☐ **Otra: _____**

fueron encontradas en su sistema de agua:
(el día)_____.

Hervir el agua mata a las bacterias y otros organismos en el agua:

- **Ponga el agua en la estufa hasta que hierva y deje hervir el agua por un minuto**
- **Deje enfriar el agua antes de usarla**

Para evitar posibles enfermedades y hasta nuevo aviso: use agua hervida o agua potable embotellada para tomar, hacer hielo, limpiarse los dientes, lavar los platos y para preparar comidas.

Hable con su doctor si usted tiene uno o más de los siguientes síntomas: náusea, dolor estomacal, diarrea, ictericia, dolores de cabeza y/o cansancio. La gente con enfermedades crónicas, bebés y personas mayores de edad, pueden estar en situación de alto riesgo y deben consultar con su médico o proveedores de servicios médicos.

Sistema de agua: _____
I.D.: _____
Condado: _____
Contacto: _____
Teléfono: _____
Fecha de notificación: _____

¿Qué son las bacterias coliforme fecal y E. coli?

Coliformes fecales o E. coli son bacterias cuya presencia indica que el agua esta contaminada con desechos humanos o de animales. Microbios de esos desechos pueden causar diarrea, dolor estomacal, náusea, dolores de cabeza u otros síntomas. Pueden representar un peligro para la salud de bebés, niños y niñas de corta edad y personas con sistemas inmunológicos en alto riesgo.

¿Por cuánto tiempo va a estar en efecto esta advertencia?

Vamos a consultar con el Departamento de Salud del estado de Washington acerca de este incidente. Le vamos a notificar cuando ya no sea necesario hervir el agua.

See reverse side for English version.

Water Boiling Notice

Communication Plan

PCAlert

PCAlert will be one of the main channels of communication to our residents. PCAlert is already utilized by Pierce County to notify individuals of emergencies. This service allows fire, police and other agencies dealing with emergency response to send out accurate and up-to-date information that they feel residents should be informed on.

The City will begin a campaign to build awareness and invite people to register. We will do so by posting regularly on our social media, website, and including it in the utility bill. It's important that people sign up because PCAlert will be a key fixture in communicating emergencies to the public.

Water Boiling Emergency Happens

Step 1 - Notify

Step 2 - Follow Up

Step 3 - Status

Step 4 - Conclusion/Results

Step 1 – Notification

Communications Coordinator

- DOH Northwest Region: 253-395-6750
- Pierce County Emergency Management: 253-798-6595
- City Administrator:
- PC Alert: 253-798-7470

City Administrator

- Mayor:
- Council
- Public Works:
- Police Chief:

- Fire Chief:

i. Call

DOH Northwest Region	253-395-6750
Pierce County Emergency Management	253-798-6595
Mayor	
City Administrator	
Public Works	
DuPont Police Department	253-798-4721
DuPont Fire Department	253-964-8414
Police Chief	
Fire Chief	
PCAlert	253-798-7470
City Council	Email

Call PCAlert 253-798-7470 to notify residents. This will be one of our main channels of communication to citizens. We will utilize this to send routine updates at 6 hours, 12 hours, 24 hours, 48 hours, and 72 hours into the emergency. These updates will also be posted on the City social media and website and emailed to media.

ii. Email press release out to media
   a. See "Boil Water Advisory" press release

King 5	newstips@king5.com
King 5 – Natalie Swaby	nswaby@king5.com
Kiro 7	newstips@kirotv.com
Komo 4	tips@komo4news.com
Q13	tips@q13.com
The News Tribune	newstips@thenewstribune.com
The Seattle Times	newstips@seattletimes.com

iii. Post on City Facebook, Twitter, and website

iv. Reader boards – we can rent reader boards from Pierce County Emergency Management (no cost)

v. Press
   a. Public Spokesperson:
   b. Alternate Public Spokesperson:
   c. If necessary, Council Chambers can be used for a press conference.
   d. See "Talking Points"

Step 2: Follow-Up

Routine updates will be sent at 6 hours, 12 hours, 24 hours, 48 hours, and 72 hours into the emergency. These updates will be sent through PCAlert, posted on the City social media, City website, and emailed to media.

Step 3: Status

Once follow-ups have been sent out and the emergency is over, send out a final message through all avenues and parties of interest mentioned above. Email out press release "Boil Water Advisory Rescinded" (see below).

Step 4: Conclusion/Results

i. After Action Review
   a. How we can prevent from happening again
   b. Timeline
   c. Lessons learned
   d. What are you going to do about it

ii. Make AAR public
   a. Share on City social media and website
   b. Email media
   c. Email internally

Talking Points

DuPont Water Supply

The City of DuPont currently utilizes groundwater from five (5) wells for its public drinking water supply. The City's water supply wells are located in the Bell Hill and Hoffman Hill development areas. All of the City's wells draw from deep aquifers making them less susceptible to contaminants. Bell Hill Well No's. 1 and 3 and Hoffman Hill Well No's 1 and 2 draw water from the Upper Salmon Springs Aquifer; Bell Hill Well No. 2 draws water from the deeper undifferentiated Outwash/ Lakewood Glacier Aquifer. Bell Hill Well's 1 & 2 and Hoffman Hill Well 2 are equipped with emergency generators for continuous operation during power outages.

Prior to its connection and integration with the main DuPont water system in 2010, DuPont also operated a separate satellite water system providing service only to customers in the El Rancho Madrona development area. This small satellite system was integrated in 2010 to increase system reliability for those customers, and to increase overall system efficiency and functionality.

Water Storage

The City has two primary storage reservoirs. A 3.0 million-gallon reservoir is located on Hoffman Hill, a 1.0 million-gallon reservoir is located at Bell Hill. The only treatment used on DuPont's groundwater sources is the addition of small amounts of chlorine to provide disinfection prior to distribution. DuPont water continues to meet all Department of Health drinking water standards. We take pride in working each day to provide you and your family with safe and reliable drinking water.

Annual Water Quality Report: http://www.dupontwa.gov/247/Water-Quality-Reports

Important Links

Drinking Water Forms:
https://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/PublicationsandForms/Forms#publicnotif

Emergency Publications for Water Systems:

https://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/DrinkingWaterEmergencies/EmergencyPublicationsforWaterSystems

Coliform Public Health Advisory Packet:

https://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/DrinkingWaterEmergencies/ColiformAdvisoryPacket

Nitrate Public Health Advisory Packet:

https://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/DrinkingWaterEmergencies/NitrateAdvisoryPacket

PCAlert: Notify residents about a safety issue, contact the Duty Officer

253-798-7470

https://www.co.pierce.wa.us/921/Pierce-County-ALERT

DATE
Contact:
Phone:

For Immediate Release

<Water System> announces boil water advisory for all customers in <area>

DuPont, WA-The <SYSTEM NAME> is advising all water customers to boil their drinking water after recent samples showed the presence of <fecal coliform, E. coli, total coliform>. The Washington State Department of Health (DOH) has been notified and <SYSTEM NAME> is working closely with the Office of Drinking Water to find the source of contamination and fix the problem, which may include disinfecting the system. The boil water advisory will remain in effect until further notice.

<System spokesperson quote> (e.g. "We are doing all we can to eliminate the bacteria from the water system. Safe and reliable drinking water is critical to good health and responding to this kind of emergency is our highest priority," said system spokesperson.)
<NUMBER or NO> illnesses related to the community's drinking water have been reported. To correct the problem <WHAT IS BEING DONE> (e.g. Chlorine was applied to the entire system on DATE.)

The boil water advisory includes several precautionary steps that customers should take. These include using purchased treated bottled water or boiled water for any water that might be consumed: drinking, brushing teeth, dishwashing, preparing food and making ice. Water should come to a rolling boil for one minute, then allowed to cool before using.

The advisory will remain in effect until <SYSTEM NAME> and DOH are confident there is no longer a threat of illness to their customers. Once satisfactory results are reported, customers will be notified that the advisory has been lifted.

If you have any questions, please call us at <TELEPHONE NUMBER>.

DATE
Contact:
Phone:

For Immediate Release

<Water System Name> Boil Water Advisory Rescinded

DuPont, WA -The <SYSTEM NAME> is advising all its water customers that it is no longer necessary to boil their drinking water. Recent test samples show the absence of <fecal coliform, E.coli, total coliform> bacteria.

<SYSTEM SPOKESPERSON QUOTE> (e.g. "Working with the Washington State Department of Health over the last <NUMBER OF> days, we have completed inspections, water quality sampling, disinfection, and flushing to resolve the contamination problem," stated <NAME OF WATER SYSTEM MANAGER>. "We're pleased to be able to lift the boil water advisory."

The inspection of the water system indicated <DESCRIPTION OF SOURCE OF CONTAMINATION, if known, and what will be done to maintain good water quality>

If you have shut off or not used fixtures, water fountains, ice machines, soda machines, and/or other equipment over the past several days, flush the fixture or equipment until there is a change in water temperature before putting it back into service.

The <SYSTEM NAME> encourages customers with questions to call <TELEPHONE NUMBER>.

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

PUBLIC NOTICE CERTIFICATION
E. coli-MCL Violation

Within 10 days after notifying your customers about an *E. coli*-MCL violation, you must complete this form and send it to our regional office along with a copy of each type of notice you distributed to your customers (hand-delivered notices, news releases, newspaper articles, and so on).

By completing this form, you certify that:

- You met all of the public notification requirements.
- You will meet future requirements for notifying new billing units of the violation or situation.

If the boil water advisory remains in effect more than three months, you must re-notify your water users and send another completed copy of this *Public Notice Certification* to us.

Complete the following items, sign the form and mail it to the nearest regional office, addresses below:

Water System:_____ ID #_____ County:_____

Violation Date:_____ / _____ / _____ Violation Type_____

This public water system certifies that it gave this public notice to water users, following state and federal requirements for delivery, content, and deadlines. ☐ **Yes** ☐ **No**

Distribution was completed Yes ☐ **No** ☐ **on** ____ **/** ____ **/**____**.**

Check all that apply:

☐ Hand delivery,
☐ News release (TV, radio, newspaper)
☐ Posting at_____ (by DOH approval only),
☐ Other _____ (by DOH approval only).

Were the water users notified within 24 hours? Yes ☐ **No** ☐

_____ _____ _____
Signature of owner or operator | Position | Date

If you need this publication in an alternative format, call 800.525.0127 (TDD/TTY call 711). This and other publications are available at www.doh.wa.gov/drinkingwater.

Northwest Regional Office:
20425 72nd Ave S Suite 310
Kent WA 98032
(253) 395-6775
Fax: (253) 395-6760
Email: dw.nwro@doh.wa.gov

Southwest Regional Office:
PO Box 47823
Olympia WA 98504-7823
(360) 236-3030
Fax (360) 664-8058
Email: swro.coli@doh.wa.gov

Eastern Regional Office:
16201 E Indiana Ave Suite 1500
Spokane Valley WA 99216
(509) 329-2100
Fax: (509) 329-2104
Email: mark.steward@doh.wa.gov

DOH Form #331-264 (Updated 03/16)

Click here for the printer-friendly version.

Office of Drinking Water

Treating Drinking Water for Emergency Use



For more information call our regional office.

Eastern Region: 509-329-2100
Northwest Region: 253-395-6750
Southwest Region: 360-236-3030

If you need this publication in an alternative format, call 800.525.0127 (TDD/TTY call 711). This and other publications are available at www.doh.wa.gov/drinkingwater.

September 2017

DOH 331-115 (Revised)

Washington State Department of Health

When do You Need to Treat Drinking Water?

Normally, your water is safe to drink, but you may need to treat it if your usual water supply is interrupted or becomes unsafe for drinking. Conditions that may require treatment of drinking water include:

- Disasters that interrupt your water supply, such as floods, earthquakes, and power outages.
- Water supply system disruption or loss of pressure due to line breaks or repairs.
- Special conditions when your water system, local health department, or the state Department of Health advise you to boil or treat the water before drinking.

Preparing for Emergencies

The best way to ensure a safe supply of drinking water is to store enough water to last through an emergency. Although most emergencies are unexpected, you may be able to anticipate situations by watching or listening to weather reports. You should also pay attention to notices from your water system about planned water disruptions or other conditions that could signal a problem with your water supply.

Even if you don't store a supply of water, keep the following items on hand to treat water during an emergency:

- Fresh supply of liquid bleach and kitchen measuring spoons or a medicine dropper. You can get a dropper with teaspoon and milliliter markings at a drug store.
- Equipment to boil water, such as propane or gas stoves or an outside barbecue grill. Remember, your usual source of energy may not be available during an emergency.

Storing Drinking Water for Emergencies

To prepare for a drinking water emergency, the American Red Cross recommends storing **one gallon of water per person per day—enough for at least three days** (two quarts for drinking and two quarts for food preparation and sanitation).

Very warm temperatures and intense physical activity can double that amount; children, nursing mothers, and ill people will need more.

One gallon per person per day.

- **Collect water from a safe supply.** If your water comes from a private well or a water system serving fewer than 15 homes or businesses, ask your local health department how to have it tested.
- **Use proper storage containers.** Store the water in containers made for water storage, or glass and plastic jugs previously used for soft drinks or bottled water. Clean the containers thoroughly before using and make sure the caps fit tightly. Never reuse a container that held toxic substances such as pesticides, chemicals, or oil.
- **Add one or two drops of liquid bleach per gallon** to maintain water quality while in storage. Seal the container tightly and label with the date.
- **Store in a cool place**, safe from flooding, freezing, and earthquake damage. We recommend that every six months you use or discard stored water and replace it with a fresh supply.

Treating Water During an Emergency

If you are informed, or have reason to believe your tap water is unsafe, you should treat the water before using it for drinking, preparing food, or brushing teeth.

There are two ways to treat water: boil it or add bleach. If the supply is unsafe because of untreated surface water (from floods, streams, or lakes), boiling is the better treatment.

If the water is cloudy, you should filter it before boiling or adding bleach. Filter cloudy water with filters designed for use when camping, coffee filters, paper towels, cheesecloth, or a cotton plug in a funnel.

Boiling

Boiling is the best way to purify water that is unsafe because of viruses, parasites, or bacterial contamination.

Don't boil the water if the contaminants are toxic metals, nitrates, pesticides, solvents, or other chemicals. Boiling won't remove chemicals or toxins.

- Bring the water to a roiling boil for one full minute. Boiling is the best way to treat water from—or affected by—surface water.
- Keep boiled water covered while it cools and then store as described in *Storing Drinking Water for Emergencies* (see prior page).

Purify by Adding Liquid Chlorine Bleach

If boiling is not possible, add household liquid bleach to water contaminated with viruses, parasites, or bacterial contamination. Bleach won't remove chemicals or toxins.

Household bleach, like Clorox or Purex, is usually 5.25 to 8.25 percent chlorine. **Don't use bleaches that contain perfumes, dyes, or other additives.** Be sure to read the label.

- Filter cloudy water before adding bleach.
- Place the water in a clean container. Use the table below to add the right amount of bleach. Mix thoroughly and let stand for 60 minutes before drinking.
- Purifying tablets or chemicals designed for camping or backpacking can also treat water effectively. Always follow the directions on the package.

Treating Water with Household Bleach

5.25 to 8.25 percent chlorine	
Water to be treated	**Bleach to add**
1 quart, 1 liter	5 drops
½ gallon, 2 quarts, 2 liters	10 drops
1 gallon	1/4 teaspoons
5 fallons	1 teaspoon
10 gallons	2 teaspoons

A Few Words of Caution

Bleach will not remove chemical pollutants or kill some disease-causing organisms commonly found in surface water supplies, such as Cryptosporidium. This protozoan parasite can cause gastrointestinal illness. For a person with a weakened or compromised immune system, it can cause prolonged illness, even death.

AVOID WATER that contains solid materials, has an odor, or a dark color.

When Water is Hard to Find

When tap water and bottled water are unavailable, you can find water in some unexpected places.

Hidden Water Sources in Your Home

Safe water sources in your home include:

- Water from the drain spout of a water heater. Be sure the electricity and gas are off before opening the spout. Drain the water into a clean storage container.
- Water drained from the pipes inside your home. Open a faucet on the top floor of your home. Next, go to the faucet at the lowest point in your home. Open the faucet and drain the water you need into a clean storage container.
- Water placed in ice cube trays in the freezer.

DO NOT USE water from toilet flush tanks or bowls, radiators, waterbeds, swimming pools, or spas.

Sources of Water Outside Your Home

Before you drink water from these surface water sources, boil it for one full minute and allow to cool before using.

- Rainwater.
- Lakes.
- Rivers and streams.
- Natural springs.
- Ponds.

The treatments described here only kill bacteria or viruses.

If you suspect the water is unsafe because of chemicals, oils, poisonous substances, sewage, or other contaminants,

DO NOT

drink the water.



APPENDIX L

DEVELOPER STANDARDS

CITY OF DuPONT
WASHINGTON
ORDINANCE NO. 11-923

AN ORDINANCE OF THE CITY OF DUPONT, PIERCE COUNTY, WASHINGTON, RELATING TO THE AMENDMENT AND UPDATE OF EXISTING PUBLIC WORKS STREET AND WATER STANDARDS, COMBINING THE TWO SEPARATE CONSTRUCTION STANDARDS INTO A SINGLE COMPREHENSIVE GUIDE AND SPECIFICATION MANUAL TO REPLACE AND SUPERCEDE THE PREVIOUS EDITIONS OF THE CITY'S STREET AND WATER STANDARDS; REPEALING PORTIONS OF ORDINANCE NOS. 02-714, 02-715, and 07-831 AND THE STREET STANDARDS AND CONDITIONS AND STANDARDS FOR CONSTURCTION OF DEVELOPER EXTENSIONS TO THE WATER SYSTEM ADOPTED OR AMENDED THEREIN; PROVIDING FOR SEVERABLITY; AND ESTABLISHING AN EFFECTIVE DATE

WHEREAS, in Ordinance Nos. 02-714, 02-715, and 07-831, the City of DuPont City Council adopted Street Standards and Conditions and Standards for Construction of Developer Extensions to the Water System ("Water System Standards") which provide and outline procedures, construction requirements, engineering specifications, and drawings to promote and encourage standardization of design elements associated with the construction or extension of water and road facilities and appurtenances; and

WHEREAS, the City Council desires to update and amend the existing Street Standards and Water System Standards to reflect current industry practices, standards and requirements, and to provide for consistency in the requirements, forms and details contained therein; and

WHEREAS, it is in the best interest of the City to combine the two separate Standards into a single comprehensive guide and specification manual that can be utilized by staff and designers and developers in the preparation and review of plans, studies, and/or reports for development and redevelopment construction or extension of road, water, or stormwater projects within the City of DuPont; and

WHEREAS, the City has developed a single "Public Works Standards" manual to meet the above purposes, and

WHEREAS, a State Environmental Policy Act (SEPA), Determination of Non-Significance (DNS) was issued by the DuPont SEPA Responsible Official on July 5, 2011 for the City of DuPont Public Works Standards; no comments or appeals were filed; and

WHEREAS, a First Reading of this Ordinance was held by the City Council at a regular thereof on September 13, 2011, prior to the subsequent adoption of the Public Works Standards on the

date indicated below.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF DuPONT, WASHINGTON, DO ORDAIN AS FOLLOWS:

Section 1. City of DuPont Public Works Standards Adopted. The City Council hereby adopts the City of DuPont Public Works Standards manual, attached hereto as Exhibit A, a copy of which is on file at the office of the City Clerk.

Section 2. Repealer. Section 2 of Ordinance No. 02-714, Ordinance No. 02-715, Ordinance No. 07-831, and any Street Standards and/or Conditions and Standards for Construcion of Developer Extensions to the Water System adopted or amended therein, are hereby repealed.

Section 3. Severability. Should any section, paragraph, sentence, clause or phrase of this Ordinance, or its application to any person or circumstance, be declared unconstitutional or otherwise invalid for any reason, or should any portion of this Ordinance be pre-empted by state or federal law or regulation, such decision or pre-emption shall not affect the validity of the remaining portions of this Ordinance, or its application to other persons or circumstances.

Section 4. Effective Date. This Ordinance shall be published in the official newspaper of the City and shall take effect and be in force (5) days after the date of publication.

ADOPTED by the City Council at a regular meeting thereof on the 13th day of September, 2011.

Pamara L. Jenkins, Mayor

ATTEST/AUTHENTICATED:

Erin Larsen, City Clerk

Approved as to form:

Bob C. Sterbank, City Attorney

Filed with the City Clerk: 9/14/11
Passed by the City Council: 9/13/11
Date of Publication: 9/16/11
Effective Date: 9/21/11

CITY OF DUPONT

PIERCE COUNTY, **WASHINGTON**

PUBLIC WORKS STANDARDS

G&O #07441
SEPTEMBER 2011

Gray & Osborne, Inc.
CONSULTING ENGINEERS

EXECUTIVE SUMMARY

The **City of DuPont "Public Works Standards[1]" Manual** is a comprehensive guide and specification manual for Designers and Developers to use in preparation of plans, studies, and/or reports for development and redevelopment construction or extension of road, water, or stormwater projects within the City of DuPont. The Manual provides a single reference guide for the *City's Water System, Stormwater System, and Street Standards* and is divided into thirteen sections, which cover procedures, construction requirements, engineering specifications, standard details, as-built requirements, and City approved forms.

The City has adopted the standards herein to encourage standardization of design elements associated with public facilities extensions, building sites, and grading operations. These Standards are minimum requirements and are intended to assist, but not substitute for competent work by engineering and design professionals, and shall be used with good engineering practices. Special conditions or environmental constraints may require a more stringent design than would normally required under these Standards. The Developer shall note that higher standards and/or additional studies and/or environmental mitigation measures may, and will, in all likelihood, be imposed by the City when developing on, in, or adjacent to critical areas which include, but not limited to, steep embankments, creeks, ponds, lakes, wetlands, certain wildlife habitat, unstable soil, high water tables, wetland areas, etc. Prior to making any application, the applicants engineer is encouraged to meet with applicable city staff and gather any additional information that may be available for incorporation into their design.

Where improvements are not covered by these details nor by the Standard Specifications nor by the Standard Details, the City will be the sole judge in establishing appropriate Standards. Any improvements not specifically covered herein by these Standards must meet or exceed the current Standard Specification for Road, Bridge & Municipal Construction, State of Washington. Where these Standards conflict with any existing City ordinances or discrepancies exist within the body of this text, the higher standards shall be utilized as determined by the Public Works Director.

[1] The "Public Works Standards" incorporates the City of DuPont's "Conditions and Standards for Construction of Developer Extensions to the Water System" and "Street Standards" (latest revisions) into a single document, and supersedes those previously separate standards.

TABLE OF CONTENTS

1. GENERAL CONSIDERATIONS 1
- 1.1 Applicability 1
- 1.2 Responsibility to Provide Public Improvements 1
- 1.3 WSDOT/APWA Documents as Primary Design and Construction References 1
- 1.4 Other Specifications 2
- 1.5 Variances 3
- 1.6 Penalties and Financial Guarantees 4
- 1.7 Meaning of Terms 4
- 1.8 Severability 7
- 1.9 Record Drawings and Geographic Information System Requirements 7

2. STREET STANDARDS 9
- 2.1 Responsibility to Provide Road Improvements 9
- 2.2 Road Drawings and Design Report 10
- 2.3 Classifications 11
- 2.4 Minimum Street Design Standard Tables 11
- 2.5 Horizontal Curvature and Sight Design Values 11
- 2.6 Private Streets 15
- 2.7 Vacant 16
- 2.8 Cul-De-Sacs and Eyebrows 16
- 2.9 Alleys 17
- 2.10 Intersections and Low Speed Curves 18
- 2.11 Maximum Grade and Grade Transitions 19
- 2.12 Stopping Sight Distance 19
- 2.13 Entering Sight Distance (ESD) 20
- 2.14 Medians (Optional Design Feature) 21
- 2.15 One-Way Streets 21
- 2.16 Bus Zones and Turn-Outs 21
- 2.17 Intersections with Pierce County Roads 21
- 2.18 Slope, Wall, Drainage Easements, and Right-of-Way Reduction 21
- 2.19 Access and Circulation Requirements 22
- 2.20 Street Names 22
- 2.21 Traffic Control and Signing 22
- 2.22 Right-of-Way 23
- 2.23 Street Frontage Improvements 23
- 2.24 Bulbs 23
- 2.25 Neighborhood Traffic Circle 23
- 2.26 Roundabouts 23

3. DRIVEWAYS, WALKS, AND TRAILS 24
- 3.1 Driveways 24
- 3.2 Sidewalks, Curbs, and Gutter 26
- 3.3 Curb Ramps 26
- 3.4 Concrete Steps, Metal Handrail, and Handicapped Access Ramps 26

3.5 Separated Pathways and Multi-Use Trails 26
3.6 School Access 27
3.7 Bikeways 27

4. SURFACING 29
4.1 Residential Streets, Sidewalks, and Pathways 29
4.2 Requirements for Residential Streets on Poor Subgrade 30
4.3 Arterials and Commercial Access Streets 30
4.4 Materials and Lay-Down Procedures 30
4.5 Pavement Markings, Markers, and Pavement Tapers 31

5. ROADSIDE FEATURES 33
5.1 General 33
5.2 Survey Monuments 33
5.3 Mailboxes 34
5.4 Guard Rails 35
5.5 Retaining Walls 35
5.6 Side Slopes 35
5.7 Street Trees and Landscaping 35
5.8 Parking Lots 36
5.9 Roadway Barricades 36
5.10 Bollards 37
5.11 Roadside Obstacles 37
5.12 Signage 38

6. ILLUMINATION 39
6.1 General 39
6.2 Design Standards 39
6.3 General Material Requirements 39
6.4 Poles and Luminaire 40

7. DRAINAGE 42
7.1 General 42
7.2 Road Ditches 42
7.3 Storm Sewers and Culverts 43
7.4 Catch Basins and Junctions 44
7.5 Frames, Grates, and Covers 45
7.6 Erosion Control 46
7.7 Trenches 46

8. WATER SYSTEM STANDARDS 47
8.1 General 47
8.2 Excavation and Backfill 48
8.3 Water Mains and Fittings 53
8.4 Service Connections 57
8.5 Valves 59
8.6 Fire Hydrants 61

8.7 Blowoff and Air Release Assemblies 63
8.8 Sampling Stations 63
8.9 Locating Wire 64
8.10 Connections to Existing Water Mains 64
8.11 Water Main Testing and Disinfection 65

9. GENERAL UTILITIES 69
9.1 Standard Utility Locations Within the Right-of-Way 69
9.2 Underground Utility Installation 69

10. CONSTRUCTION CONTROL AND INSPECTION 74
10.1 Basis for Control of the Work 74
10.2 Subdivision, Commercial, and Right-of-Way Inspection 74
10.3 Penalties for Failure to Notify for Inspection 77
10.4 Embankment Construction Control in Developments 77
10.5 Traffic Control in Development Construction 78
10.6 City Forces and City Contract Road Inspection 79
10.7 Call Before You Dig 79

11. GENERAL NOTES AND DRAWINGS 80
11.1 General Notes (Street Construction) 80
11.2 Erosion/Sedimentation Control Notes 81
11.3 General Notes (Water System Construction) 83

12. STANDARD DETAILS **DRAWING NO.**

MISCELLANEOUS DETAILS

Construction Approval Block 1-1
As-built Certification Stamp 1.9-1

STREET STANDARD DETAILS

Commercial Access Street - Office/Retail Village 2.4-2.1
Commercial Access Street - Town Center/Mixed Use 2.4-2.2
Commercial Access Street - Business and Technology Park 2.4-2.3
Commercial Access Street - Business and Technology Park (Adjacent to Open Space/Sensitive Area) 2.4-2.4
Industrial Access Streets - Major 2.4-2.5
Industrial Access Streets - Minor 2.4-2.6
Urban Residential Street - Neighborhood Collector 2.4-3.1
Urban Residential Street - Sub Collector 2.4-3.2
Urban Residential Street - Access Street 2.4-3.3
Urban Residential Street – One Way Access Loop 2.4-3.4
Cul-De-Sac - Street Section 2.8-1
Eyebrow 2.8-2
Alley Section 2.9-1

Concrete Alley Approach	2.9-2
Fire Access Turnaround	2.9-3
Typical Bulb Detail	2.24
Neighborhood Traffic Circle	2.25-1
Neighborhood Traffic Circle Details	2.25-2
Sample Roundabout Channelization Plan	2.26-1
Roundabout Ahead Sign	2.26-2
Driveway Approach	3.1-1
Driveway Approach (with shoulder and ditch)	3.1-2
Sidewalk Section	3.2-1
Sidewalk Section - Retail Core	3.2-2
Vertical Curb and Gutter	3.2-3
Cement Concrete Vertical Curb	3.2-4
Curb Ramp Locations	3.3-1
Curb Ramp	3.3-2
Detectable Warning Pattern Detail (Truncated Domes)	3.3-3
Concrete Steps & Metal Handrail	3.4-1
Trail Designation Sign	3-5
Pavement Markings	4.5-1
Arrow Details	4.5-2
Crosswalk Detail	4.5-3
Roadway Survey Case and Cover Monument	5.2-1
Roadway Survey Surface Monument	5.2-2
Off-Roadway Survey Monument	5.2-3
Mail Box Detail	5.3-1
Collection Box Unit (C.B.U.) Mail Box Installation	5.3-2
Rock Wall Detail	5.5-1
Street Tree Standards	5.7-1
Street Tree Planting and Staking Detail	5.7-2
Bollard Detail	5.10
Vehicular Control Signs	5.12-1
Typical Street Name Sign	5.12-2
Street Sign Detail	5.12-3
Catch Basin Type 1	7.4-1
Catch Basin Stencil	7.4-2
Catch Basin Type 2	7.4-3
Trench - Pavement Restoration	9.2-1
Asphalt Diamond Patch	9.2-2
CDF Encasement	9.2-3
Valve Box Adjustment	9.2-4
Manhole Grade Adjustment	9.2-5

WATER SYSTEM STANDARD DETAILS

Water Main Trench Section	8.2-1
Water Main Depth Requirements	8.2-2
Typical Utility Crossing	8.2-3
Thrust Blocks	8.3-1
Vertical Anchor Blocks	8.3-2
Thrust Restraint for Ductile Iron Pipe	8.3-3
Encasement/Carrier Pipes	8.3-4
3/4" & 1" Service Connection	8.4-1
3/4" & 1" Dual Service Connection	8.4-2
1-1/2" & 2" Service Connection	8.4-3
3" & Larger Service Connection	8.4-4
3/4" to 2" Reduced Pressure Backflow Assembly	8.4-5
3" & Larger Reduced Pressure Backflow Assembly	8.4-6
2" & Smaller Double Check Valve Assembly	8.4-7
3" & Larger Double Check Valve Assembly	8.4-8
Water Valve Stem Extension	8.5
Fire Hydrant Installation	8.6-1
Fire Hydrant Relocation	8.6-2
2" In-Line Blowoff Assembly	8.7-1
2" End-Line Blowoff Assembly	8.7-2
1" Air & Vacuum Release Assembly	8.7-3
2" Air & Vacuum Release Assembly	8.7-4
Water Sampling Station	8.8
Wet Tap Water Main Connection	8.10-1
Cut-In Water Main Connection	8.10-2
Testing Connection	8.11
Fire Department Connection	11.3

13. GUIDELINES AND FORMS

Traffic Impact Analysis Guidelines
Site Work Application, Civil Plan Review/Grading Permit Application
Plan Checklist

	Form No.
Performance Bond	1
Assignment of Funds in Lieu of Performance Bond	2
Maintenance Bond	3
Assignment of Funds in Lieu of Maintenance Bond	4
Easement for Utilities	5
Agreement for Inspection and Maintenance of Privately Maintained Storm Drainage Facilities	6
Water System Bill of Sale	7
Water Availability Form	8

1. GENERAL CONSIDERATIONS

1.1 Applicability

The City of DuPont has adopted this Public Works Standards manual to encourage the standardization of design elements to provide for consistency and public safety assurance. These Standards are intended to assist, advise, and guide, not substitute for, competent work.

These Standards shall apply to all new development, redevelopment, or propose actions that would impact public roads, public right of way, or existing utility infrastructure, both public and private, within the City of DuPont's jurisdiction, which includes but not limited to, extension of transportation-related facilities, storm drainage, sanitary sewer, water, parks, open-space facilities used by the public, modifications of roadway features of existing facilities, required off-site road improvements for land developments, or capital improvement projects when so required by the City of DuPont. These Standards are not intended to apply to "resurfacing, restoration, and rehabilitation" projects as those terms are defined in the Local Agency Guidelines, WSDOT, as amended; however, the City may, at its discretion, consider the Standards as optional goals.

These Standards shall apply to every new placement and every planned, non-emergency replacement of existing utility poles and structures (transformers, telephone boxes, etc.) within the City of DuPont right-of-way.

1.2 Responsibility to Provide Public Improvements

The purpose of these Standards is to define requirements for the design and construction of public improvements to serve new and future developments or redevelopments. These include street, storm drainage, water, and sanitary sewer improvements as required by the development review process, City Ordinance, and other City policies adopted by the City Council or Mayor. Where not governed by building or other codes, standards for improvements on private property shall also be governed by these Standards for purposes of design and inspection. No work shall commence prior to City approval of the construction drawings. Designs submitted shall be stamped by a registered Professional Engineer licensed to practice in the State of Washington.

1.3 WSDOT/APWA Documents as Primary Design and Construction References

Except where these Standards provide otherwise, design detail, construction workmanship, and materials shall be in accordance with the following publications produced separately by Washington State Department of Transportation (WSDOT), or jointly by WSDOT and Washington State Chapter of American Public Works Association (APWA).

1.3.1 WSDOT/APWA Standard Specifications for Road, Bridge, and Municipal Construction, current edition as amended. These will be referred to as the "WSDOT/APWA Standard Specifications."

1.3.2 The WSDOT/APWA Standard Plans for Road and Bridge Construction, current edition as amended. These will be referred to as the "WSDOT/APWA Standard Plans."

1.3.3 WSDOT Design Manual, current edition as amended.

1.4 Other Specifications

The following shall be applicable when pertinent, when specifically cited in the Standards, or when required by state or federal funding authority. All specifications used shall be the current edition, unless otherwise stated.

1.4.1 Conditions and standards as set forth in the current edition of the City of DuPont Comprehensive Land Use Plan.[1]

1.4.2 Conditions and standards as set forth in the current edition of the City of DuPont Water System Comprehensive Plan.[1]

1.4.3 Adopted rules, regulations and ordinances of the DuPont Municipal Code.[1]

1.4.4 Criteria set forth in the Local Agency Guidelines as amended and approved by Washington State Department of Transportation.

1.4.5 A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials (AASHTO), 2004, or current edition as adopted by WSDOT.

1.4.6 Department of Transportation Manual on Uniform Traffic Control Devices, "MUTCD," as amended and approved by WSDOT, current edition.

1.4.7 Guide for the Development of Bicycle Facilities, adopted by AASHTO current edition.

1.4.8 Federal "Americans with Disabilities" Act (ADA).

1.4.9 State of Washington, Department of Ecology's "Stormwater Management Manual for Western Washington" 2005 edition and all amendments and additions thereto, or current edition.

1.4.10 Rules and regulations of the State Board of Health regarding public water supplies as published by the State Department of Health.

[1] Available thru the City of DuPont's website.

1.4.11 Conditions and standards as set forth in the American Water Works Association (AWWA) design manuals, current edition.

1.4.12 American Water Works Association (AWWA) Cross Connection Control Manual, current edition.

1.4.13 State of Washington Department of Health Water System Design Manual, current edition.

1.4.14 Conditions and standards as set forth in the State of Washington Department of Ecology "Criteria for Sewage Works Design," current edition.

1.4.15 Associated Rockery Contractors, Standard Rock Wall Construction Guidelines, current edition.

1.4.16 American Society for Testing and Materials (ASTM), current edition.

1.4.17 Other specifications not listed may apply when required by the City.

1.5 Variances

Variances from these Standards may be granted by the Public Works Director upon evidence that such variances are consistent with the City's Comprehensive Plans, in the public interest, and that requirements for safety, function, fire protection, appearance, and maintainability based upon sound engineering judgment are fully met. Variances must be approved prior to approval of the engineering drawings for construction. Any anticipated variances from these Standards which do not meet the Fire Code shall also require concurrence by the City Fire Chief.

Variance requests shall be submitted to the Public Works Director. A complete variance includes: variance filing fee; written narrative addressing the City's standard to which the variance is being sought, the extent of the variance, how the variance meets the above referenced decisional criteria and related drawings. The burden of proof for granting the variance is the responsibility of the applicant.

When the variance affects street width, street classification, or plat design the Public Works Director shall consult with other affected city departments. The Public Works Director shall consider the variance and may solicit comments from other affected city departments or agencies prior to issuing the variance final decision. No public notice of the variance request is required. Appeals of final variance decisions shall be heard by the City's Hearing Examiner using the Type II appeal process indicated in Chapter 25.175.060 of the DuPont Municipal Code.

1.6 Penalties and Financial Guarantees

Failure to comply with these Standards may result in denial of plan or development permit approval, revocation of prior approvals, legal action for forfeiture of financial guarantee, code enforcement, and/or other penalties as provided by law.

1.6.1 Construction Performance Guarantees: Any construction work on City right-of-way (both maintained and unmaintained) other than Capital Improvement Projects or City maintenance work shall be guaranteed by a financial guarantee. All work on private road and drainage facilities required as a condition of City approval process shall be guaranteed by a financial guarantee at the time of plat recording. The financial guarantee shall consist of a bond or assignment of funds submitted for an amount equal to 150 percent of the total contract bid amount or Engineer's estimated construction cost. The minimum financial guarantee for work within City right-of-way shall be $5,000.00.

The amount of the financial guarantee may be reduced during construction, as determined by the City. At no time will the financial guarantee amount be reduced to less than 30 percent of the original amount or $1,000.00, whichever is greater. The City will process no more than two reductions in the financial guarantee amount for partial completion of work.

1.6.2 Maintenance Performance Guarantees: The successful performance of the right-of-way improvements shall be guaranteed for a period of 2 years (or other period if updated by City Code or if deemed necessary due to unusual or special circumstances) from the latest date of either the acceptance of the completed work or Final Construction Approval. The amount of the financial guarantee shall be 15 percent of the value of the right-of-way improvements approved by the City. The form of the maintenance financial guarantee shall be determined by the City. The minimum Maintenance Bond for City right-of-way improvements shall be $5,000. The minimum maintenance guarantee for all other work shall be $1,000.00. Maintenance guarantees will not be required when the value of the right-of-way improvements or required performance guarantee does not exceed $1,000.00.

1.7 Meaning of Terms

"Alley"	Access easements dedicated to the City, usually narrower than a street, which provides access to the rear boundary of residential properties and is not intended for general traffic circulation; privately maintained.
"ATB"	Asphalt Treated Base
"City"	City of DuPont

"Cul-De-Sac"	Short street having one end open to traffic and the other temporarily or permanently terminated by a vehicle turnaround
"CBR"	California Bearing Ratio is a penetration test that compares the bearing capacity of a material with that of a well graded crushed stone for evaluation of the mechanical strength of road subgrades and basecourses. The CBR rating measures the load bearing capacity of soils used to build roads.
"Design Speed"	The speed approved by the City for the design of the physical features of a road as established by Section 2 for residential and commercial access streets, or equal to 10 miles per hour above the current or expected posted speed limit for arterials. The design speed should be 5 miles per hour greater than the posted speed for roads posted with speed limits less than 40 miles per hour.
"Developer"	Any person, firm, partnership, association, joint venture or corporation or any other entity who undertakes to improve residential, commercial, or industrial property or to subdivide for the purpose of resale and profit.
"Driveway"	A privately maintained access to residential, commercial or industrial properties.
"Eyebrow"	A partial bulb located adjacent to the serving road that provides access to lots and serves as a vehicle turnaround.
"Joint-Use Driveway Tract"	A jointly owned and maintained tract or easement serving two properties.
"Landing"	A road or driveway approach area to any public or private road.
"Loop"	Road of limited length forming a loop, having no other intersecting road, and functioning mainly as direct access to abutting properties. A loop may be designated for one-way or two-way traffic.
"MUTCD"	Manual of Uniform Traffic Devices Department of Transportation Manual on Uniform Traffic Control Devices, "MUTCD," as amended and approved by WSDOT, current edition.

"Neighborhood Traffic Circle"	A circular intersection constructed at the intersection of two urban residential local access streets for traffic calming. They are generally not channelized, may be uncontrolled or stop controlled, and may allow left turns to occur left (clockwise) of the central island.
"Off-Street Parking Space"	An area accessible to vehicles, exclusive of roadways, sidewalks, and other pedestrian facilities, that is improved, maintained, and used for the purpose of parking a motor vehicle.
"Pavement Width"	Paved area on shoulder-type roads or paved surface between curbs, thickened edge or gutter flow line on all other roads.
"Private Street"	A privately owned and maintained access provided for by a tract, easement or other legal means, typically serving three or more potential dwelling units.
"Professional Engineer"	A professional civil engineer currently licensed to practice in the State of Washington.
"Public Street"	Publicly owned facility providing access, including the roadway and all other improvements, inside the right-of-way.
"Right-of-Way"	All real property owned or held by the City in fee, or by way of easement, or dedicated to the public and located within the city, and used or intended for use as a street, alley, sidewalk, public way or easement for public or private utilities, whether developed or undeveloped.
"Road"	A facility providing public or private access including the roadway and all other improvements inside the right-of-way.
"Road and Street"	Will be considered interchangeable terms for the purpose of these Standards.
"Roadway"	Pavement width plus any non-paved shoulders.
"Roundabout"	An intersection design alternative that may be used in-place of stop control or signalization at physically centralized intersection to help improve problems and excessive delays at intersections.

"R Value"	Resistance Value
"Stormwater Management Manual"	Refers to the State of Washington, Department of Ecology's "Stormwater Management Manual for Western Washington," current edition.
"Shoulder"	The paved or unpaved portion of the roadway outside the traveled way that is available for emergency parking or non-motorized use.
"Standards"	The City of DuPont Public Works Standards.
"Traveled Way"	The part of the road made for vehicle travel excluding shoulders and auxiliary lanes.
"Utility"	A company providing public service such as gas, electric power, telephone, telegraph, water, sewer, or cable television, whether or not such company is privately owned or owned by a governmental entity.
"Urban Compact Roundabout"	Capacity is not a primary design consideration. Geometric design includes a raised splitter island, at grade pedestrian storage areas, non-mountable central island, and an apron surrounding the non-mountable part of the compact central island to accommodate large vehicles.
"Urban Single Lane Roundabout"	Capacity is a primary design consideration. The roundabout design is focused on achieving consistent entering and circulating vehicle speeds. Geometric design includes raised splitter island, pedestrian storage areas, non-mountable central island and preferably no apron.
"Work"	The labor, materials or both, superintendence, equipment, transportation, and other facilities necessary to complete the project.

1.8 Severability

If any part of these City of DuPont Public Works Standards as established by ordinance shall be found invalid, all other parts shall remain in effect.

1.9 Record Drawings and Geographic Information System Requirements

Following construction, the developer shall submit as-built drawings and electronic Geographic Information System (GIS) AutoCAD files in accordance with City of DuPont Ordinance No. 97-559.

Developer shall furnish the City with accurate drawings, plans and profiles, showing the location and curvature of all underground structures installed, including existing facilities where encountered and abandoned installations. Horizontal locations of utilities are to be referenced to street centerlines, as marked by survey monuments, and shall be accurate to a tolerance of plus or minus 1/2 foot. The depth of such structure may be referenced to the elevation of the finished street above said utility, with depths to the nearest 1/10 foot being shown in minimum of 50 foot intervals along the locations of said utility. The datum shall be per City datum as mandated by the City's Engineer. The City's vertical datum is based on National Geodetic Vertical Datum (1929) and the horizontal datum is based on Washington State Plane Coordinate System South (NAD 83). Hand-markup construction drawings are not acceptable to meet the City's as-built drawing requirement. Non-essential data may be removed from the drawings at the City's discretion.

Such as-built drawings shall be submitted to the City for review within 30 calendar days after completion of the work. Subsequent reviews and revisions are typically necessary to obtain as-built drawings consistent with City of DuPont Standards. Upon final review and acceptance of the as-built drawings, final as-built drawings on permanent reproducible Mylar, two sets of blackline drawings, a GIS AutoCAD base map file in the format as outlined in the City of DuPont GIS Ordinance 97-559, and a copy of the Pierce County approved sanitary sewer as-built drawings will be requested by the City in writing. Final approved as-built drawings shall include all sheets approved for construction and be submitted with the signed and dated City Standard As-built Certification Stamp. See Drawing No. 1.9. Upon receipt of the GIS AutoCAD base map, we will review the file(s) for compliance with the ordinance and request (if necessary) any required revisions that are not consistent with the Mylar drawings.

In the event that the Developer does not have qualified personnel to furnish the as-built drawings required by this section, he/she shall advise the Public Works Director 48 hours in advance in order that necessary field measurements may be taken during construction for the preparation of as-built drawings. All costs of such field inspection and measurement, to include preparation of the as-built drawings, shall be at the sole expense of the Developer.

Pages 9 through 46 intentionally omitted because not related to water system construction.

8. WATER SYSTEM STANDARDS

8.1 General

8.1.1 The type and class of materials to be used shall be as shown on the project drawings reviewed and approved by the City. Where no specific reference is shown, the following specifications shall govern the materials used. All materials shall be new and undamaged, of a known brand, with replacement parts readily available from the general Seattle/Tacoma area.

8.1.2 Prior to the installation of any facilities required for the project, all materials shall be approved by the City.

8.1.3 All specifications referenced herein shall be of the latest revision.

8.1.4 A preconstruction conference will be held at the City office prior to the start of construction.

8.1.5 The developer shall notify the City seven days in advance of proposed construction to allow for checking of materials to be used on the job.

8.1.6 Except as otherwise noted herein, all construction workmanship and materials shall be in accordance with the most current edition of the adopted standards of the City of DuPont, Washington State Department of Transportation/Washington State Chapter of the American Public Works Association Standard Specifications (WSDOT/APWA Standard Specifications for Road, Bridge, and Municipal Construction), as recommended in applicable American Waterworks Association (AWWA) specifications, and according to the recommendations of the manufacturer of the material or equipment used. The Contractor performing actual construction shall have a copy of the drawings and specifications on the job site at all times.

8.1.7 General Guarantee and Warranty:

The Developer shall be required, upon completion of the work and prior to acceptance by the City, to furnish the City a written financial guarantee covering all material and workmanship for a period of 2 years after the date of final acceptance of the work and shall make all necessary repairs during that period at his own expense, if such repairs are necessitated as the result of furnishing poor materials and/or workmanship. The amount of the financial guarantee shall be not less than 10 percent of the value of the water system extension or improvements. The Developer shall obtain warranties from the contractors, subcontractors and suppliers of material or equipment where such warranties are required, and shall deliver copies to the City upon completion of the work.

8.1.8 All water mains and appurtenances to be owned and operated by the City, up to and including water meters, backflow assembly vaults, and fire hydrants, shall be located in 15-foot-wide easements dedicated to the City. All of the proposed easements or easement revisions shall be verified to comply with said requirement. A Bill of Sale for the water system improvements within the easements shall be provided following construction and prior to final approval of the project and acceptance of the water system extension or improvements.

8.1.9 All damage to existing improvements during progress of the work on the structures covered by these Standards shall be repaired or restored by the Developer to the satisfaction of the City, using for such repair, materials and methods conforming to the requirements of the City's "Public Works Standards," Project Plans and Specifications, and any additional instructions issued therefore by the City, with the intent that such damaged improvements be restored to equal or superior condition existing prior to damage. If the Developer fails to furnish the necessary labor and materials for such repair, the City may cause said labor and materials for such repairs to be furnished by other parties, and the cost thereof shall be paid by the Developer.

8.2 Excavation and Backfill

(See Drawing Nos. 8.2-1, 8.2-2, and 8.2-3)

8.2.1 Clearing and Grubbing

8.2.1.1 Clearing and grubbing shall consist of the removal of all trees, stumps, brush, and debris and shall be confined within the limits of the easements obtained for the construction of this project, and/or existing public rights-of-way. Where necessary to facilitate construction, and not otherwise identified to be retained, trees shall be cleared and felled with sufficient care to prevent damage. Construction work in forested and native unimproved areas shall be conducted with extra precaution. Construction activity, stored materials and piles of earth shall not extend beyond the designated work limits. Trees and foliage which are not to be removed in construction shall be protected. Finished grades after completion shall match original grades, sloped to prevent ponding. Any surplus dirt or over burden piled around trees shall be removed to prevent future damage; such material shall be removed by hand if necessary.

8.2.1.2 All trees which are removed by the Developer shall become the property of the Developer and shall become his responsibility to remove from the site, unless otherwise noted in the easement stipulations or elsewhere in these specifications. Removal of clearing and grubbing debris shall be subject to the approval of the City and shall, in no way, constitute a hazard to the continuous operation of any existing utilities. Any damage to the existing utilities shall be repaired by the respective utility company, at the expense of the Developer. Any private improvements in the rights-of-way and easement areas shall not be removed until permission has been given by the City.

8.2.1.3 All fences adjoining any excavation or embankment that may be damaged or buried shall be carefully removed and temporarily erected on the adjoining property or stored for reinstallation as directed by the City.

8.2.1.4 No debris of any kind shall be deposited in any stream or body of water, or in any street or alley. All waste material shall be hauled to a waste site arranged for by the Developer. Any permits required for disposal shall be secured and paid for by the Developer.

8.2.1.5 The Developer shall be responsible for all damage to existing improvements resulting from his operations.

8.2.2 Traffic Control

The Developer shall make suitable, safe, and adequate provision for necessary traffic around, over, or across the work in progress and shall schedule pavement patching to follow after backfill is completed.

8.2.3 Excavating in Paved Areas

Prior to excavating in paved areas, the existing road surface shall be cut 1 foot (minimum) back from the outer edge of the excavation with a cutter and removed. The cuts are to be made in clean, straight lines to insure a minimum of damage to existing pavements. All cuts in existing concrete pavement are to be made with a concrete saw, except that where the concrete has been overlaid with asphalt, the pavement will be cut with a cutter 1 foot (minimum) from the outer edge of the excavation on each side of the trench section. If the Developer fails to adequately protect the trench edges during trenching and backfilling, he will be required, at his own expense, to recut the edges prior to repairing the pavement.

8.2.4 Trench Excavation

8.2.4.1 Trench excavation shall be unclassified. The terms earthwork or excavation include all materials excavated or removed regardless of material characteristics. The Developer shall make his own estimate of the kind and extent of materials which will be encountered in the excavation.

8.2.4.2 Trenches shall be excavated to the line and depth so that all new pipelines constructed shall have neither less than 3, nor more than 5 feet of cover, measured from the top of the pipe to the approved finished grade in accordance with Drawing No. 8.2-2, unless otherwise approved by the City.

8.2.4.3 If a grade revision is made, the cover over the water main must remain within these limits. Otherwise, the water main shall be reconstructed. All added costs of inspecting such water main reconstruction shall be charged to the Developer.

8.2.4.4 The excavation shall be made in a straight grade through localized breaks in grade. The excavation shall be deepened gradually at changes in the street grades so that there are no abrupt changes in pipeline grade.

8.2.4.5 Where it is necessary to cross sanitary sewer or storm sewer trenches, all trench backfill shall be removed and replaced with mechanically compacted granular material to provide a uniform support for the full length of the pipe.

8.2.4.6 The root systems of all trees not to be removed which are located on or near the easements and right-of-way shall not be cut or disturbed, but shall be tunneled or otherwise protected by the Developer to ensure that no damage is done.

8.2.4.7 When so directed by the City, the trench shall be extended below the pipeline grades to permit the placing of foundation gravel.

8.2.4.8 The maximum length of open trench permissible on any line, in advance of pipe laying, will be 100 feet. Upon completion of work each day, all open trenches shall be completely backfilled, leveled, and temporarily graveled or patched.

8.2.5 Trench Safety Systems

8.2.5.1 The Developer shall be responsible for designing, providing, and installing sheeting, shoring, and bracing as necessary to protect workmen, the work, and existing utilities and other properties. All work involving sheeting, shoring, and bracing shall be done in accordance with all applicable local, State and Federal safety regulations, and shall be designed in accordance with the Washington State Safety Code, "Safety Standards for Construction Work," Chapter 296-155 WAC Part N.

8.2.5.2 Removal of sheeting, shoring, and bracing shall be accomplished in such a manner that there will be no damage to structures, pavements, facilities, utilities, and adjacent properties.

8.2.5.3 All trenches which exceed a depth of four feet shall be provided with safety systems that meet the requirements of the Washington Industrial Safety & Health Act, Chapter 49.17 RCW.

8.2.6 Dewatering and Control of Water

8.2.6.1 Where encountered during construction, the Developer shall dewater and dispose of the water so as not to cause injury to public or private property, or cause a nuisance or menace to the public. Dewatering systems shall be designed and operated so as to prevent the removal of natural soils.

8.2.6.2 During excavating, installation of water mains, placing of trench backfill, and the placing and setting of concrete, excavations shall be kept free of water. The static water level shall be drawn down below the bottom of the excavation so as to maintain the undisturbed state of the natural soils, and allow the placement of backfill to the required density. The dewatering system shall be installed and operated so that the groundwater level outside the excavation is not reduced to the extent that would damage or endanger adjacent structures or property.

8.2.6.3 The release of groundwater to its static level shall be performed in such a manner as to maintain the undisturbed state of the natural foundation soils, prevent disturbance of compacted backfill, and prevent flotation or movement of structures, and water mains.

8.2.6.4 In carrying out the work within the limits of streams, or an area that will drain to a stream during a rain, the Developer is required to comply with the regulations of the appropriate local, State, and Federal agencies. Any isolated potholes remaining from the Developer's operations shall be provided with open water channels in such a manner that there will be a direct drainage outlet at the lowest elevation of the pothole.

8.2.6.5 Dust control water shall be applied as designated by the City and for such period of time as the City deems necessary.

8.2.6.6 The Developer shall contact the applicable agencies and secure such permits as may be necessary to cover his proposed method of operation within the areas described above. If no permit is necessary, and if directed by the City, he shall obtain a letter from the appropriate agency.

8.2.7 Foundation Gravel

8.2.7.1 Foundation gravel required in the bottom of the trench to provide proper pipe support shall be furnished by the Developer. The Developer shall perform all excavation of every description and of whatever substance encountered. Boulders, rocks, roots, and other obstructions shall be completely removed or cut out to the new width of the trench and to a depth 6 inches below the water main grade. Where material is removed from below water main grade, the trench shall be backfilled to grade with material satisfactory to the City and thoroughly compacted.

8.2.7.2 Foundation gravel shall be manufactured in accordance with the provisions of Section 9-03.12(1)B of the WSDOT/APWA Standard Specifications. The materials shall be uniform in quality and free from wood, roots, bark and other extraneous material. Materials also shall conform to and be placed in accordance with Section 4-04 of the WSDOT/APWA Standard Specifications.

8.2.8 Gravel Base

If the excavated material is unsuitable for backfill, or as directed by the City, water main trenches shall be backfilled with gravel base material. This material shall conform to and be placed in accordance with Section 4-02 of the WSDOT/APWA Standard Specifications. The material shall be in accordance with the provisions of Section 9-03.19 of the WSDOT/APWA Standard Specifications.

8.2.9 Trench Backfill

8.2.9.1 All brush, stumps, logs, planking, disconnected drains, boulders, paving, etc., shall be removed from the material to be used for backfilling the trench. No timber bracing, lagging, sheathing, or other lumber shall be left in any excavation.

8.2.9.2 Where, in the opinion of the City, the existing material removed from the trench is not suitable for roadway subgrade, gravel base or other approved material shall be used as backfill.

8.2.9.3 At all roadway and driveway crossings within existing paved rights-of-way, and in such additional locations as may be directed by the City, the trench shall be immediately backfilled after the pipe is installed and inspected, and shall be immediately provided with a temporarily graveled surface, and continually maintained on a daily basis until replaced with permanent repair as required.

8.2.9.4 All paved crossings shall have a temporary asphalt paved surface installed, which surface shall be a minimum of 2 inches in thickness, and fully maintained level with existing undisturbed pavement until replaced with permanent repair.

8.2.9.5 Sufficient cold mix to make immediate repairs and to maintain repairs until permanent repair is made, shall be on the job site.

8.2.9.6 The Developer shall be responsible for restoring to a condition equal to their original condition, any and all exiting culverts, ditches, drains, landscaping, or other facilities which are damaged as a result of the Developer's operations.

8.2.10 Compaction of Trench Backfill

Unless otherwise approved, compaction of trench material is required. The density of compacted backfill material shall meet requirements outlined in the WSDOT/APWA Standard Specifications.

8.3 Water Mains and Fittings

8.3.1 Design

8.3.1.1 Water mains and fittings to be installed shall be ductile iron for all sizes, unless specifically noted otherwise.

8.3.1.2 Water mains shall provide adequate domestic plus fire flow at the required residual pressure. Fire flow requirements will be determined by the local fire authority.

8.3.1.3 New water mains shall be sized in accordance with these Standards and the City's Water System Plan, current edition. The City may require installation of larger-sized mains if deemed necessary to meet fire protection and domestic requirements or for future service.

8.3.1.4 In single-family residential areas, the minimum water main size shall be 8-inch diameter for looped systems or dead ends with fire hydrants.

8.3.1.5 In multi-family residential and non-residential areas, the minimum water main size shall be 8-inch diameter for looped systems and 12-inch diameter for dead ends.

8.3.2 Ductile Iron Pipe

8.3.2.1 The ductile iron pipe shall conform to AWWA C151, and current amendments thereto. Grade of iron shall be a minimum of 60-42-10. The pipe shall be cement-lined in accordance with AWWA C104 to a minimum thickness of 1/16 inch and meet NSF Standards for potable water. The exterior shall be an asphaltic coating. Each length shall be plainly marked with the manufacturer's identification, year cast, thickness, class of pipe and weight. Bolts furnished for mechanical joint pipe shall be high strength ductile iron, with a minimum tensile strength of 50,000 psi. The class of ductile iron pipe shall be thickness Class 52 for all diameters.

8.3.2.2 The pipe shall have a nominal inside diameter of the size indicated on the Drawings. All pipe shall be of one manufacturer and be carefully installed in complete compliance with the manufacturer's recommendations and these Specifications.

8.3.2.3 All ductile iron pipes shall be furnished with mechanical joint or push-on type, employing a single gasket, such as "Tyton", except where otherwise calling for flanged ends. All joints and rubber gaskets shall conform to AWWA C111. Flanged joints shall conform to AWWA C110.

8.3.2.4 Restrained joint pipe shall be push-on joint pipe with "Field Lok" gaskets as furnished by U.S. Pipe or City approved equal. The restrained joint pipe shall meet all other requirements of the non-restrained pipe.

8.3.2.5 All pipes shall be joined by the manufacturer's standard coupling, be all of one manufacturer, and be carefully installed in complete compliance with the manufacturer's recommendations.

8.3.2.6 Joints shall be "made up" in accordance with the manufacturer's recommendations. Standard joint materials, including rubber ring gaskets, shall be furnished with the pipe. Material shall be suitable for the specified pipe size and pressures.

8.3.3 Ductile Iron Fittings

8.3.3.1 All fittings shall be short-bodied, ductile iron complying with applicable AWWA C110 or C153 Standards for 350 psi pressure rating for mechanical joint fittings and 250 psi pressure rating for flanged fittings. All fittings shall be cement lined in accordance with AWWA C104 and be either mechanical joint or flanged.

8.3.3.2 Fittings in areas requiring restrained joints shall be mechanical joint fittings with a mechanical joint restraint device. The mechanical joint restraint device shall have a working pressure of at least 250 psi with a minimum safety factor of 2:1 and shall be EBAA Iron, Inc., Megalug, or approved equal.

8.3.3.3 All couplings shall be ductile iron mechanical joint sleeves.

8.3.4 Water Pipe Installation

8.3.4.1 All pipes shall be installed in accordance with these specifications and the instructions of the manufacturer, subject to the approval of the City. All pipe ends shall be square with the longitudinal axis of the pipe, and any damage to the ends shall be cut off prior to installation, if approved by the City. When it is necessary to cut the pipe, the pipe shall be cut with approved cutting tools.

8.3.4.2 The pipe shall be laid in a straight grade through localized breaks in grade. The excavation shall be deepened gradually at changes in street grades so that there are no abrupt changes in pipeline grade. To maintain the required alignment, short lengths shall be used and joints shall be deflected or necessary bends shall be used. Bends shall be provided and approved in the field to suit construction and in accordance with the manufacturer's recommendations, so as not to exceed allowable deflection at pipe joints.

8.3.4.3 Each pipe section shall be carefully lowered into place onto bedding material that is placed to a minimum depth of four inches in the trench after inspecting it for defects and removing any gravel or dirt, etc., from the interior of the pipe.

8.3.4.4 Thrust blocking or restrained joints shall be provided at all fittings and bends in accordance with the Standard Details and conditions described herein.

8.3.4.5 A 10-foot horizontal separation between all sanitary sewer lines and water mains shall be maintained to meet Department of Ecology standards. A 5-foot horizontal separation is required between all water facilities and underground power, telephone, and other facilities unless otherwise approved by the City.

8.3.5 Alignment

All water mains shall be placed 5 feet north or east of the centerline of the street right-of-way. Unless otherwise specified, the location of the water mains, hydrants, valves, and principal fittings will be in accordance with the approved drawings. The Developer shall provide sufficient horizontal control, in the form of centerline stakes, property corners, or other markers, as required for proper pipe location.

8.3.6 Concrete Blocking (See Drawing No. 8.3-1)

8.3.6.1 Concrete blocking mix shall be Cement Concrete Class 3000 (min), and shall be cast in place and have a minimum of 1/4 square foot bearing against the fittings and two square feet bearing against undisturbed soil. Blocking shall bear against fittings only and shall be clear of Joints so as to permit taking up or dismantling the joint. All bends and tees shall be blocked in accordance with the Standard Details.

8.3.6.2 The developer shall install blocking which is adequate to withstand full test pressure as well as to continuously withstand operating pressures under all conditions of service. For concrete blocking based on 250-psi test pressure, with safe soil load bearing of 2,000 pounds per square foot. Pea gravel and other smooth surfaced rock are not acceptable as concrete mix aggregate.

8.3.6.3 Fittings shall be "blocked" with poured-in-place concrete, with a firm minimum bearing against an undisturbed earth wall. Timber blocking will not be permitted. Thrust blocks shall be poured as soon as possible after setting the fittings in place to allow the concrete to "set" before applying the pressure test. The concrete thrust blocks shall be in place before beginning the pressure test. Anchor blocks shall be allowed to set sufficiently to develop the necessary bond strength between the reinforcing rods and the concrete anchor before beginning the pressure test. A visqueen barrier shall be provided to protect glands, bolts and other miscellaneous materials required for this type of connection from the connector.

8.3.6.4 Fittings that cannot be blocked against an undisturbed earth wall shall be restrained with restrained joint pipe and fittings. See Drawing No. 8.3-3.

8.3.7 Road and Stream Crossings (See Drawing No. 8.3-4)

8.3.7.1 All highway crossings, stream crossings, and other locations determined by the Developer and/or the City require the installation of a steel pipe casing and laying the water main inside the casing.

8.3.7.2 Steel casing shall be of sufficient diameter, size, and strength to enclose the water main and to withstand maximum highway loading. Sizing and wall thickness of the casing are to be approved by the City. The carrier pipe shall be ductile iron, Class 52, restrained joint pipe, unless otherwise approved by the City. Casing spacers shall be installed at 10-foot intervals along the pipeline. The spacers shall be Uni-Flange UFRCS 1300 or approved equal. Sand backfill between the casing and the water main, or other approved means of pipe support, is required. The ends of the casing are to be sealed with low pressure grout or bricked and cemented after installation, backfill, and testing of the pipe are completed.

8.4 Service Connections

(See Drawing Nos. 8.4-1, 8.4-2, 8.4-3, 8.4-4, 8.4-5, 8.4-6, 8.4-7, and 8.4-8)

8.4.1 Conditions applicable to all Water Service Connections

8.4.1.1 All single family residential services shall include, at a minimum, 3/4-inch water meters.

8.4.1.2 The Developer shall submit water service and meter sizing calculations for review and approval by the City for all proposed service connections, except for single family residential services.

8.4.1.3 Separate water connections will be required for domestic, fire, and irrigation for all non-single family residential services.

8.4.1.4 All service connection shall be separately metered.

8.4.1.5 All non-single family residential services shall include required backflow prevention devices to be located outside of any proposed buildings.

8.4.1.6 Service connections off of fire hydrant runs shall not be made.

8.4.2 Existing Services

8.4.2.1 Prior to construction of new water mains, the Developer shall remove, tag and deliver any existing meters to the City of DuPont and temporarily jumper the meters to maintain service. The City staff will then inspect and overhaul the meters, and deliver them to the construction site when the Developer is ready to reinstall the meters.

8.4.2.2 The existing meters shall be relocated at the property line, where applicable. A new meter box shall be furnished by the Developer for each such service. Any meters damaged or clogged during construction will be replaced by the City and back charged to the Developer.

8.4.2.3 Following installation, testing and disinfection of water mains, the services shall be connected.

8.4.3 Ductile Iron Service Pipe

Service connections larger than 2-inch diameter shall be ductile iron pipe Class 52.

8.4.4 Polyethylene Service Pipe

8.4.4.1 1-1/2-inch and 2-inch-diameter service connections from the water main to the customer's service may be made with high density polyethylene (HDPE) pipe conforming to AWWA C902-78. The 2-inch-diameter services shall be supplied and installed with a 2-inch-diameter ball valve with 2-inch operating nut adapter and valve box at the main in accordance with the Standard Details.

8.4.4.2 3/4- and 1-inch-diameter service pipe from the water main to the customer's service shall be made with Performance 5100 Ultra-line ultra high molecular plastic pipe or approved equal.

8.4.4.3 All non-metallic service lines shall be continuous from the water main to the water service meter and shall include locating wire as specified in Section 8.9.

8.4.5 Meter Boxes

Meter boxes shall be Mid-States, Fog-Tite, or Raven, inverted with reading lid, or approved equal, in accordance with the Standard Details.

8.4.6 Service Saddles

All service connections shall be installed with service saddles, which shall be by Ford, in accordance with the Standard Details.

8.4.7 Water Meters

Water meters shall comply with the following standards for Sensus meters or most current Sensus equivalent:

Meter Size	Model	Meter Length	Unit of Measure	Type	Encoder
3/4"	SR II	7-1/2" [1]	Cubic Feet	Displacement	TR-PL & Radio
1"	SR II	10-3/4" [1]	Cubic Feet	Displacement	TR-PL & Radio
1-1/2"	SR	13" [1]	Cubic Feet	Displacement	TR-PL & Radio
2"	SRH	15-1/4" [1]	Cubic Feet	Compound	TR-PL & Radio
3"	SRH w/Strainer	[2]	Cubic Feet	Compound	TR-PL & Radio
4"	SRH w/Strainer	[2]	Cubic Feet	Compound	TR-PL & Radio
6"	SRH w/Strainer	[2]	Cubic Feet	Compound	TR-PL & Radio

8.5 Valves

Valves shall be installed at intervals not to exceed 1,000 feet. Valves shall be installed at each end of easements, unless otherwise approved by the City. Complete manufacturer's specifications for the valves proposed for use shall be submitted to the City for approval. No valves shall be used which have not been approved by the City.

8.5.1 Gate Valves

8.5.1.1 Water main valves, 12 inch and smaller shall be resilient seat gate valves and conform with AWWA C500 and C509, except where superseded by the following: The valves shall be ductile iron body with epoxy coating inside and out with vulcanized resilient rubber wedge seat. The valves shall be non-rising stem, open to the left, and shall be equipped with standard 2-inch square operating nuts. Valves shall be equipped with "o-ring" packing. Valves shall be M&H, Mueller, or approved equal.

8.5.1.2 All 1-1/2-inch and 2-inch valves shall be ball valves or gate valves approved by the City. Said ball valves shall be equipped with a slotted operator, and with an adapting 2-inch square operating nut (Ford QT-67, or equal) secured with a stainless steel cotter pin.

8.5.1.3 Gate valves shall be set in the ground vertically and shall be opened and shut under pressure to check operation and, at the same time, show no leakage. See "Water Main Testing and Disinfection" Section 8.11 of these Standards for additional testing requirements. Valves 6 inches and larger that are not flanged to other fittings shall be blocked in accordance with the Standard Details.

8.5.2 Butterfly Valves

8.5.2.1 Water main valves larger than 12 inches shall be butterfly valves. Butterfly valves shall be Class 150 or better, and shall meet the requirements of AWWA C504. Valves shall be Dresser, M&H, or Pratt.

8.5.2.2 Valve shafts shall meet or exceed the strength requirements of AWWA C504 and be one-piece. Packing shall be "o-ring," or other design approved by the City.

8.5.2.3 Butterfly valves to be installed underground shall have sealed mechanical operators, open to the left and have 2-inch standard square operating nuts.

8.5.3 Tapping Tee and Valve

The tapping tee sleeve shall be cast iron or stainless steel with a ductile iron or stainless steel flange. The tapping valve shall meet the specifications of the gate valves. All tapping sleeves and tapping valves shall be pressure tested prior to making connection to the existing main. The assembly shall be installed in accordance with the Standard Details.

8.5.4 Valve Boxes

8.5.4.1 Valves boxes shall be Rich 940 or City approved equal and be cast iron with adjustable sections; 18-inch top section and regular 24-inch base section as required. A valve cover marked "WATER" shall be provided.

8.5.4.2 Valve boxes shall be set flush in pavement. In gravel shoulder and in unimproved roadway areas, install a protective concrete collar and asphalt pad in accordance with Standard Details. Valve boxes shall be installed such that the slots in the valve box lid shall be oriented in the direction of the pipe. Where valve boxes are in asphaltic pavement, the cover shall be painted as directed by the City.

8.5.5 Valve Stem Extensions

The materials and requirements for the valve stem extension shall be in accordance with Drawing No. 8.5.

8.5.6 Valve Marker Posts

8.5.6.1 A concrete valve marker post shall be 4-inch minimum square section and a minimum of 42 inch in length, with beveled edges and containing at least one 3/8-inch x 37-inch bar of reinforcing steel. Valve Marker Posts shall be painted Kelly Moore 1700-64 KEL-GUARD ENAMEL INDIGO BLUE, or City approved substitute.

8.5.6.2 Valve markers shall be installed for all valves except fire hydrant valves and valves located in paved areas at a location as directed by the City. The markers shall be set to leave 18 inches exposed above ground. The exposed portion of the markers shall be painted with Kelly Moore 1700-64 KEL-GUARD ENAMEL INDIGO BLUE, or City approved substitute. The valve size and the distance to the valve, rounded off to the nearest foot, shall be stenciled on the marker in 2-inch-high numbers using black paint.

8.6 Fire Hydrants

(See Drawing Nos. 8.6-1 and 8.6-2)

8.6.1 General

8.6.1.1 In single-family residential areas, fire hydrants shall be installed at intervals not to exceed 600 feet and/or located no more than 350 feet from the back corner of any proposed lot. In all other areas, fire hydrants shall be installed at intervals not to exceed 300 feet or as required by the City Fire Chief.

8.6.1.2 Hydrant runs shall be a maximum of 50 feet in length.

8.6.1.3 Fire hydrants shall be a breakaway type and conform to AWWA Standard C502. Fire hydrants shall be M & H Style 929, AVK, Mueller Centurion, or Clow. All fire hydrants shall be approved by the National Board of Fire Underwriters.

8.6.1.4 Fire hydrants shall be non-rising stem compression-type which open counter-clockwise, and close with pressure. The main valve opening diameter shall be 5-1/4 inches and the hydrant barrel shall have a diameter of 7 inches unless otherwise specified. The hydrant seat and hydrant seat retaining ring shall be bronze. All external bolts, nuts and studs shall be cadmium plated in accordance with ASTM A165 Type HS or rust proofed by some other process approved by the City. Gaskets shall be of rubber composition.

8.6.1.5 Fire hydrants shall be equipped with one 5-inch Storz or equal pumper connection and with two 2-1/2-inch NST hose ports. Ports shall be fitted with renewable bronze nipples locked in place.

8.6.1.6 The fire hydrants shall be painted with two coats of Kelly-Moore 1700-63 KEL-GUARD ENAMEL SUNBURST YELLOW, or City approved substitute. See the Standard Details for additional specifications.

8.6.1.7 Fire hydrants shall be set as shown in the Standard Details. Fire hydrant ports are to be oriented as approved by the City Fire Chief.

8.6.1.8 In some instances, it may be necessary to make a cut or provide fill to set hydrants. Where this occurs, the area for at least a 3-foot radius around the hydrant shall be graded and leveled, and the cut or fill slopes shall be neatly graded by hand, unless otherwise approved by the City and the Fire Chief.

8.6.1.9 No tool other than an approved hydrant operating wrench shall be used when opening or closing hydrants.

8.6.1.10 Fire hydrants to be relocated shall be as shown on the Standard Details, by installing fittings, new ductile iron pipe and thrust restraint between the gate valve and the fire hydrant. New gaskets shall be installed at each connection.

8.6.1.11 All new and relocated hydrants located adjacent to a paved road shall have Type 2 raised pavement markers installed 6 inches from the centerline on the hydrant side of the road. See Section 8.6.3.

8.6.2 Fire Hydrant Guard Posts

8.6.2.1 The guard posts shall be precast reinforced concrete, 9 inches in diameter, 6-feet long. Paint shall be as for fire hydrants. See Section 8.6.1.6.

8.6.2.2 When directed by the City, guard posts shall be set with the tops of the posts at the same elevation as the top of the hydrant. The exposed portion of the posts shall be painted the same as for fire hydrants.

8.6.3 Raised Pavement Markers

Raised pavement markers for fire hydrant locations shall be Type 2, two-way blue and shall conform to Section 8-09 of the WSDOT/APWA Standard Specifications.

8.7 Blowoff and Air Release Assemblies

8.7.1 Blowoff Assemblies

Blowoff assemblies shall be located at the terminus of all dead-end water mains and at all low points of water mains, and shall be installed per Standard Details for "End-Line" and "In-Line" assemblies, as applicable. The blowoff assemblies shall be painted with Kelly Moore 1700-64 KEL-GUARD ENAMEL INDIGO BLUE, or City approved substitute. See Drawing Nos. 8.7-1 and 8.7-2.

8.7.2 Air and Vacuum Release Assemblies

8.7.2.1 Air and vacuum relief assemblies shall be located at all high points of water mains and shall be installed per Standard Details. The air and vacuum relief assemblies shall be painted with Kelly Moore 1700-64 KEL-GUARD ENAMEL INDIGO BLUE, or City approved substitute. See Drawing Nos. 8.7-3 and 8.7-4.

8.7.2.2 Water mains shall be constructed so that the valves may be installed in a convenient location for future access by the City.

8.8 Sampling Stations

(See Drawing No. 8.8)

8.8.1 Sampling stations shall be set at locations approved by the City and shall be installed per Standard Details. A minimum of one sampling station shall be provided per 50 residential units or portion thereof. A minimum of one sampling station shall be provided per plat unless waived by the City.

8.8.2 Sampling stations shall be Eclipse No. 88 or City approved equal with a lockable, non-removable, aluminum-cast housing and an all brass waterway. All working parts will be of brass and be removable from above ground. A copper vent tube will enable each station to be pumped free of standing water. The exterior piping shall be galvanized.

8.8.3 Each sampling station shall include a ball valve.

8.8.4 Sampling stations shall be set in the ground vertically and shall be opened and shut under pressure to check operation. A concrete base shall be provided at finished grade.

8.9 Locating Wire

8.9.1 All non-metallic water mains and services shall have 14-gauge solid copper wire and neoprene coating placed in the trench over the water line and the ends brought up into the valve or meter boxes.

8.9.2 Locating wire shall be 14-gauge solid copper, with neoprene coating. All connections or splicing shall be made with ILSCO split bolt connectors, Catalog No. 1 KS, or equal.

8.10 Connections to Existing Water Mains

(See Drawing Nos. 8.10-1 and 8.10-2)

8.10.1 General

8.10.1.1 Where necessary to connect to existing facilities, the operation of the existing facility shall be maintained while making the connection.

8.10.1.2 Wet tap connections shall be installed as shown on the Standard Details and the tapping valve shall remain closed.

8.10.1.3 Cut-in tees and crosses shall be installed as shown on the Standard Details and the valves on the branches of the tee or cross shall remain closed.

8.10.1.4 At connections of new piping to existing piping where no valve is installed to separate the system, all of the new piping, appurtenances and blocking shall have been installed, disinfected and tested up to the point of cutting into the existing line before the connection is made.

8.10.1.5 Provide the City with 48-hours notice prior to making connections to the existing system and proceed only after receiving permission. Assemble all necessary material and equipment 48 hours before starting work to allow the City inspector to examine the material for acceptability. Notify all affected customers at least 48 hours in advance. No cut-in connections or connections of new piping to existing piping will be scheduled on Fridays or Mondays.

8.10.1.6 Bolts, flanges, gaskets, couplings and all accessories shall be checked and assembled where possible by the Developer and verified by the City prior to shut down of the water system. 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 City.

8.10.1.7 After connection to the existing system, the opening of the valves shall be done with the authorization of, and in the presence of the City's authorized representative.

8.10.1.8 The Developer shall not operate any valves or make any connections to the existing water main without prior approval of the City. The Developer shall make the necessary arrangements with the City for the connection to the existing water main.

8.10.2 Water Shutoff

8.10.2.1 Where it is necessary to shut off the existing mains to make a connection, the Developer shall notify the City 48 hours in advance of such shutoff and the City will shut off the mains. Once the water has been shutoff, the Developer shall diligently pursue to complete the connection so that the time required for the shut off may be held to a minimum.

8.10.2.2 All connections to existing mains shall be completed the same day as they are started. The Developer shall time his operations so that the water will not be shut off overnight or over weekends or during holidays.

8.11 Water Main Testing and Disinfection

8.11.1 General

8.11.1.1 All costs for testing and disinfection, including bacteriological sample testing shall be borne by the Developer.

8.11.1.2 All water from the City system shall be supplied through a metered double-check backflow assembly per the Standard Details, unless otherwise approved by the City.

8.11.1.3 All water mains and services located, or to be located, in City rights-of-way and easements shall be subject to the testing and disinfection requirements specified herein.

8.11.1.4 The water main pipes shall be disinfected and tested before being placed in service. Water for testing and disinfecting must be obtained by the Developer by arrangement with the City. 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 Developer. Feed for the pump shall be from a barrel or other container, wherein the actual amount of "makeup" water can be measured periodically during the test period.

8.11.1.5 Prior to initiation of testing and disinfection procedures, the contractor shall complete the installation of the water main and all appurtenances such as valves, hydrants, hydrant collars, blowoffs, air release valves, service lines and meter setters.

8.11.1.6 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 shall furnish and install temporary blocking.

8.11.1.7 Defective materials or workmanship, discovered as a result of the tests, shall be replaced by the Developer at the Developer's expense. Whenever it is necessary to replace defective material or correct the workmanship, the tests shall be rerun at the Developer's expense, until a satisfactory test is obtained.

8.11.1.8 It is the intent of the testing procedure to demonstrate the integrity of all water main system components the contractor installs in City right-of-way and easements. If the contractor's work ends at the meter setter, the 150 psi leakage test must include the setter. The City will provide a jumper for the meter and the contractor is responsible for capping the outlet of the setter. The meter setter may be capped on the lot side of the sidewalk, at the contractor's option. For meter setters 1-1/2 inch and larger, the contractor shall provide gaskets and bolts.

8.11.1.9 The contractor may develop his own sequence for the specified tests or perform partial tests prior to City witnessed tests. Before final acceptance, the contractor shall have successfully completed and passed the specified tests described in Sections 8.11.2, 8.11.3, and 8.11.4, as witnessed by the City.

8.11.2 Hydrostatic Test

The pipeline shall be subjected to a hydrostatic pressure test of 200 pounds per square inch (200 psi) for a period of not less than 15 minutes for all lines with gate valves 12 inch and smaller. System will pass if there are no sudden pressure drops.

8.11.3 Leakage Test

8.11.3.1 In addition to the hydrostatic pressure test, a leakage test shall be conducted on the pipeline. The leakage test shall be conducted at one hundred fifty pounds per square inch (150 psi) for a period of not less than two hours. 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 = number of joints in the length of pipeline tested
- D = nominal diameter of the pipe in inches
- P = average test pressure during the leakage test, psi.

8.11.3.2 When the building supply line has been extended to the point where a shutoff valve or cap is installed, the line shall be tested at 150 psi to demonstrate that there are no leaks at the meter setter/supply line connection. This connection shall be visibly checked by the City.

8.11.4 Main Line Valve Test

All main line valves shall be tested to 150 psi differential across the gate or butterfly valve. All tests shall be made with the hydrant auxiliary gate valves open and pressure against the hydrant valve. Hydrostatic tests shall be performed on every complete section of water main between two valves, and each valve shall withstand the same test pressure as the pipe with no pressure active in the section of pipe beyond the closed valve. System will pass if there are no sudden pressure drops.

8.11.5 Disinfection

8.11.5.1 The pipe shall also be disinfected when being tested. As each length of pipe is laid, calcium hypochlorite or other disinfecting agent, having an available chlorine content of about 65 percent shall be placed in the pipe in sufficient quantities to give a dosage of about 50 parts per million available chlorine, calculated on the volume of water which the pipe will contain.

8.11.5.2 This may be placed in the upstream or high pressure end of the pipe. The following table shows the amount of high test calcium hypochlorite which should be used in each 20-foot length of pipe of various sizes:

PIPE SIZE (Inside Diameter In Inches)	HIGH TEST HYPOCHLORITE REQUIRED (Ounces per 20-foot length to give 50 ppm available chlorine)
2, 3, 4 & 6	0.4
8, 10 & 12	0.7

8.11.5.3 The calcium hypochlorite or other disinfecting agent used for this purpose shall be furnished by the Developer.

8.11.5.4 When the line is completed and ready to disinfect, water shall be allowed the flow in slowly, so as to not displace the chlorine agent, until it appears at the far end of the line. The system shall then be allowed to stand for at least 24 hours. The line shall then be flushed through the fire hydrants or into the next section, until a test shows no more than 0.2 parts per million available chlorine. If any of the materials need to be replaced, the line shall again be disinfected and tested. The line may be pressure tested at the same time it is disinfected.

8.11.5.5 Disposal of chlorinated water shall be in accordance with Washington State Department of Ecology requirements.

8.11.5.6 The water system will not be acceptable to the City until receipt of a satisfactory report from the Washington State Department of Health on water samples submitted to that office for bacteriological analysis.

9. GENERAL UTILITIES

9.1 Standard Utility Locations Within the Right-of-Way

Utilities within the existing or proposed right-of-way shall be installed in the following locations:

Utility	Designated Side of Center Line
Sanitary Sewer	5 ft. south or west
Water	5 ft. north or east
Storm Drainage	north or east
Gas	south or west
Telephone	south or west
Power	south or west

Where existing utilities or storm drains are in place, new utilities shall conform to these Standards as nearly as practical and yet be compatible with the existing installations. Exceptions may be approved by the City when necessary to meet special requirements only if the public's best interest is served.

9.2 Underground Utility Installation

9.2.1 Utility Cuts on Existing Traveled Roads

In accordance with City Ordinance 480 and its amendments, all pavement types shall not be cut for a period of 5 years after the pavement has been constructed or resurfaced. In cases of emergency or construction failures or if all alternatives to pavement cutting have been exhausted, provisions to allow cutting of the pavement may be obtained if approved by the City. Provisions shall be conditioned on providing a standard asphalt patch and minimum 150 linear foot overlay for asphalt concrete pavement or standard cement concrete restoration for cement concrete pavements, unless otherwise approved by the City.

9.2.1.1 All final asphalt cuts will be made by sawcutting; wheel or jackhammer cuts will not be allowed unless the entire street is to be overlaid.

9.2.1.2 Backfill

A. All backfill under asphalt paving and/or within four feet of the edge of pavement will be crushed rock meeting WSDOT/APWA Standard Specification for crushed surfacing or other material deemed suitable by the City.

B. All backfill under asphalt paving will be placed in layers and each layer will be mechanically compacted using vibratory compactors capable of attaining the required compaction. Minimum compaction for all trenches under asphalt or within 4 feet of the edge of pavement will be 95 percent of the Standard Proctor Density. Minimum density for all other areas within the public right-of-way shall be 90 percent of the Standard Proctor Density. Inspection and/or testing, if required by the City, shall be at the sole expense of the Developer.

9.2.1.3 Pipelines, Cable, and Wiring

A. All buried pipelines, cable, or wiring installed within the public right-of-way shall have at least 36-inch minimum cover unless written approval by the City is secured prior to actual construction.

B. All non-metallic pipelines shall have 16 gauge minimum size copper locator wires buried with the pipe. Locator wires shall be brought to the surface at approximate 400-foot intervals to allow locators to connect to the locator wires. Connection to residential gas meters or telephone pedestals will serve to meet this requirement.

C. All utilities will be installed in conduit where they cross or lie under the traveled portion of the roadway or where they lie within two feet of the edge of pavement. Piping used as conduit shall be appropriately sized and shall be at least Schedule 40 PVC where other regulations do not exist and/or take precedence.

9.2.1.4 Restoration
(See Drawing Nos. 9.2-1 and 9.2-2)

A. A temporary patch of cold mix asphalt shall be installed on all asphalt cuts at the completion of the backfill and compaction process and at the end of each day during which a project is ongoing. Patches shall be maintained to conform to the original cross section and grades of the surrounding road. Required repairs to trench patches must be made within 24 hours when repairs are required to maintain the safety of the public roadway. Where Developer's, their agents or employees fail to make repairs required by the City within 24 hours, the City may cause the repairs to be made and the total cost of those repairs together with the City's overhead and attorney fees shall be borne by the Developer or the Developer's

bonding company. No new permits will be issued and no work will be allowed on other existing permits while any person, company, or entity is in default of any of the provisions of this ordinance.

B. Final restoration must be completed as soon as possible using two-inch minimum thickness of Class B Asphalt Concrete Pavement (ACP). All patches will be constructed using best practices and are required to meet or exceed WSDOT/APWA Standard Specifications for thickness of asphalt, smoothness, and compaction. Sealing of all patch edges with hot asphalt following completion of each patch is required.

C. Overlay's will be constructed of ACP meeting the WSDOT requirements for Class B ACP and will be at least 0.10 foot in thickness.

D. On crossings required to be opened to traffic prior to final trench restoration, steel plates may be used as approved by the City.

9.2.2 On Proposed Roads
(e.g., New Subdivisions)

Backfill compaction for trenches within the roadway of roads not open to public travel may be achieved throughout the entire depth of the trench by mechanical compaction as described in Section 9.2.1.2(B).

9.2.3 Controlled Density Backfill
(See Drawing No. 9.2-3)

As an alternative to mechanical compaction, trench backfill above the bedding and below the base course or ATB may be accomplished by use of controlled density backfill (CDF) in a design mixture approved by the City.

9.2.4 Testing

9.2.4.1 Consistent with the above and prior to placing any surface materials on the roadway, it shall be the responsibility of the developer to provide density test reports certified by a professional engineer. A minimum of one test shall be taken within every 500 feet of trench length and at depths up to 50 percent of trench depth, or as directed by the City. Compaction of laterals or service line trenches shall be tested where directed by the City. Testing of CDF shall be in accordance with ASTM D4832.

9.2.4.2 Whichever compaction method the installer elects, the backfill below four feet must test to be not less than 90 percent maximum density and the upper four feet of backfill must test not less than 95 percent maximum density. Where this cannot be achieved, all affected backfill in the top 4 feet shall be removed and replaced by gravel base and mechanically compacted to 95 percent.

9.2.5 Notification and Inspection

9.2.5.1 Consistent with Section 10.2 of these Standards, any developers, utilities, or others intending to trench in existing or proposed traveled City roads shall notify the City not less than 2 working days prior to doing the work. This notification shall include:

A. Location of the work.
B. Method of compaction to be used.
C. Day and hour when compaction is to be done.
D. Day and hour when testing is to be done.

9.2.5.2 As set forth in Section 10.3 of these Standards, failure to notify may necessitate testing or retesting by the City at the expense of the Developer or Utility. Furthermore, the work may be suspended pending satisfactory test results.

9.2.6 Final Utility Adjustment to Finish Grade

9.2.6.1 All utility covers which are located on proposed asphalt roadways shall be temporarily placed at subgrade elevation prior to placing crushed surfacing material.

9.2.6.2 Water meter boxes shall not be located within sidewalks, driveways, or driveway approaches, unless otherwise approved by the City. Where driveway locations have not been established, meter boxes shall be located along the center of the lot line. If an existing meter box falls within sidewalks, driveways, or driveway approaches, the meter box shall be relocated.

9.2.6.3 Final adjustment of all covers and access entries shall be made following final paving by (See Drawing Nos. 9.2-4 and 9.2-5):

9.2.6.3.1 Sawcutting or neat-line jackhammering of the pavement around lids and covers. Opening should not be larger than 12 inches beyond the radius of the cover.

9.2.6.3.2 Removing base material, surfacing course, and frame; adding raising bricks; replacing frame and cover no higher than finished grade of pavement and no lower than 1/2 inch below the pavement.

9.2.6.3.3 Place 8-inch minimum thickness of cement concrete Class 3000 to within 2 inches of the top.

9.2.6.3.4 Filling the remaining two inches with asphalt concrete Class B hot mix, compacted and sealed to provide a dense, uniform surface.

9.2.6.3.5 Final adjustment of all covers and access entries shall be completed within 30 days of final paving.

9.2.7 Final Cleanup, Restoration of Surface Drainage and Erosion Control: In addition to restoration of the road as described above, the responsible utility shall care for adjacent areas in compliance with Sections 1-04.11 "Final Cleanup" and 8-02 "Roadside Restoration" in the WSDOT/APWA Standard Specifications. In particular:

9.2.7.1 Streets and roads shall be cleaned and swept both during and after the installation work.

9.2.7.2 Disturbed soils shall be final graded, seeded and mulched after installation of utility. In limited areas, seeding and mulching by hand using approved methods will be acceptable.

9.2.7.3 Ditch lines with erodible soil and subject to rapid flows may require seeding, jute matting, netting, or rock lining to control erosion.

9.2.7.4 Any silting of downstream drainage facilities, whether ditches or pipe and catch basins, which results from the utility installation shall be cleaned out and the work site restored to a stable condition as part of site cleanup.

10. CONSTRUCTION CONTROL AND INSPECTION

10.1 Basis for Control of the Work

10.1.1 Work performed in the construction or improvement of City roads, stormwater system, and/or water system, whether by or for a private developer, by City forces, or by City contractor, shall be done in accordance with these Standards, approved drawings, and specifications (Section 1.4). It is emphasized that no work may be started until such drawings are approved. Any revision to such drawings shall be approved by the City before being implemented.

10.1.2 The City will have authority to enforce the Standards as well as other referenced or pertinent specifications. The City will determine the amount of inspection required and will appoint project engineers, assistants, and inspectors as necessary to inspect the work. The Developer shall pay all inspection costs.

10.1.3 It is the responsibility of the developer, contractor or their agents to have an approved set of plans, permits, Standard Specifications, and the City's Standards available on the job site wherever work is being accomplished.

10.1.4 Failure to comply with the provisions of these Standards may result in stop work orders, removal of work accomplished, or other penalties as established by ordinance.

10.2 Subdivision, Commercial, and Right-of-Way Inspection

On all roads, stormwater system, and/or water system construction, proposed or in progress, which relates to subdivision, commercial, and right-of-way development, control and inspection will be done by the City. Table 10.2-1, Testing and Sampling Frequency Guide, indicates the minimum testing frequency required. The developer shall submit all testing results to the City.

Unless otherwise instructed by the City, construction events which require monitoring or inspection are identified as follows:

10.2.1 Preconstruction Conference: Four working days prior notice. Conference must precede the beginning of construction and include contractor, designing engineer, utilities, and other parties affected. Plan approvals and permits must be in hand prior to the conference. The applicant is responsible for notifying all affected parties.

10.2.2 Clearing and Temporary Erosion/Sedimentation Control: Two working days notice prior to initial site work involving drainage and installation of temporary water retention/detention and siltation control. Such work to be in accordance with the approved drawings.

10.2.3 Utility Installation: Two working days notice prior to trenching and placing of storm sewers, sanitary sewer, water, gas, power, telephone, and cable TV lines.

10.2.4 Utility and Storm Drainage Backfill and Compaction: One working day notice before backfill and compaction of storm sewers and underground utilities.

10.2.5 Subgrade Completion: One working day notice at stage that underground utilities and roadway grading are complete, to include placement of gravel base if required. Inspection to include compaction tests and certifications described in Section 10.4.

10.2.6 Curb and Sidewalk Forming: One working day notice to verify proper forming and preparation prior to pouring concrete.

10.2.7 Curb and Sidewalk Placement: One working day notice to check placement of concrete.

10.2.8 Crushed Surfacing Placement: One working day notice to check placement and compaction of crushed surfacing base course and top course.

10.2.9 Paving: Three working days notice in advance of paving with asphalt or Portland cement concrete.

10.2.10 Structural: Three working days notice prior to each of critical stages such as placing foundation piling or footings, placement and assembly of major components, and completion of structure and approaches. Tests and certification requirements will be as directed by the City.

10.2.11 Final Construction Inspection: Ten working days prior to overall check of road or drainage project site, to include completion of paving and associated appurtenances and improvements, cleaning of drainage system, and all necessary cleanup. Prior to approval of construction work and acceptance of City right-of-way, water, and/or stormwater improvements by council, the following must submitted and approved by City staff: warranty and maintenance bond, performance bond for outstanding work, easement documents, final plat or right-of-way deeds, the developer/contractor shall pay any required fees, provide a certificate of monumentation, submit one photo mylar or ink-on-mylar set, two sets (minimum) of black line final, corrected drawings (as-built) reflecting all minor and design plan changes of the road and drainage systems. The record drawings shall be mylars. The City shall specify the number of black line sets as warranted by the type of improvement. Mylar drawings shall not have shading or adhesive addition in any areas. See Section 1.9 for requirements.

10.2.12 Final Maintenance Inspection: Thirty days prior to the end of the maintenance period. Prior to release of the maintenance guarantee, there shall be successful completion of the maintenance period as described in Section 1.7, repair of any failed facilities and the payment of any outstanding fees.

TABLE 10.2-1

Testing and Sampling Frequency Guide

Item	Type of Tests	Min. No.	Frequency
Gravel Borrow	Grading and SE	1 Each	1-4000 Ton
Sand Drainage Blanket	Grading	1 Each	1-4000 Ton
Crushed Surf, Top Course	Grading, SE, and Fracture	1 Each	1-2000 Ton
Crushed Surf, Base Course	Grading, SE, and Fracture	1 Each	1-2000 Ton
Ballast	Grading, SE, and Dust Ratio	1 Each	1-2000 Ton
Backfill/Sand Drains	Gradation	1 Each	1-2000 Ton
Gravel Backfill for:			
Foundations	Grading, SE, and Dust Ratio	1 Each	1-1000 Ton
Walls	Grading, SE, and Dust Ratio	1 Each	1-1000 Ton
Pipe Bedding	Grading, SE, and Dust Ratio	1 Each	1-1000 Ton
Drains	Gradation	1 Each	1-100 Ton
PCC Structures: (Sidewalk, Curb and Gutter, Foundations)			
Course Aggregate	Gradation	1 Each	1-1000 Ton
Fine Aggregate	Gradation	1 Each	1-500 Ton
Consistency	Slump	1 Each	1-100 CY
Air Content	Air	1 Each	1-100 CY
Cylinders (28 day)	Compressive Strength	2 Each	1-100 CY
Cement:	Chemical and Physical Certification	1	1-Job
Asphalt Cement Concrete:			
Blend Sand	SE	1 Each	1-1000 Ton
Mineral Filler	S.G. and PI, Certification	1	1-Job
Completed Mix	Fracture, SE, Grading Asphalt Content Compaction	2 Each	5-400 Ton
Asphalt Materials	Certification	1	1-Job
Rubberized Asphalt	Certification	1	1-Job
Compaction Testing:			
Embankment	Compaction	1 Each	1-500 LF
Cut Section	Compaction	1 Each	1-500 LF
Crushed Surf-Top Course	Compaction	1 Each	1-500 LF
Crushed Surf-Base Course	Compaction	1 Each	1-500 LF
Ballast	Compaction	1 Each	1-500 LF
Trench Backfill	Compaction	1 Each	1-500 LF

SE = Sand Equivalency
SG = Specific Gravity
PI = Plasticity Index

10.3 Penalties for Failure to Notify for Inspection

Timely notification by the developer as noted above is essential for the City to verify through inspection that the work meets the appropriate standards. Failure to notify in time may oblige the City to arrange appropriate sampling and testing after-the-fact, with certification. Costs of such testing and certification shall be borne by the developer. At the time that such action is directed by the City, the City may prohibit or limit further work on the development until all directed tests have been completed and corrections made to the satisfaction of the City.

10.4 Embankment Construction Control in Developments

The provisions of Section 2-03 of the WSDOT/APWA Standard Specifications apply in all respects to development construction unless otherwise approved or instructed in writing by the City. The following elements are mentioned for clarification and emphasis:

10.4.1 Embankment and Cut Section Compaction: Compaction of the top 2 feet of fill subgrade and top 6 inches of cut subgrade shall meet a minimum 95 percent of maximum density in accordance with WSDOT/APWA Standard Specifications, Section 2-03.3(14)C - Method B. Subgrade fill below the top two feet shall be compacted to 90 percent of maximum density.

10.4.2 Testing for Density:

10.4.2.1 Prior to placing any surfacing material on the roadway, it will be the responsibility of the developer/contractor to provide density test reports reviewed and approved by a professional engineer. Optimum moisture content and maximum density shall be determined by methods cited in Section 2-03.3(14)D of WSDOT/APWA Standard Specifications or by other test procedures approved by the City. See Table 10.2-1 for testing frequency. For work to be accepted, tests must show consistent uniform density as required by tests referenced above.

10.4.2.2 Refer to Table 10.2-1 for testing and sampling frequency requirements.

10.4.2.3 In cases where tests do not meet the minimum standard, corrective action shall be taken such as adding water, aerating, replacing material or applying more compactive effort as directed by the developer's engineer. Retests shall show passing densities prior to placing the next lift of subgrade fill.

10.4.2.4 Finishing Subgrade: After the subgrade preparation has been completed, it shall be thoroughly checked by the developer/contractor using a level, string line, crown board, or other means to determine that the subgrade conforms to the typical section or special plan conditions prior to placing any surfacing material.

10.5 Traffic Control in Development Construction

10.5.1 Interim Traffic Control: The developer/contractor shall be responsible for interim traffic control during construction on or along traveled City streets. When street or drainage work is to be performed on City streets that are open to traffic, the developer/contractor will be required to submit a traffic control plan for approval by the City prior to beginning the work. Traffic control shall follow the guidelines of Section 1-07.23 of the WSDOT/APWA Standard Specifications. All barricades, signs and flagging shall conform to the requirements of the MUTCD Manual. Signs must be legible and visible and should be removed at the end of each work day if not applicable after construction hours.

10.5.2 Temporary Road Closures and Detours: When temporary road closures cannot be avoided the developer/contractor shall post "To Be Closed" signs a minimum of five days prior to the closing. The types and locations of the signs shall be shown on a detour plan. A detour plan must be prepared and submitted to the City at least 10 working days in advance, and approved prior to closing any City road. In addition, the developer/contractor must notify, in writing, local fire, school, law enforcement authorities Pierce County transit, and any other affected persons as directed by the City at least five days prior to closing.

10.5.3 Haul Routes: If the construction of a proposed development is determined by the City to require special routing of large trucks or heavy construction equipment to prevent impacts to surrounding roads, residences or businesses, the developer/contractor shall be required to develop and use an approved haul route.

When required, the haul route plan must be prepared and submitted to the City and approved prior to beginning or continuing construction. The haul route plan shall address routing, hours of operation, signage and flagging, daily maintenance, and restoration of City right-of-way.

If the developer/contractor's traffic fails to use the designated haul route, the City may prohibit or limit further work on the development until such time as the requirements of the haul route are complied with.

10.6 City Forces and City Contract Road Inspection

Road construction performed by City forces or by contract for the City will be inspected under the supervision of the City.

10.7 Call Before You Dig

Developers are responsible for timely notification of utilities in advance of any construction in right-of-way or utility easements. The utility One-Call Center phone number 1-800-424-5555 should be prominently displayed on the work site.

11. GENERAL NOTES AND DRAWINGS

11.1 General Notes (Street Construction)

1. A preconstruction conference shall be held prior to the start of construction. The Contractor shall be responsible for securing all necessary permits prior to construction.

2. A copy of the approved roadway drawings must be on the job site whenever construction is in progress.

3. All workmanship and materials shall be in accordance with City of DuPont's Public Works Standards and Stormwater Management Manual and the most current edition of the State of Washington Standard Specifications for Road, Bridge, and Municipal Construction.

4. It is the responsibility of the Contractor to provide adequate temporary traffic control to ensure traffic safety during construction activities. Therefore, the Contractor shall submit a traffic control plan to the Public Works Department at least 48 hours prior to starting any work in the right-of-way. All traffic control devices shall conform to the "Manual on Uniform Traffic Control Devices" (MUTCD).

5. All curb and gutter, street grades, sidewalk grades, and any other vertical and/or horizontal alignment shall be staked by a professional engineer or surveying firm capable of performing such work.

6. Any roadway signage or striping removed or temporarily moved by the Contractor shall be restored so as to meet the current MUTCD standards.

7. Where new asphalt joins existing, the existing asphalt shall be cut to a neat vertical edge and tacked with Asphalt Emulsion type CSS-1 in accordance with the standard specifications. The joint shall be sealed with grade AR-4000W paving asphalt.

8. Compaction of subgrade, rock, and asphalt shall be in accordance with the WSDOT/APWA Standard Specifications. See City of DuPont Public Works Standards Table 10.2-1 for testing and sampling frequencies. Density test reports will be required for all public roadways.

9. Form and subgrade inspection by the City is required before placing concrete. Twenty-four hours advance notice is required for the scheduling of inspection.

10. Call underground utility locate line, 1-800-424-5555, prior to any excavation.

11. Dead-end streets shall be appropriately signed and barricaded.

12. Where a sidewalk is to be constructed above a slope or adjacent to a rockery or retaining wall, where the lowest finished elevation of the slope, rockery, or retaining wall is to be 30 inches or more below the finished elevation of the sidewalk, a safety railing shall be required when:

    (a) The plane of the wall face is less than 4 feet in horizontal distance from the outside edge of the sidewalk.

    (b) The plane of the wall face is greater than 4-feet horizontal distance to the outside edge of the sidewalk, but the slope down to the wall top exceeds three to one.

    (c) The slopes adjacent to the sidewalk average greater than two to one.

11.2 Erosion/Sedimentation Control Notes

The Contractor shall provide erosion control methods according to the Washington State Department of Ecology's (WDOE) "Stormwater Management Manual for Western Washington." The following notes are only a few of the minimum requirements and should not be interpreted to exclude any erosion control practices as specified in the WDOE stormwater manual.

1. All limits of clearing and areas of vegetation preservation as prescribed on the plan shall be clearly flagged by the Engineer in the field and observed during construction.

2. All required sedimentation/erosion control facilities must be in operation prior to land clearing and/or other construction to insure that sediment laden water does not enter the natural drainage system. All erosion and sediment facilities shall be maintained in a satisfactory condition until such time that clearing and/or construction is completed and potential for on-site erosion has passed. The implementation, maintenance, replacement and additions to erosion/sedimentation control systems shall be the responsibility of the Contractor.

3. The erosion and sedimentation control systems depicted on this drawing are intended to be minimum requirements to meet anticipated site conditions. As construction progresses and as unexpected or seasonal conditions dictate, the Contractor should anticipate that more erosion and sedimentation control facilities will be necessary to insure complete siltation control on the proposed site. During the course of construction, it shall be the obligation and responsibility of the Contractor to address any new conditions that may be created by his activities and to provide additional facilities, over and above minimum requirements, as may be needed to protect adjacent properties and water quality of the receiving drainage system.

4. At no time shall more than 1 foot of sediment be allowed to accumulate within a catch basin. The Contractor shall be responsible for removing and disposing of the sediment. All catch basins, conveyance lines and ditches along [**street names**] shall be cleaned prior to paving.

5. The Contractor shall remove material dropped, washed or tracked from vehicles onto the City right-of-way or into the storm drainage system on [**street names**]. Debris shall not be washed into the storm drainage system.

6. Temporary erosion control facilities shall be inspected weekly and maintained within 24 hours following a storm event. Sediment shall be removed to ensure the facilities will function properly. The facilities shall be satisfactorily maintained until construction is completed and the potential for on-site erosion has passed.

7. All storm drain inlets made operable during construction shall be protected so that stormwater runoff shall not enter the conveyance system without first being filtered or otherwise treated to remove sediment.

8. No disturbed soil shall remain unstabilized for more than two days.

9. Sediment trap/pond baffles shall be embedded in side slopes.

Construction Sequence

1. Install filter fabric and N.G.P.E. fence where indicated.

2. Identify limits of clearing.

3. Install rock-lined construction entrance.

4. Clear to limits shown on Drawings.

5. Rough grade roadway as designed and install interceptor ditches.

6. Install sediment traps and ponds.

7. Install sanitary sewer system.

8. Install domestic water system.

9. Install storm drainage system.

11.3 General Notes (Water System Construction)

1. All irrigation crossings shall have schedule 80 sleeves and the size shall be per the approved irrigation drawings.

2. Light poles shall be located a minimum of 3 feet from all underground utilities, including water meters. Light poles shall be located a minimum of 5 feet from fire hydrants.

3. Water mains and fittings to be installed shall be ductile iron for all sizes, unless specifically noted otherwise. The class of the ductile iron pipe shall be thickness Class 52 for all diameters.

4. Water mains shall maintain a minimum of 3 feet and a maximum of 5 feet of cover.

5. Utility crossings having less than 1 foot of vertical separation shall be constructed with Controlled Density fill (CDF) to prevent possible damage to either utility.

6. Water main deflections at joints are not to exceed manufacturer's recommendations plus an additional factor of safety of 50 percent.

7. Identify a minimum horizontal separation of 10 feet between sanitary sewer mains and water mains, both existing and proposed.

8. For proposed water mains, identify restrained joint fittings and push-on joints at locations where thrust blocks will not have sufficient undisturbed adjacent area for bearing.

9. Water service connections shall be made perpendicular to the main.

10. The water main pipes shall be disinfected and tested before being place in service. All water main testing and disinfection shall be per City of DuPont Public Works Standards.

11. Water main stubouts that are not used shall be disconnected at the main, with a blind flange installed at the tee.

12. Tee connections to existing water mains shall be wet taps.

13. Separate water connections will be required for domestic, fire, and irrigation. All services shall include backflow prevention devices located outside of any proposed buildings.

14. All fire protection system installations, including pipelines and double detector check assemblies, are subject to the construction standards of NFPA 24 and to the inspection and testing requirements of the City of DuPont Fire Department.

15. The fire protection systems, including the backflow prevention devices, underground fire service lines, and fire department connections, are subject to separate review, permitting, and approval by the City of DuPont Fire Department.

16. Relocate the Fire Department Connections (FDCs) to planter islands or other locations, as feasible, to be outside of the building collapse zones.

17. The applicant shall furnish meter sizing calculations for domestic and fire water services. The sprinkler system design, including confirmation of the provided sizing for the fire line components shall be reviewed and approved by the City Building Department and Fire Department as part of the building permit process. Each fire line connection to a City water main will require a double detector check valve assembly (DDCVA) in an underground vault and a Fire Department Connection (FDC) within 50 feet of a fire hydrant.

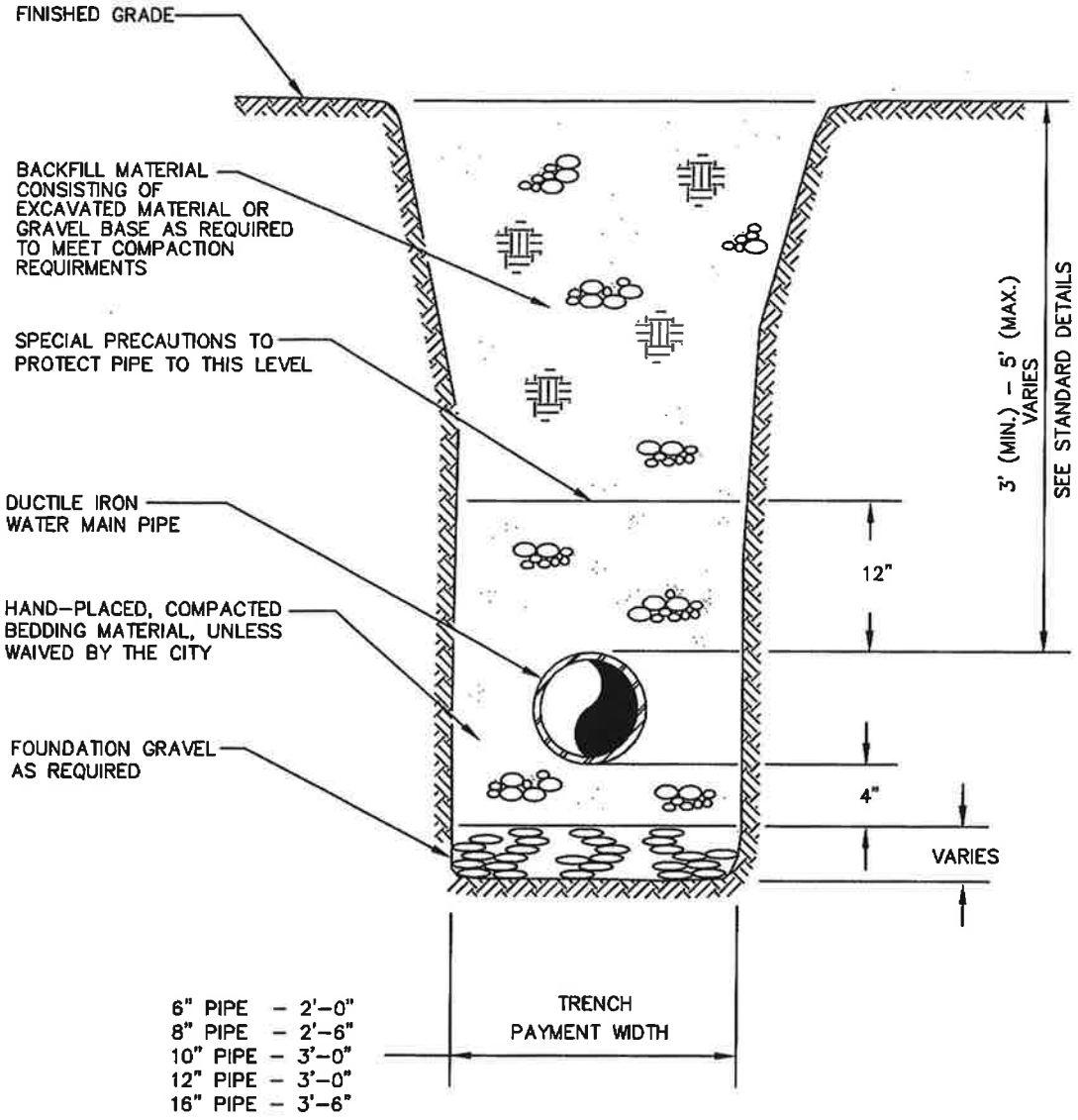
12. STANDARD DETAILS

Miscellaneous Details and Street Standard Details omitted because not related to water system construction.

WATER SYSTEM
STANDARD DETAILS

LIST OF WATER SYSTEM STANDARD DETAILS

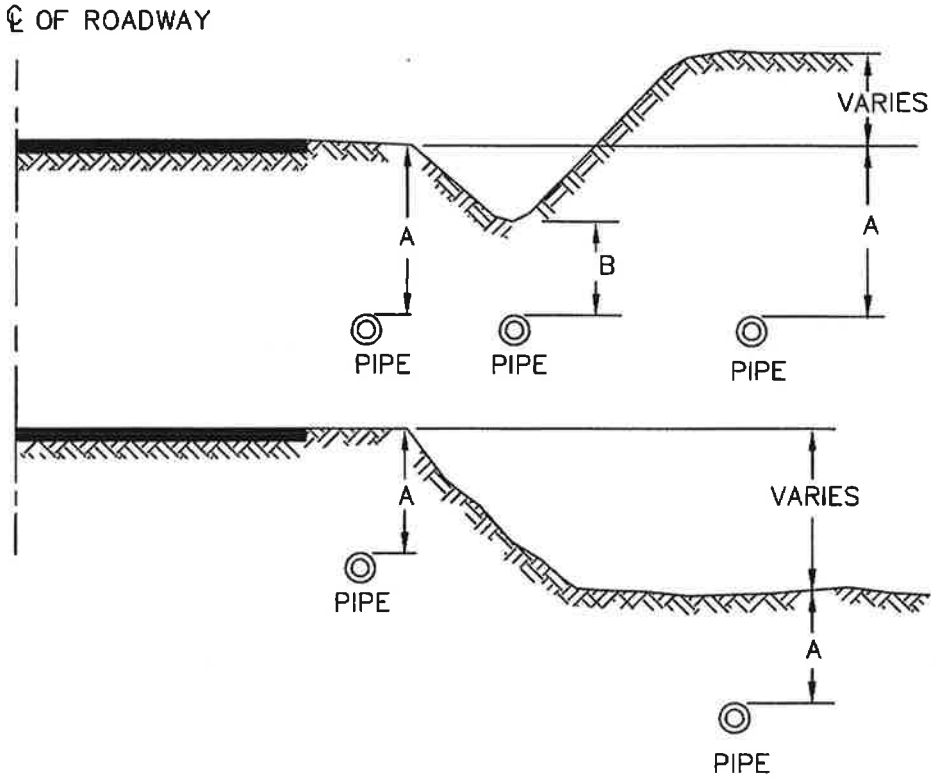
Water Main Trench Section	8.2-1
Water Main Depth Requirements	8.2-2
Typical Utility Crossing	8.2-3
Thrust Blocks	8.3-1
Vertical Anchor Blocks	8.3-2
Thrust Restraint for Ductile Iron Pipe	8.3-3
Encasement/Carrier Pipes	8.3-4
3/4" & 1" Service Connection	8.4-1
3/4" & 1" Dual Service Connection	8.4-2
1-1/2" & 2" Service Connection	8.4-3
3" & Larger Service Connection	8.4-4
3/4" to 2" Reduced Pressure Backflow Assembly	8.4-5
3" & Larger Reduced Pressure Backflow Assembly	8.4-6
2" & Smaller Double Check Valve Assembly	8.4-7
3" & Larger Double Check Valve Assembly	8.4-8
Water Valve Stem Extension	8.5
Fire Hydrant Installation	8.6-1
Fire Hydrant Relocation	8.6-2
2" In-Line Blowoff Assembly	8.7-1
2" End-Line Blowoff Assembly	8.7-2
1" Air & Vacuum Release Assembly	8.7-3
2" Air & Vacuum Release Assembly	8.7-4
Water Sampling Station	8.8
Wet Tap Water Main Connection	8.10-1
Cut-In Water Main Connection	8.10-2
Testing Connection	8.11
Fire Department Connection	11.3



NOTES:

1) FOR ADDITIONAL REQUIREMENTS, SEE SECTION 8.2 OF THE PUBLIC WORKS STANDARDS.

CITY OF DUPONT			
WATER MAIN TRENCH SECTION			
APPROVED: 9/21/11 CITY OF DUPONT DATE			DWG. NO. 8.2-1
DATE: 9/11	DRWN: L.L.	CHKD: T.N.	SCALE: NO SCALE

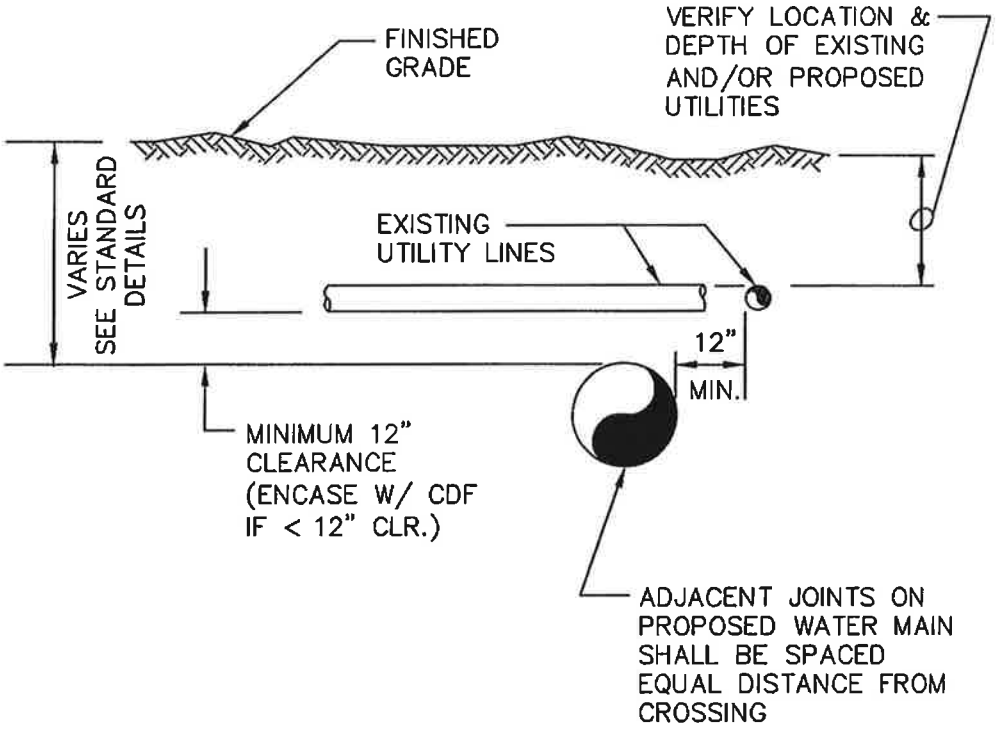


PIPE SIZE	A	B
6" – 12"	36"	24"
14" – 18"	42"	30"
20" & OVER	48"	36"

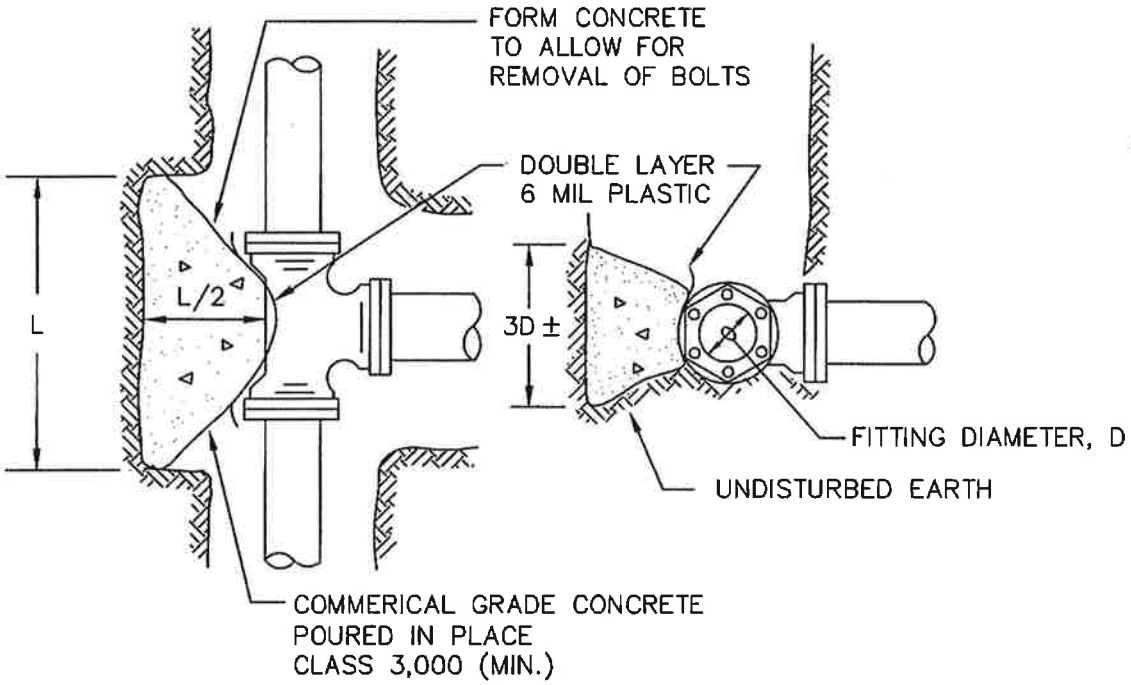
NOTES:

1. MAXIMUM COVER ON WATER MAINS SHALL BE 5' UNLESS OTHERWISE APPROVED BY THE CITY.
2. ALL DEPTH REQUIREMENTS SHALL BE MET UNLESS OTHERWISE APPROVED BY THE CITY.

CITY OF DUPONT			
WATER MAIN DEPTH REQUIREMENTS			
APPROVED: CITY OF DUPONT 9/21/11 DATE			DWG. NO. 8.2-2
DATE: 9/11	DRWN: L.L.	CHKD: T.N.	SCALE: NO SCALE



CITY OF DUPONT			
TYPICAL UTILITY CROSSING			
APPROVED: CITY OF DUPONT 9/21/11 DATE			DWG. NO. 8.2-3
DATE: 9/11	DRWN: L.L.	CHKD: T.N.	SCALE: NO SCALE



PLAN ELEVATION

MINIMUM BEARING AREA TABLE					
FITTING D	TEE	90°	45°	22 1/2°	11 1/4°
6"	4 SQ.FT.	6 SQ.FT.	3 SQ.FT.	2 SQ.FT.	2 SQ.FT.
8"	7 SQ.FT.	10 SQ.FT.	6 SQ.FT.	3 SQ.FT.	2 SQ.FT.
10"	10 SQ.FT.	15 SQ.FT.	9 SQ.FT.	5 SQ.FT.	3 SQ.FT.
12"	14 SQ.FT.	22 SQ.FT.	12 SQ.FT.	6 SQ.FT.	4 SQ.FT.
16"	25 SQ.FT.	38 SQ.FT.	21 SQ.FT.	11 SQ.FT.	7 SQ.FT.
18"	32 SQ.FT.	48 SQ.FT.	27 SQ.FT.	14 SQ.FT.	8 SQ.FT.

NOTES:

1) BEARING AREA TABLE BASED ON 250 PSI PRESSURE AND 2000 PSF SOIL BEARING. IF PRESSURE IS GREATER OR SOIL BEARING IS LESS, THE THRUST BLOCK SIZE SHALL BE INCREASED. DESIGN FOR THRUST BLOCK TO BE PROVIDED BY THE DEVELOPER.

2) THIS TABLE REPRESENTS THE "MINIMUM" CONSTRUCTION STANDARDS. THE DEVELOPER'S ENGINEER SHALL BE RESPONSIBLE FOR THE DESIGN AND SIZING OF ALL BLOCKING BASED ON SOIL CONDITIONS, TEST PRESSURES, AND OTHER RELEVENT CONDITIONS, AND SHALL SUBMIT THE PROPOSED DESIGN AND SIZING TO THE CITY FOR REVIEW AND APPROVAL.

3) FOR ADDITIONAL REQUIREMENTS, SEE SECTION 8.3.5 OF THE PUBLIC WORKS STANDARDS.

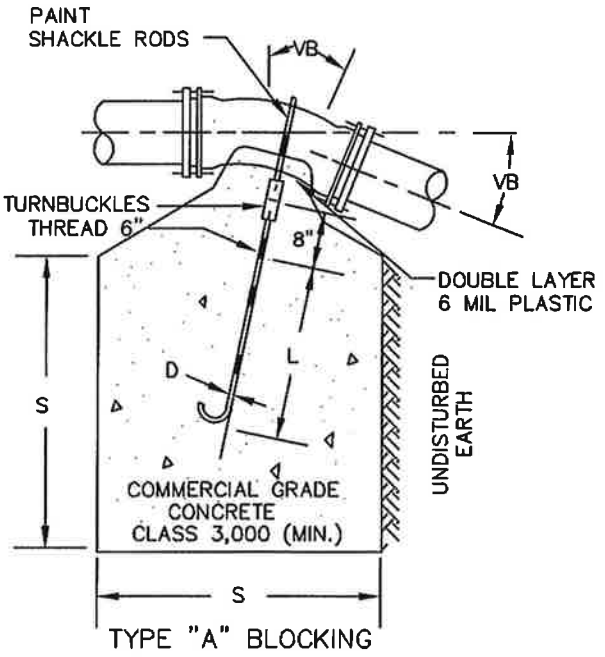
CITY OF DUPONT			
THRUST BLOCKS			
APPROVED: CITY OF DUPONT 9/21/11 DATE			DWG. NO. 8.3–1
DATE: 9/11	DRWN: L.L.	CHKD: T.N.	SCALE: NO SCALE

TYPE "A" BLOCKING
FOR 11 1/4°–22 1/2° VERTICAL BENDS

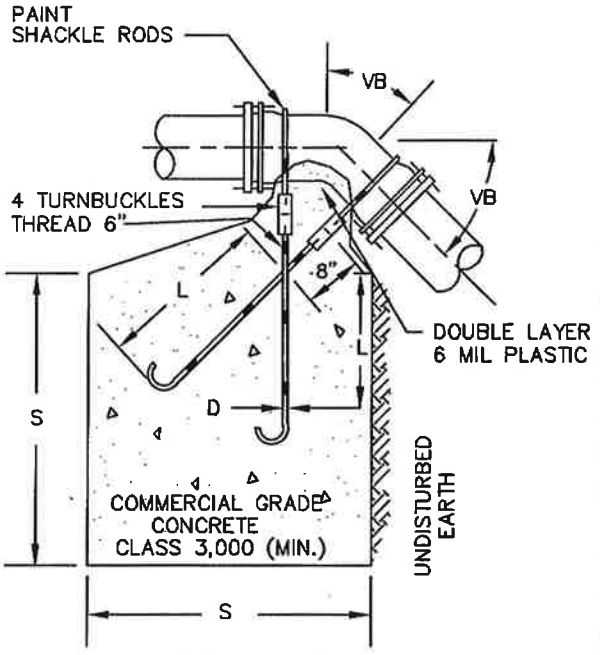
PIPE SIZE NOMINAL DIAMETER– INCHES	TEST PRESSURE PSI	VB VETICAL BEND DEGREES	No. OF CU. FT. OF CONC. BLOCKING	S SIDE OF CUBE (LIN. FT.)	d DIAM. OF SHACKLE RODS (2) INCHES	L DEPTH OF RODS IN CONCRETE (LIN. FT.)
4"	300	11 1/4	8	2	5/8"	1.5
		22 1/2	11	2.2		2.0
6"	300	11 1/4	11	2.2	5/8"	2.0
		22 1/2	25	2.9		
8"	300	11 1/4	16	2.5	5/8"	2.0
		22 1/2	47	3.6		
12"	250	11 1/4	32	3.2	5/8"	2.0
		22 1/2	88	4.5	7/8"	3.0
16"	225	11 1/4	70	4.1	7/8"	3.0
		22 1/2	184	5.7	1 1/8"	4.0
20"	200	11 1/4	91	4.5	7/8"	3.0
		22 1/2	225	6.1	1 1/4"	4.0
24"	200	11 1/4	128	5.0	1"	3.5
		22 1/2	320	6.8	1 3/8"	4.5

TYPE "B" BLOCKING
FOR – 45° VERTICAL BENDS

		VB		S	d	L
4"	300	45	30	3.1	5/8"	2.0
6"			68	4.1		
8"			123	5.0		
12"	250		232	6.1	3/4"	2.5
16"	225		478	7.8	1 1/8"	4.0
20"	200		560	8.2	1 1/4"	
24"			820	9.4	1 3/8"	4.5



TYPE "A" BLOCKING



TYPE "B" BLOCKING

NOTES:

1) THIS TABLE REPRESENTS THE "MINIMUM" CONSTRUCTION STANDARDS. THE DEVELOPER'S ENGINEER SHALL BE RESPONSIBLE FOR THE DESIGN AND SIZING OF ALL BLOCKING BASED ON SOIL CONDITIONS, TEST PRESSURES, AND OTHER RELEVANT CONDITIONS, AND SHALL SUBMIT THE PROPOSED DESIGN AND SIZING TO THE CITY FOR REVIEW AND APPROVAL.

2) FOR ADDITIONAL REQUIREMENTS, SEE SECTION 8.3 OF THE PUBLIC WORKS STANDARDS.

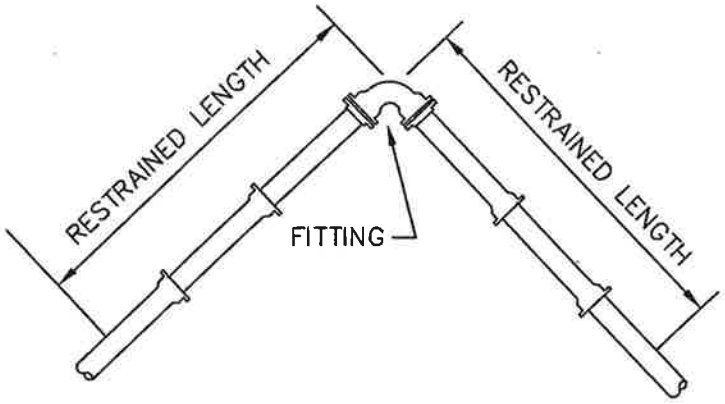
CITY OF DUPONT

VERTICAL ANCHOR BLOCKS

APPROVED: _____ 9/21/11
CITY OF DUPONT DATE

DWG. NO. 8.3–2

DATE:	DRWN:	CHKD:	SCALE:
9/11	L.L.	T.N.	NO SCALE



PIPE SIZE	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND	TEE OR DEAD END CAP
	RESTRAINED LENGTH IN FEET				
4"	40	17	8	4	30
6"	55	23	11	6	39
8"	73	31	15	8	53
10"	88	37	18	9	67
12"	103	43	21	10	82
16"	133	55	27	13	110
18"	145	60	29	15	124

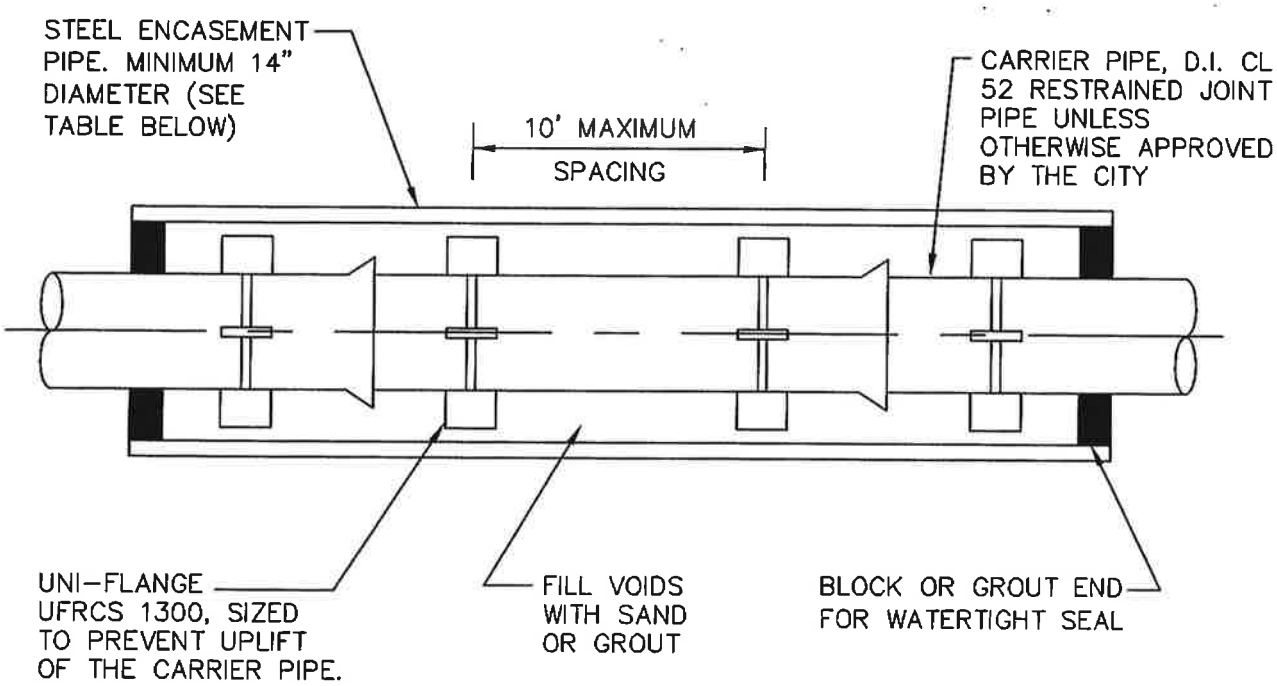
GENERAL NOTES:

1) RESTRAINED LENGTHS SHOWN ARE MINIMUM AND FOR LINEAL FEET REQUIRED ON EACH SIDE OF FITTING INDICATED.

2) FOOTAGES ARE BASED ON 250 PSI PRESSURE AND 42 INCHES COVER. IF PRESSURE IS GREATER OR COVER IS LESS, THE RESTRAINED LENGTH SHALL BE INCREASED.

3) THIS TABLE REPRESENTS THE "MINIMUM" CONSTRUCTION STANDARDS. THE DEVELOPER'S ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING THE APPROPRIATE RESTRAINED LENGTHS.

CITY OF DUPONT			
THRUST RESTRAINT FOR DUCTILE IRON PIPE			
APPROVED: CITY OF DUPONT 9/21/11 DATE			DWG. NO. 8.3-3
DATE: 9/11	DRWN: L.L.	CHKD: D.J.M.	SCALE: NO SCALE



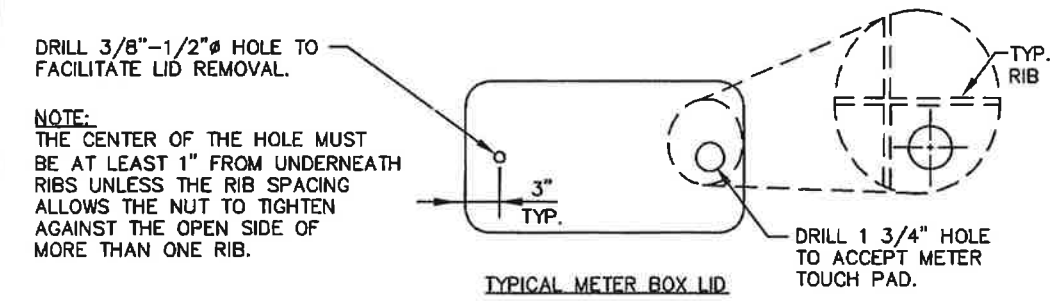
GENERAL NOTES:

1) CARRIER PIPE SHALL BE PRESSURE TESTED PRIOR TO FILLING VOIDS WITH SAND.

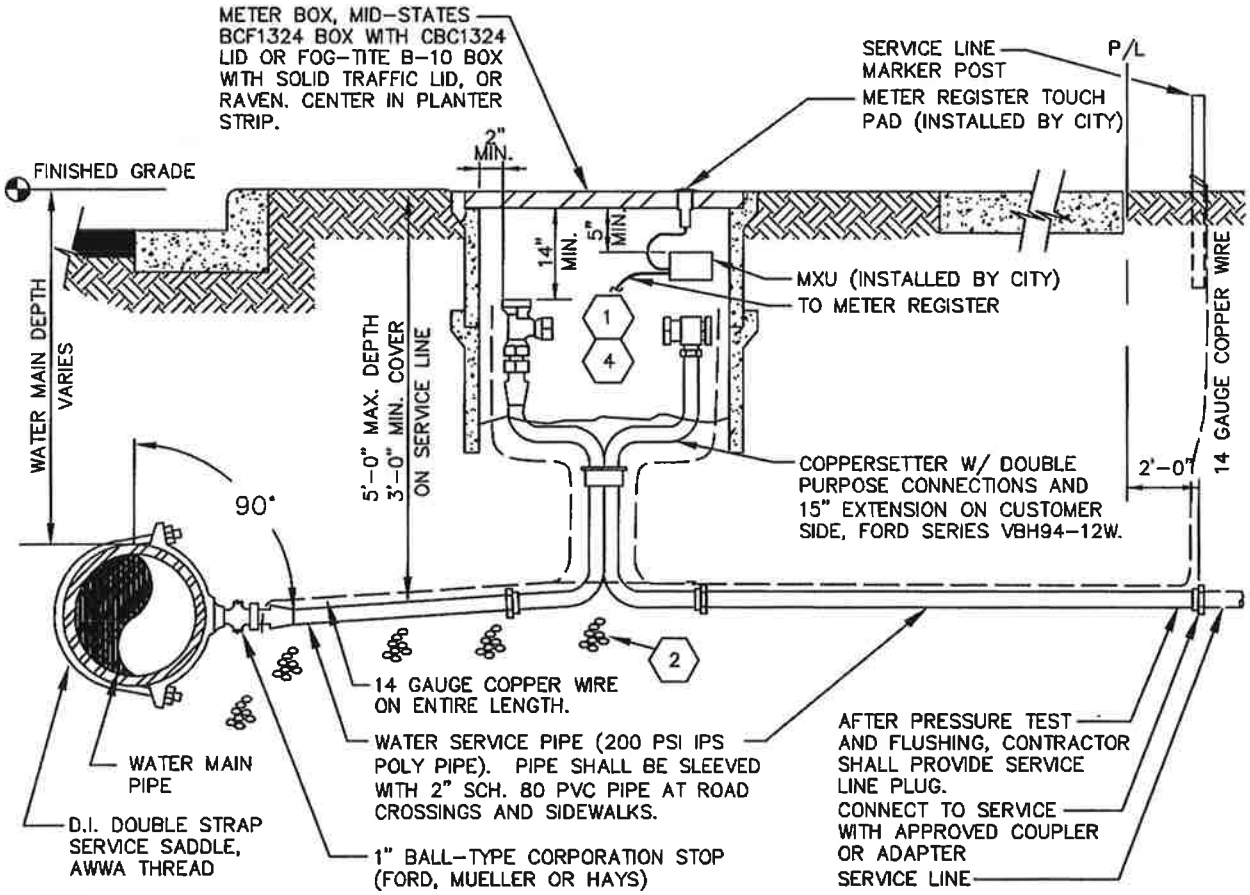
2) CARRIER PIPE WITHIN THE LENGTH OF THE ENCASEMENT PIPE SHALL HAVE RESTRAINED JOINTS.

MINIMUM ENCASEMENT DIAMETERS	
CARRIER DIA.	ENCASEMENT DIA.
6"	14"
8"	18"
10"	21.5"
12"	23"
16"	30"

CITY OF DUPONT			
ENCASEMENT/CARRIER PIPES			
APPROVED: CITY OF DUPONT 9/21/11 DATE			DWG. NO. 8.3-4
DATE: 9/11	DRWN: L.L.	CHKD: D.J.M.	SCALE: NO SCALE



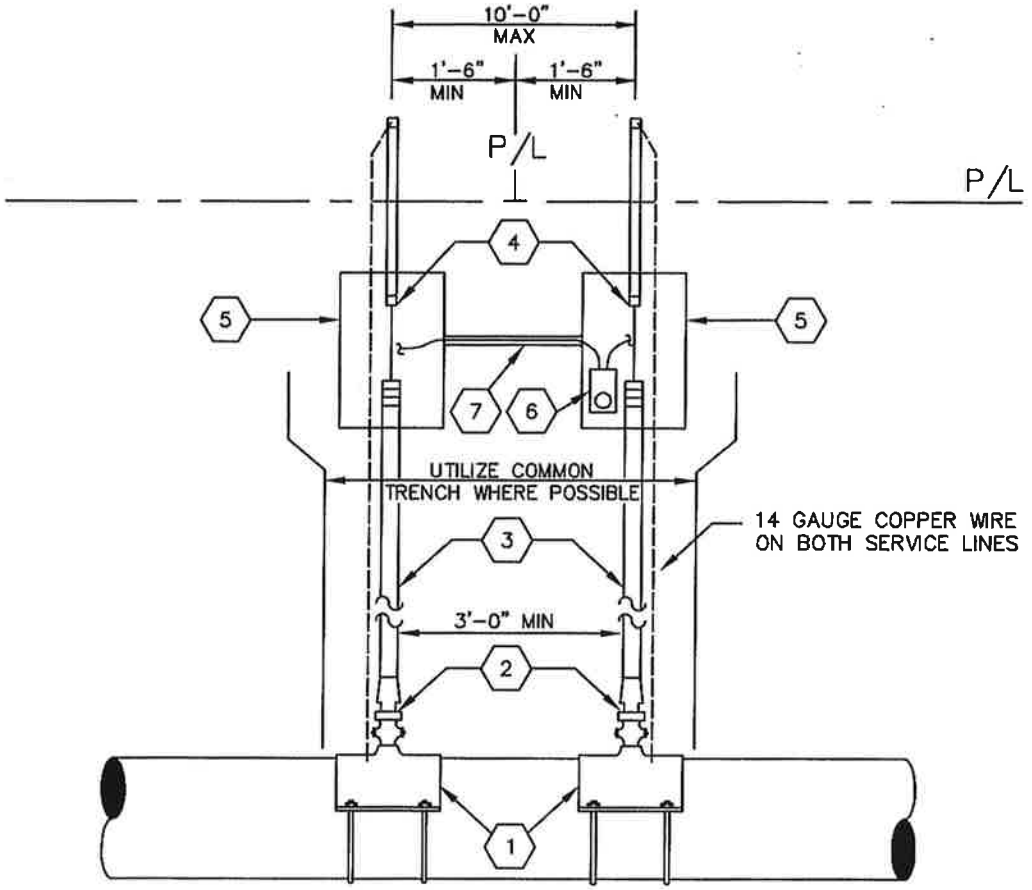
TYPICAL METER BOX LID



NOTES:

1. METER NOT SHOWN FOR CLARITY. REFERENCE SENSUS WATER METER STANDARDS FOR TYPE AND DIMENSIONS FOR REQUIRED METER.
2. TRENCH BACKFILL FOR SERVICE PIPE SHALL CONSIST OF SAND AND PEA GRAVEL.
3. ANY METERS DAMAGED OR CLOGGED DURING CONSTRUCTION SHALL BE REPLACED BY THE CITY AND THE COSTS SHALL BE REIMBURSED BY DEVELOPER.
4. "JUMPER" SHALL BE PROVIDED BY THE CITY.
5. THE CITY SHALL INSTALL THE METER TRANSCEIVER UNIT (MXU) AND CONNECT THE MXU WIRING WITHIN THE METER ENCLOSURE.
6. FOR ADDITIONAL REQUIREMENTS, SEE SECTION 8.4 OF THE PUBLIC WORKS STANDARDS.

CITY OF DUPONT			
3/4" & 1" SERVICE CONNECTION			
APPROVED: CITY OF DUPONT 9/21/11 DATE			DWG. NO. 8.4-1
DATE: 9/11	DRWN: L.L.	CHKD: T.N.	SCALE: NO SCALE



ITEM	QUANTITY	ITEM DESCRIPTION
1	2	D.I. DOUBLE STRAP SERVICE SADDLE, AWWA THREAD.
2	2	1" BALL-TYPE CORPORATION STOP (FORD, MUELLER, OR HAYS).
3	VAR	WATER SERVICE PIPE (200 PSI IPS POLY PIPE). PIPE SHALL BE SLEEVED WITH 2" SCH. 80 PVC PIPE AT ROAD AND SIDEWALK CROSSINGS.
4	2	COPPERSETTER W/ DOUBLE PURPOSE CONNECTIONS AND 15" EXTENSION ON CUSTOMER SIDE, FORD SERIES VBH94-12W.
5	2	METER BOX, MID-STATES BCF1324 BOX WITH CBC1324 LID, OR FOG-TITE B-10 BOX WITH SOLID TRAFFIC LID, OR RAVEN.
6	1	METER TRANSCEIVER UNIT (MXU) W/ TOUCH PAD (INSTALLED BY CITY)
7	1	3/4" PVC CONDUIT BY CONTRACTOR, SEAL BOTH ENDS.

NOTES:

1) ALL SERVICES TO BE PAIRED AS INDICATED. USE OF A SINGLE METER WITH MXU SHALL BE LIMITED AND REQUIRES APPROVAL BY THE CITY. HOWEVER, IF DISTANCE BETWEEN SERVICES IS > 10', THEN A SINGLE SERVICE CONNECTION MUST BE USED.
2) SEE THE 3/4" & 1" SERVICE CONNECTION DETAIL FOR MORE INFORMATION.
3) FOR ADDITIONAL INFORMATION, SEE SECTION 8.4 OF THE PUBLIC WORKS STANDARDS.

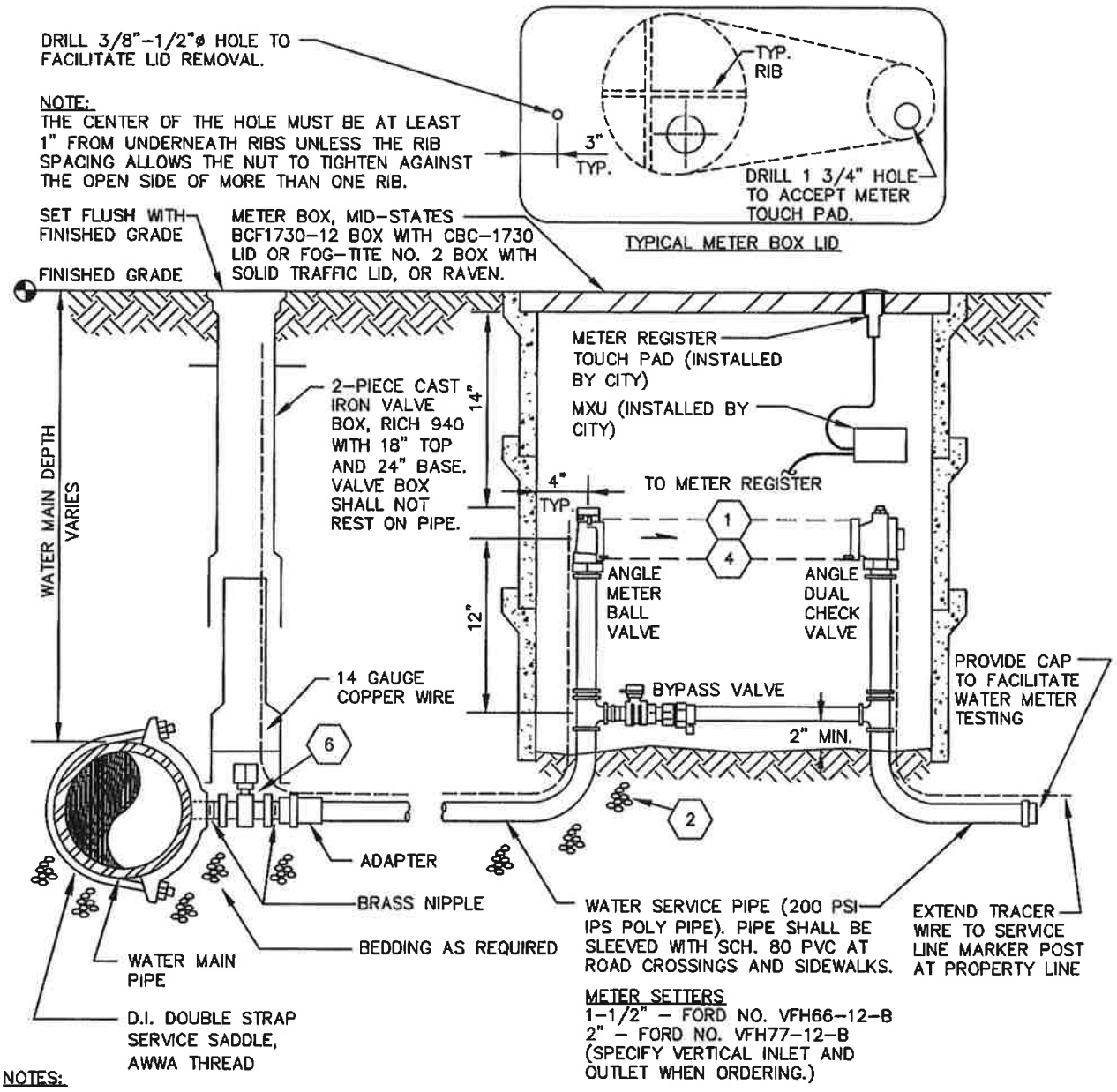
CITY OF DUPONT

3/4" & 1" DUAL SERVICE CONNECTION

APPROVED: _____ 9/21/11
CITY OF DUPONT DATE

DWG. NO. 8.4-2

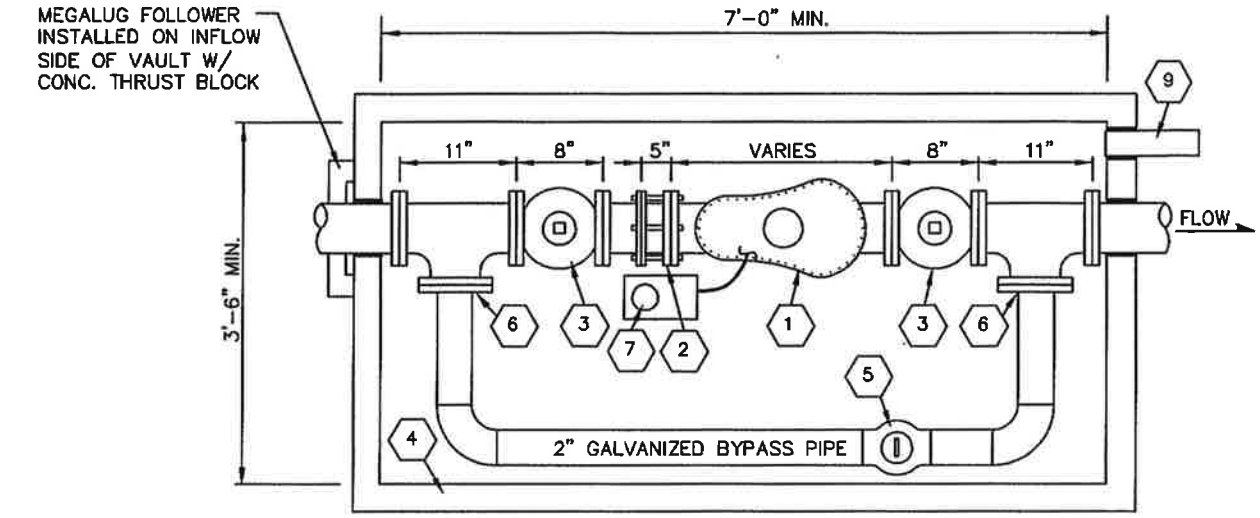
DATE:	DRWN:	CHKD:	SCALE:
9/11	L.L.	T.N.	NO SCALE

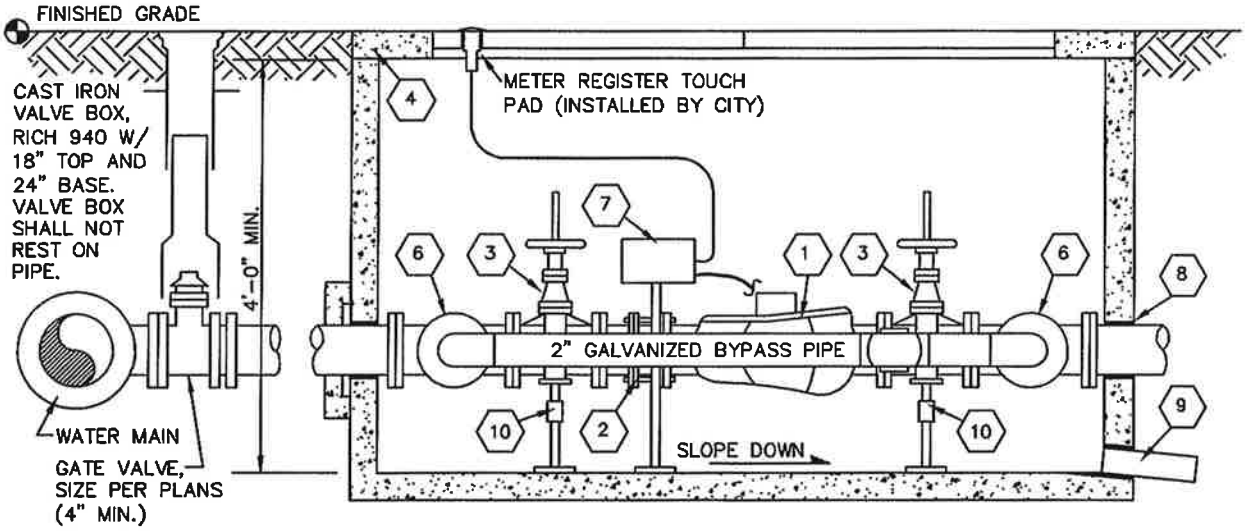


NOTES:

1. METER NOT SHOWN FOR CLARITY. REFERENCE SENSUS WATER METER STANDARDS FOR REQUIRED METER. VERIFY METER TYPE AND DIMENSIONS PRIOR TO ORDERING METER SETTER.
2. TRENCH BACKFILL FOR SERVICE PIPE SHALL CONSIST OF SAND AND PEA GRAVEL.
3. ANY METERS DAMAGED OR CLOGGED DURING CONSTRUCTION SHALL BE REPLACED BY THE CITY AND THE COSTS SHALL BE REIMBURSED BY DEVELOPER.
4. "JUMPER" SHALL BE PROVIDED BY THE CITY.
5. THE CITY SHALL INSTALL THE METER TRANSCEIVER UNIT (MXU) AND CONNECT THE MXU WIRING WITHIN THE METER ENCLOSURE.
6. BALL VALVE FOR IRON PIPE, FORD NO. B11-666, B11-777, OR EQUAL WITH 2" OPERATING NUT ADAPTER, FORD NO. QT-67.
7. FOR ADDITIONAL INFORMATION, SEE SECTION 8.4 OF THE PUBLIC WORKS STANDARDS.

CITY OF DUPONT			
1-1/2" & 2" SERVICE CONNECTION			
APPROVED: CITY OF DUPONT 9/21/11 DATE			DWG. NO. 8.4-3
DATE: 9/11	DRWN: J.C.	CHKD: D.M.	SCALE: NO SCALE





1. COMPOUND METER W/ STRAINER, SENSUS OR EQUAL, SIZE AS NOTED ON PLANS. (SEE METER TABLE). INSTALL ENCODER AS REQUIRED.
2. ROMAC STYLE FLANGED COUPLING ADAPTER.
3. RESILIENT SEAT G.V. (FLxFL) W/ NON-RISING STEM.
4. PRE-CAST CONCRETE VAULT, UTILITY VAULT CO., NO. 575-LA WITH SPRING LOADED, LOCKABLE STEEL PLATE COVER NO. 2-332P TYPICAL. VERIFY VAULT SIZE TO FIT COMPLETE ASSEMBLIES.
5. BALL VALVE WITH PADLOCK WING OR LOCKCAP (FORD).
6. BLIND FLANGE, DRILL AND TAP FOR 2" THREADED GALVANIZED PIPE.
7. METER TRANSCEIVER UNIT WITH TOUCH PAD. INSTALLED BY CITY ON CONTRACTOR PROVIDED 1" SCH. 80 PVC SUPPORT.
8. WATER TIGHT RUBBER SEAL, TYP. ALL PENETRATIONS.
9. 6" PVC DRAIN TO DAYLIGHT OR TO STORM SYSTEM.
10. ADJUSTABLE STANCHIONS.

NOTES:

1) PROVIDE FLEXIBLE COUPLINGS ON BOTH INLET AND OUTLET PIPES OUTSIDE VAULT.
2) INLET AND OUTLET PIPE FLANGES SHALL BE A MINIMUM 6" FROM INSIDE WALL OF VAULT.
3) ALL PIPE TO BE DUCTILE IRON EXCEPT FOR 2" BYPASS LINE (GALVANIZED).
4) FOR ADDITIONAL REQUIREMENTS, SEE SECTION 8.4 OF THE PUBLIC WORKS STANDARDS.

CITY OF DUPONT

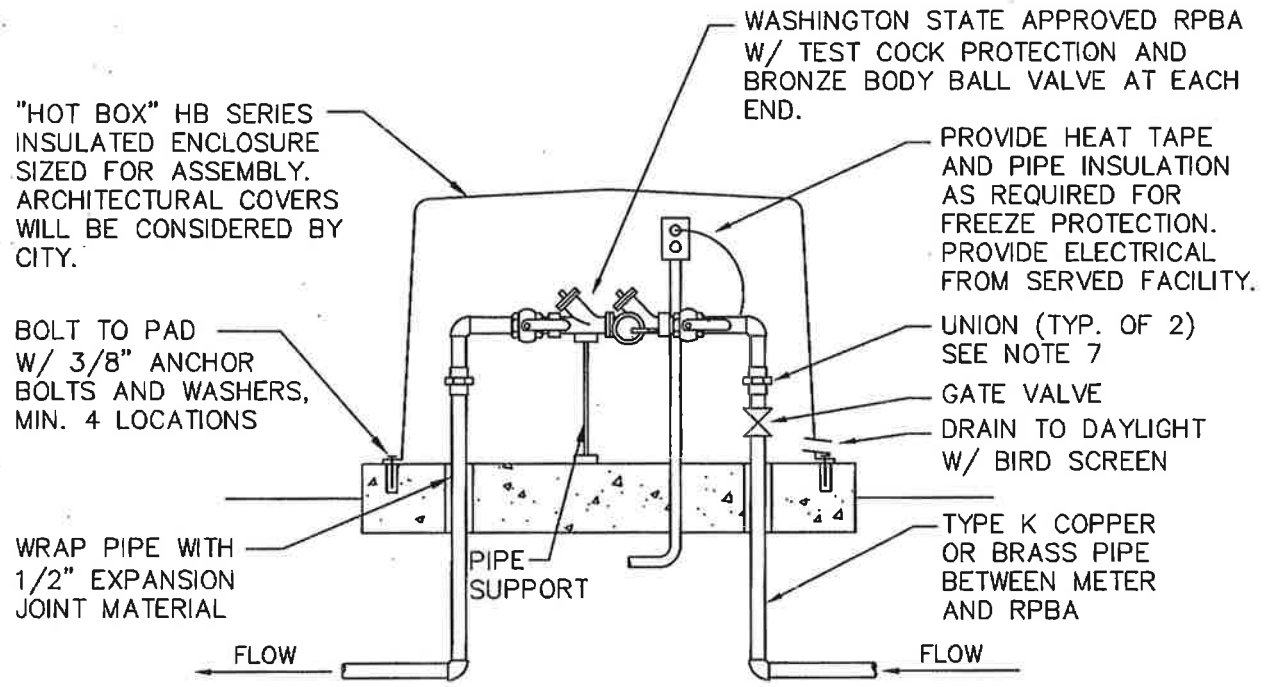
3" & LARGER SERVICE CONNECTION

APPROVED:

CITY OF DUPONT — DATE 9/21/11

DWG. NO. 8.4-4

DATE:	DRWN:	CHKD:	SCALE:
9/11	P.E.	T.N.	NO SCALE



NOTES:

1) BACKFLOW ASSEMBLY SHALL BE SELECTED FROM WASHINGTON STATE DEPARTMENT OF HEALTH CURRENT APPROVED LIST.

2) CONCRETE TO BE 2500 PSI MIX WITH AIR ENTRAINMENT.

3) COMPLETE ALL WORK IN ACCORDANCE WITH STATE, CITY AND SUPPLIER STANDARDS.

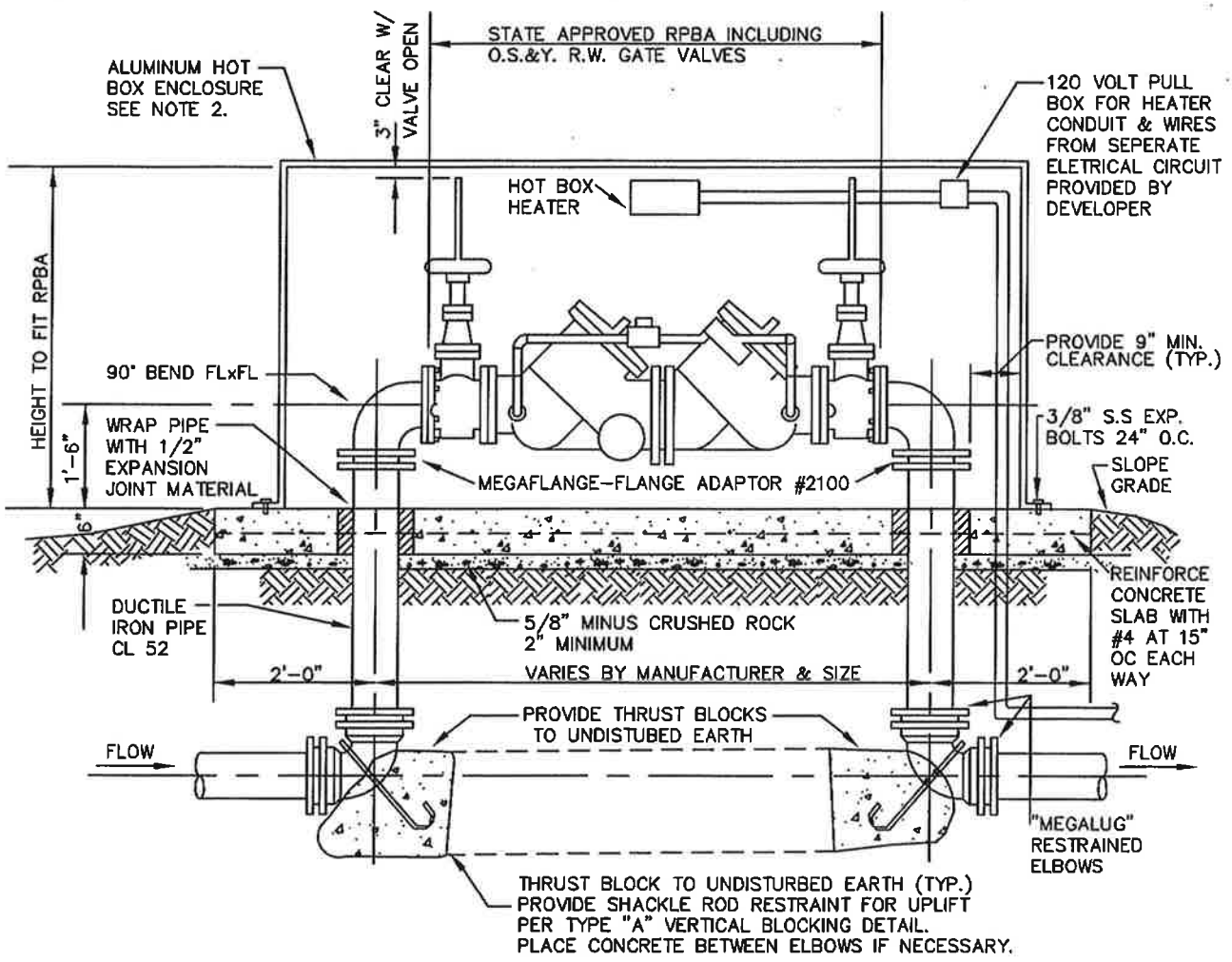
4) SYSTEM SHALL NOT BE PUT INTO SERVICE UNTIL RPBA IS APPROVED BY THE CITY AND TESTED/CERTIFIED BY A WASHINGTON STATE LICENSED TESTER.

5) RPBA IS CONSIDERED PART OF THE PRIVATE SYSTEM AND SHALL BE MAINTAINED BY THE PROPERTY OWNER WITH ANNUAL CERTIFICATION REQUIRED.

6) PRESSURE TEST AND DISINFECT PER A.W.W.A. STANDARDS.

7) DIELECTRIC UNIONS SHALL BE USED TO SEPARATE DISSIMILAR MATERIALS.

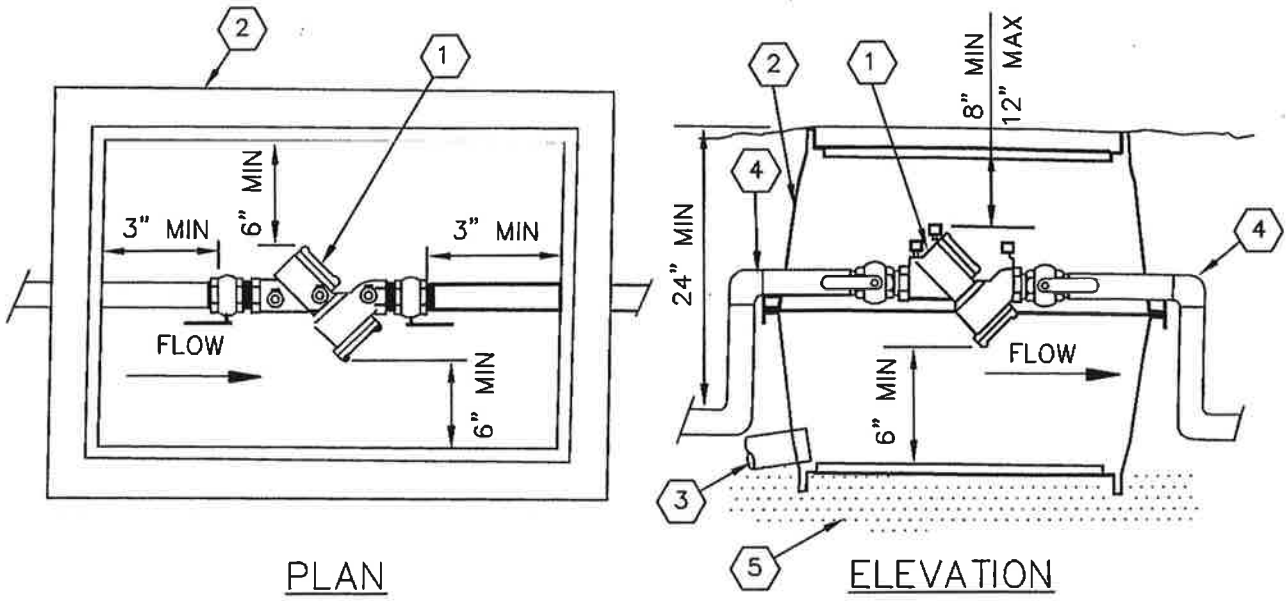
CITY OF DUPONT			
3/4" TO 2" REDUCED PRESSURE BACKFLOW ASSEMBLY			
APPROVED: CITY OF DUPONT 9/21/11 DATE			DWG. NO. 8.4-5
DATE: 9/11	DRWN: L.L.	CHKD: T.N.	SCALE: NO SCALE



GENERAL NOTES:

1) BACKFLOW ASSEMBLY SHALL BE SELECTED FROM WASHINGTON STATE DEPARTMENT OF HEALTH CURRENT APPROVED LIST.
2) ALUMINUM "HOT BOX" MODELS 4 THROUGH 10 FOR RESPECTIVE SIZE RPBA SHALL BE MODIFIED TO FIT ABOVE EIGHT REQUIREMENTS. VALVE STEM SHALL NOT BE ALLOWED TO EXTEND OUTSIDE OF BOX.
3) HEATERS SHALL BE 2,000 WATT FOR 8" AND UNDER: 3,000 WATT FOR 10".
4) CONCRETE TO BE 2500 PSI MIX WITH AIR ENTRAINMENT.
5) COMPLETE ALL WORK IN ACCORDANCE WITH STATE, CITY AND SUPPLIER STDS.
6) SYSTEM SHALL NOT BE PUT INTO SERVICE UNTIL RPBA IS APPROVED BY THE CITY AND TESTED/CERTIFIED BY A WASHINGTON STATE LICENSED TESTER.
7) RPBA IS CONSIDERED PART OF THE PRIVATE SYSTEM AND SHALL BE MAINTAINED BY THE PROPERTY OWNER WITH ANNUAL CERTIFICATION REQUIRED.
8) PRESSURE TEST AND DISINFECT PER A.W.W.A. STDS.

CITY OF DUPONT			
3" & LARGER REDUCED PRESSURE BACKFLOW ASSEMBLY			
APPROVED: CITY OF DUPONT 9/21/11 DATE			DWG. NO. 8.4-6
DATE: 9/11	DRWN: L.L.	CHKD: T.N.	SCALE: NO SCALE



1. STATE APPROVED DOUBLE CHECK VALVE ASSEMBLY (DCVA)
2. METER BOX. FOG–TITE NO. 2 CONCRETE, OR MID STATES PLASTICS MSBCF 1730–12 COMPOSITE. BOX SHALL BE H–20 LOAD RATED WHERE REQUIRED.
3. 4" PVC DRAIN TO CATCH BASIN OR DAYLIGHT. SCREEN BOTH ENDS.
4. BENDS MAY BE LOCATED INSIDE OR OUTSIDE OF BOX SO LONG AS SUFFICIENT ROOM IS ALLOWED AT EACH END FOR VALVE OPERATOR AND DCVA REPAIR OR MAINTENANCE.
5. PROVIDE FREE DRAINING BACKFILL BELOW BOX.

NOTES:

1) ALL TEST COCKS SHALL HAVE BRASS PLUGS.

2) TEST COCKS SHALL FACE UP OR SIDEWAYS, WHICHEVER IS MORE ACCESSIBLE.

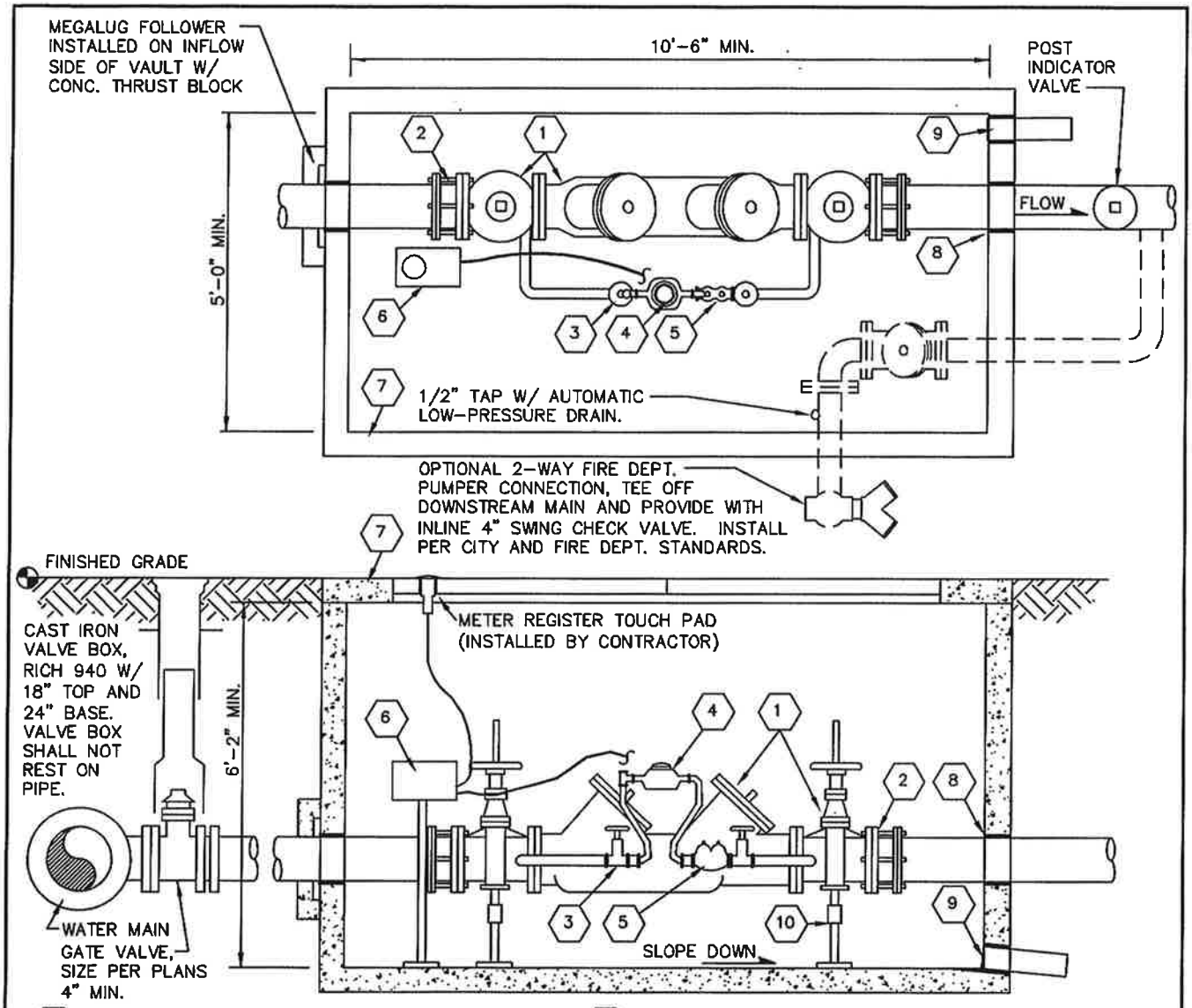
3) COMPLETE ALL WORK IN ACCORDANCE WITH STATE, CITY AND SUPPLIER STANDARDS.

4) SYSTEM SHALL NOT BE PUT INTO SERVICE UNTIL DCVA IS APPROVED BY THE CITY AND TESTED/CERTIFIED BY A WASHINGTON STATE LICENSED TESTER.

5) DCVA IS CONSIDERED PART OF THE PRIVATE SYSTEM AND SHALL BE MAINTAINED BY THE PROPERTY OWNER WITH ANNUAL CERTIFICATION REQUIRED.

6) PRESSURE TEST AND DISINFECT PER A.W.W.A. STDS.

CITY OF DUPONT			
2" & SMALLER DOUBLE CHECK VALVE ASSEMBLY			
APPROVED: 9/21/11 CITY OF DUPONT DATE			DWG. NO. 8.4–7
DATE: 9/11	DRWN: L.L.	CHKD: T.N.	SCALE: NO SCALE



1. STATE DOH APPROVED DOUBLE-CHECK DETECTOR BACKFLOW PREVENTION ASSEMBLY WITH O.S. & Y.V., SIZE AS NOTED ON PLANS.
2. ROMAC STYLE FLANGED COUPLING ADAPTER, 6" MIN. FROM INSIDE VAULT WALL.
3. SHUT-OFF VALVES PER STATE REQUIREMENTS.
4. 5/8"x3/4" SENSUS SRII-TRPL BYPASS METER (PER CITY WATER METER STANDARDS).
5. STATE DOH APPROVED 3/4" DOUBLE CHECK VALVE ASSEMBLY.
6. METER TRANSCEIVER UNIT WITH TOUCH PAD. INSTALLED BY CITY ON CONTRACTOR PROVIDED 1" SCH. 80 PVC SUPPORT.
7. PRE-CAST CONCRETE VAULT, UTILITY VAULT CO., NO. 5106-LA WITH SPRING LOADED, LOCKABLE STEEL PLATE COVER NO. 2-332P TYPICAL. VERIFY VAULT SIZE TO FIT COMPLETE ASSEMBLIES.
8. WATER TIGHT RUBBER SEAL, TYP. ALL PENETRATIONS.
9. 6" PVC DRAIN TO DAYLIGHT OR TO STORM SYSTEM.
10. ADJUSTABLE STANCHIONS (2 TOTAL).

NOTES:

1) PROVIDE FLEXIBLE COUPLINGS ON BOTH INLET AND OUTLET PIPES OUTSIDE VAULT.
2) A CERTIFIED TEST REPORT SHALL BE SUPPLIED TO THE CITY FOR EACH BACKFLOW ASSEMBLY.
3) ALL PIPE SHALL BE DUCTILE IRON EXCEPT FOR BYPASS (BRASS OR TYPE K COPPER).

CITY OF DUPONT

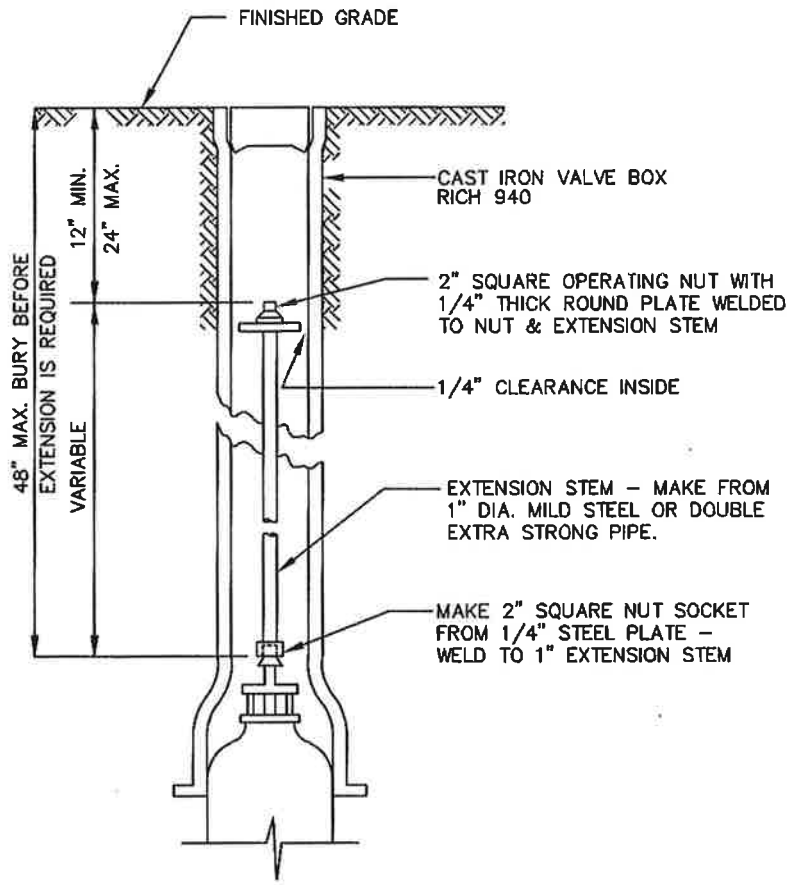
3" & LARGER DOUBLE CHECK VALVE ASSEMBLY

APPROVED:

CITY OF DUPONT — DATE: 9/21/11

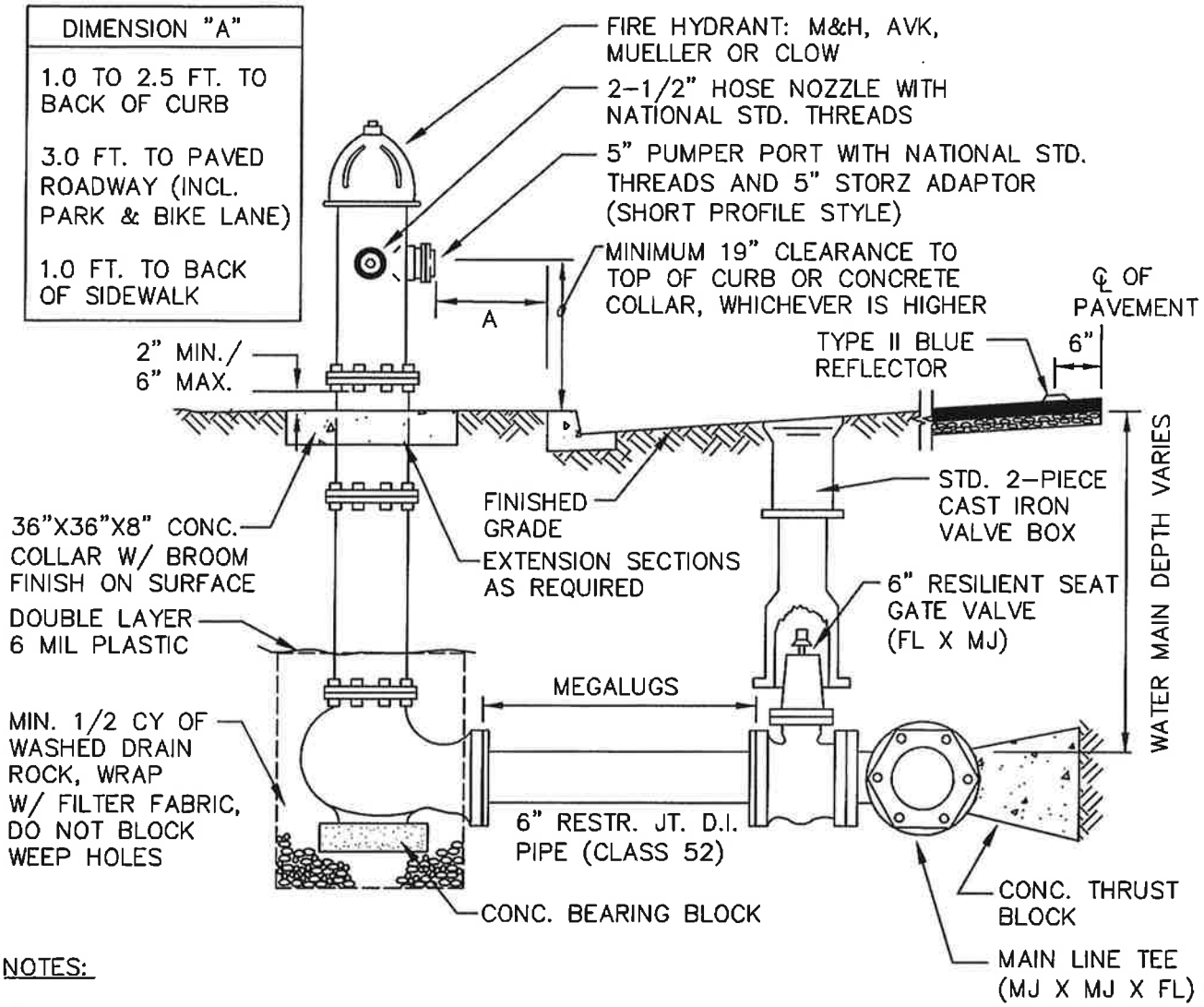
DWG. NO. 8.4-8

DATE:	DRWN:	CHKD:	SCALE:
9/11	P.E.	T.N.	NO SCALE



CITY OF DUPONT			
WATER VALVE STEM EXTENSION			
APPROVED: 9/21/11 CITY OF DUPONT DATE			DWG. NO. 8.5
DATE: 9/11	DRWN: L.L.	CHKD: T.N.	SCALE: NO SCALE

DIMENSION "A"
1.0 TO 2.5 FT. TO BACK OF CURB
3.0 FT. TO PAVED ROADWAY (INCL. PARK & BIKE LANE)
1.0 FT. TO BACK OF SIDEWALK



NOTES:

1) HYDRANT RUN PIPE SHALL BE MIN. 6" DIA.

2) MAXIMUM LENGTH OF 6" DIA. HYDRANT RUNS SHALL BE 50 FT. FOR HYDRANT RUNS GREATER THAN 6" DIA. OR LONGER THAN 50 FT., THE DEVELOPER'S ENGINEER SHALL SUBMIT FLOW CALCS. FOR REVIEW AND APPROVAL BY CITY.

3) ALL JOINTS ON HYDRANT RUN SHALL BE RESTRAINED PER CITY STDS.

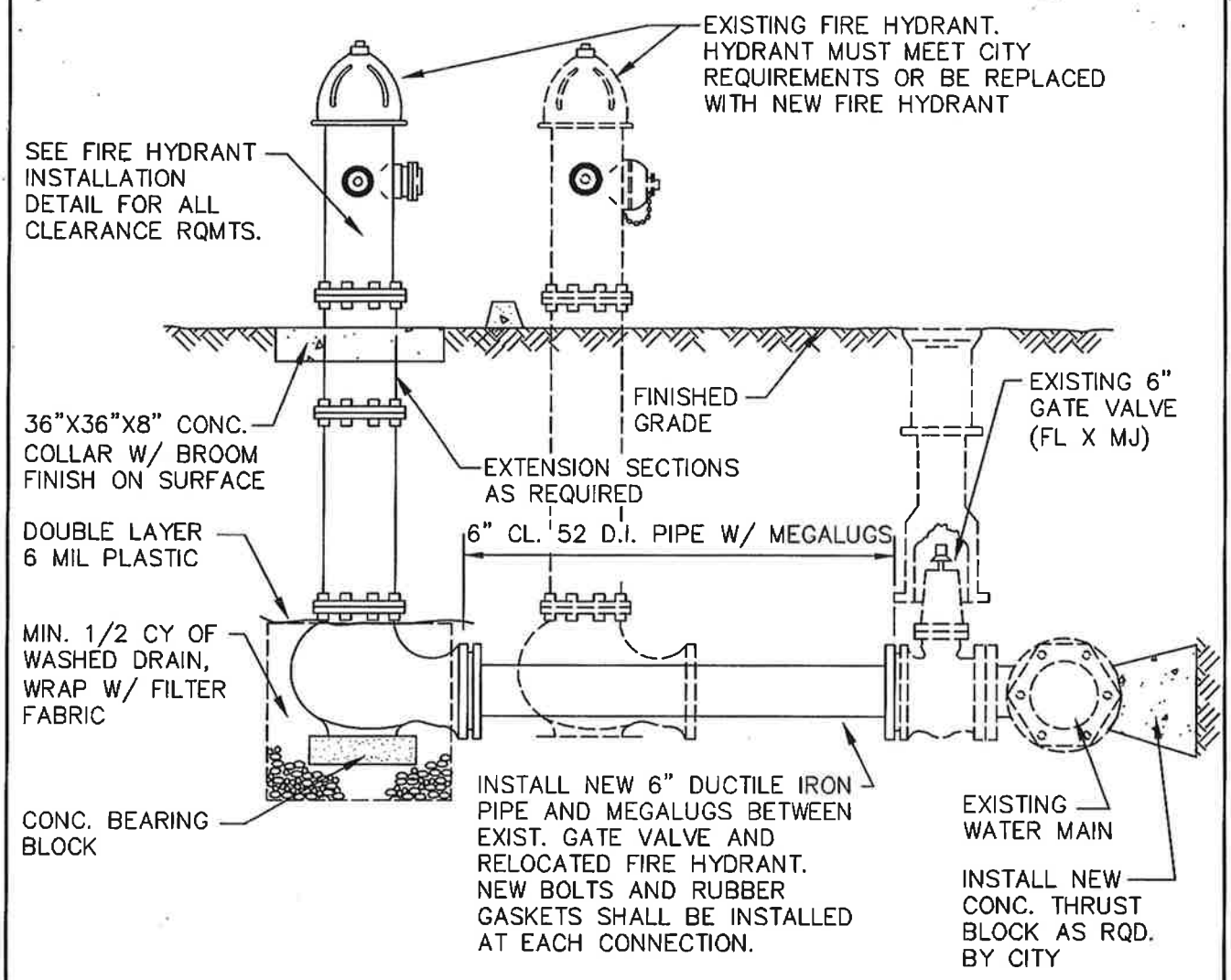
4) INSTALL GUARD POSTS AS RQD. BY CITY.

5) PROVIDE MIN. 3 FT. CLR. AND LEVEL AREA AROUND HYDRANT.

6) ORIENT PUMPER PORT AS APPROVED BY CITY.

7) FOR ADDITIONAL REQUIREMENTS, SEE SECTION 8.6 OF THE PUBLIC WORKS STANDARDS.

CITY OF DUPONT			
FIRE HYDRANT INSTALLATION			
APPROVED: CITY OF DUPONT 9/21/11 DATE			DWG. NO. 8.6-1
DATE: 9/11	DRWN: J.C.	CHKD: D.J.M.	SCALE: NO SCALE



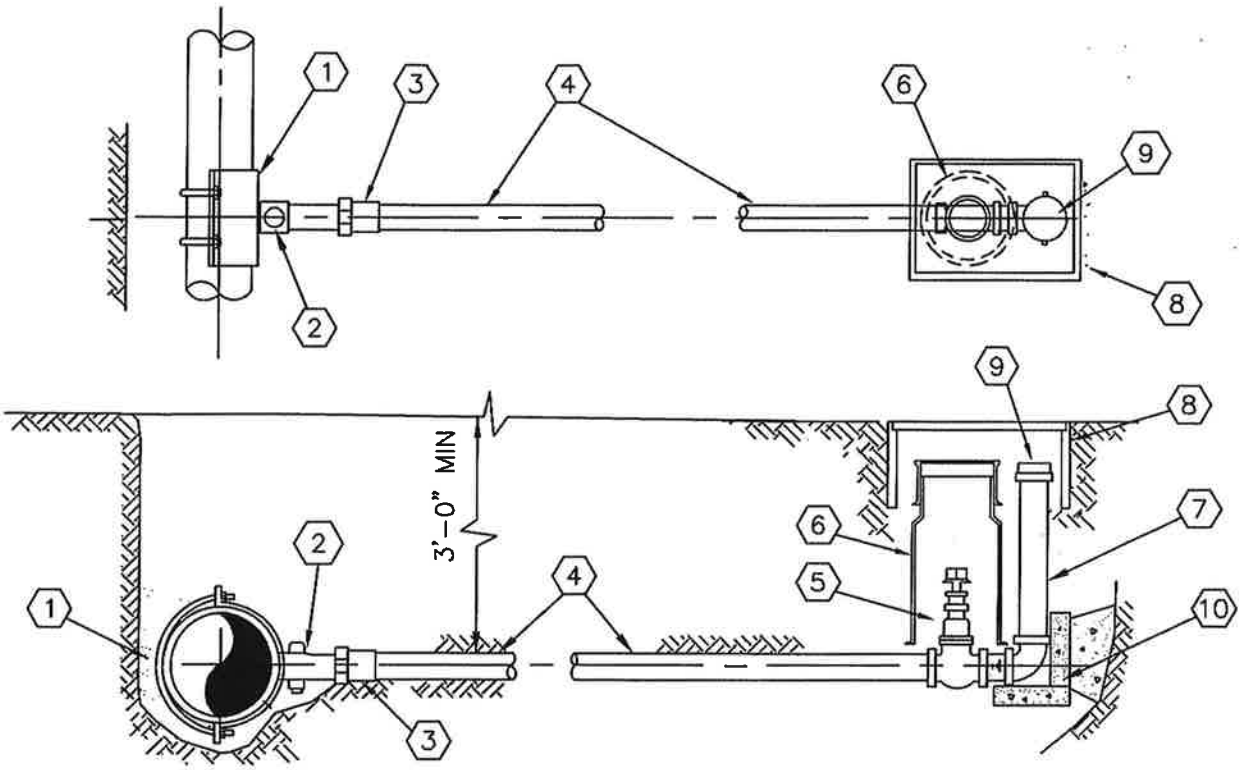
NOTES:

1) SEE FIRE HYDRANT INSTALLATION DETAIL NOTES FOR ADDITIONAL REQUIREMENTS.

2) THE PUMPER PORT OF ALL RELOCATED FIRE HYDRANTS SHALL BE EQUIPPED WITH A 5" STORZ ADAPTOR (SHORT PROFILE STYLE)

3) FOR ADDITIONAL REQUIREMENTS, SEE SECTION 8.6 OF THE PUBLIC WORKS STANDARDS.

CITY OF DUPONT			
FIRE HYDRANT RELOCATION			
APPROVED: CITY OF DUPONT 9/21/11 DATE			DWG. NO. 8.6-2
DATE: 9/11	DRWN: L.L.	CHKD: T.N.	SCALE: NO SCALE

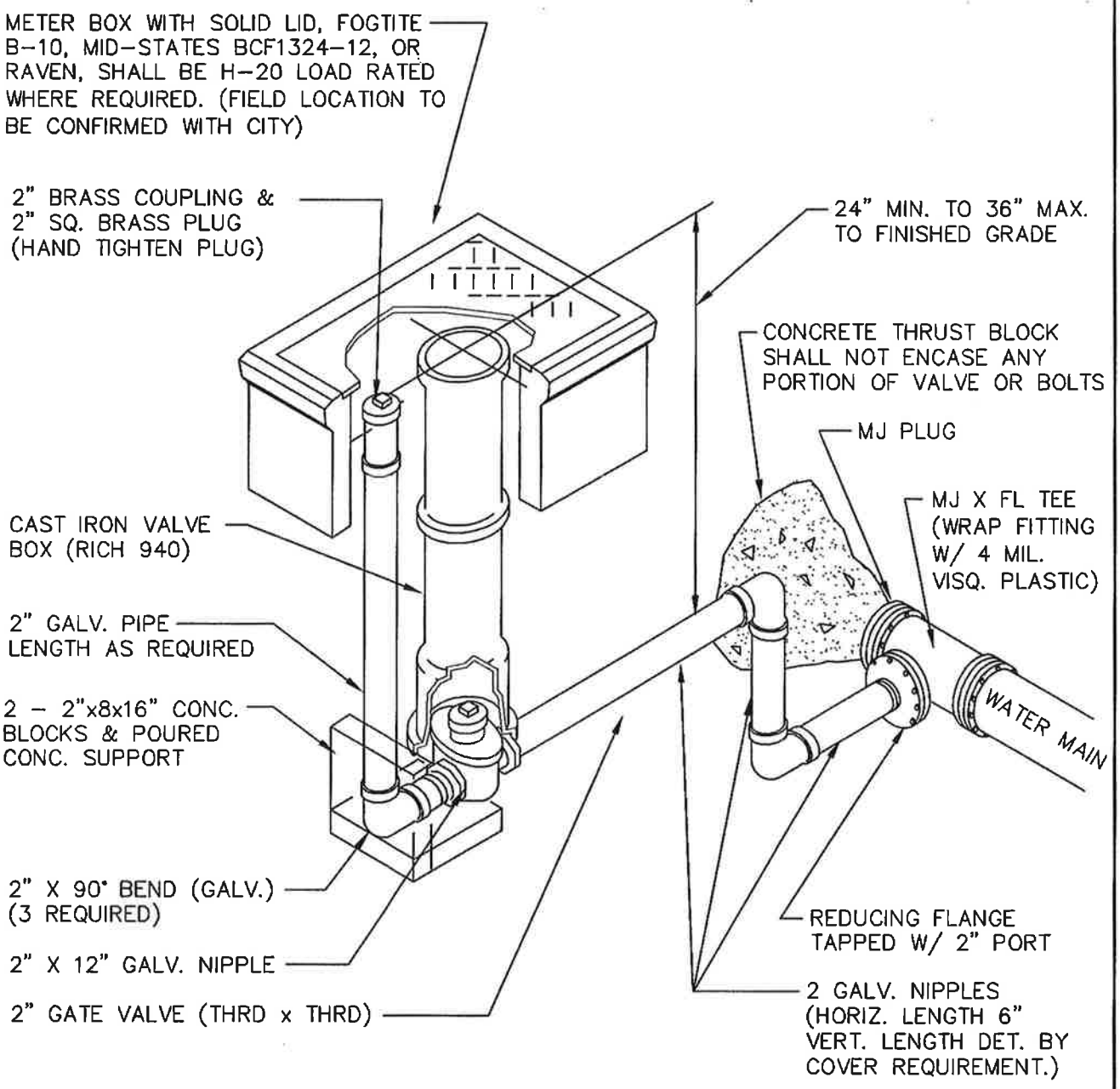


1. D.I. DOUBLE STRAP SERVICE SADDLE
2. 2" CORPORATION STOP
3. ADAPTOR
4. 2" 200 PSI IPS POLY PIPE
5. 2" GATE VALVE WITH SQUARE OPERATING NUT
6. CAST IRON VALVE BOX, RICH 940.
7. 2" GALVANIZED IRON PIPE & FITTINGS
8. METER BOX WITH SOLID LID, FOGTITE B-10, MID-STATES BCF1324-12, OR RAVEN SHALL BE H-20 LOAD RATED WHERE REQUIRED. (FIELD LOCATION TO BE CONFIRMED WITH CITY)
9. 2" BRASS COUPLING & 2" SQUARE BRASS PLUG (HAND TIGHTEN PLUG)
10. 2 - 2"x8"x16" CONC. SUPPORT BLOCKS & POURED CONC. SUPPORT

NOTES:

1) INSTALL DIELECTRIC COUPLINGS AT DISSIMILAR METALS.
2) FOR ADDITIONAL REQUIREMENTS, SEE SECTION 8.7 OF THE PUBLIC WORKS STANDARDS.

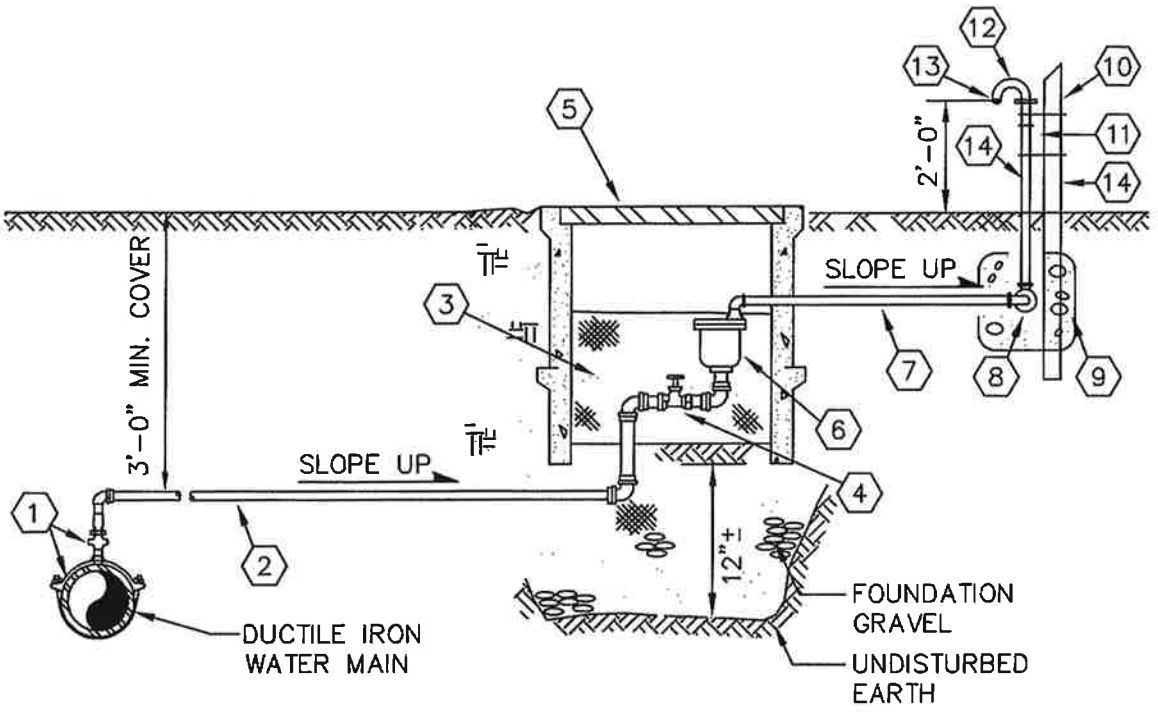
CITY OF DUPONT			
2" IN-LINE BLOWOFF ASSEMBLY			
APPROVED: CITY OF DUPONT 9/21/11 DATE			DWG. NO. 8.7-1
DATE: 9/11	DRWN: L.L.	CHKD: T.N.	SCALE: NO SCALE



NOTE:

1) INSTALL DIELECTRIC COUPLINGS AT DISSIMILAR METALS.
2) FOR ADDITIONAL REQUIREMENTS, SEE SECTION 8.7 OF THE PUBLIC WORKS STANDARDS.

CITY OF DUPONT			
2" END-LINE BLOWOFF ASSEMBLY			
APPROVED: CITY OF DUPONT 9/21/11 DATE			DWG. NO. 8.7-2
DATE: 9/11	DRWN: L.L.	CHKD: T.N.	SCALE: NO SCALE

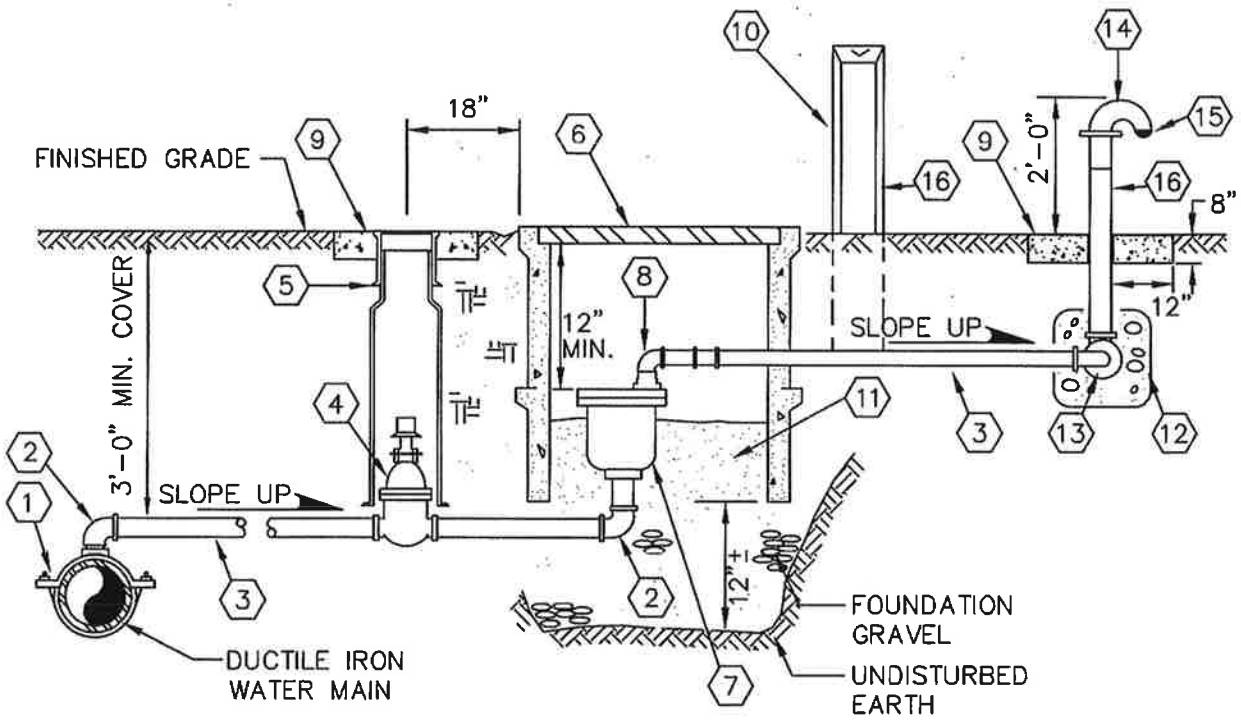


1. DOUBLE STRAP SERVICE CLAMP W/ 1" CORP. STOP
2. 1" WATER SERVICE PIPE (200 PSI IPS POLY PIPE). PIPE SHALL BE SLEEVED WITH 2" SCH. 80 PVC AT ROAD & SIDEWALK CROSSINGS.
3. PEA GRAVEL
4. 1" BALL VALVE (FORD)
5. CONCRETE METER BOX, 17"X28" FOGTITE NO. 2, W/ DIAMOND PLATE STEEL SOLID COVER
6. 1" AIR & VACUUM RELEASE VALVE, APCO OR CRISPIN MODELS ONLY
7. 1" GALVANIZED IRON PIPE
8. MIN. 1/4 CY OF WASHED ROCK, WRAP WITH FILTER FABRIC
9. 2, 1"X90° ELL. (GALV.) WITH WEEP HOLE IN ONE
10. 4"X4" CONC. MARKER POST W/ DISTANCE & DIRECTION TO VALVE STENCILED IN BLACK
11. ATTACH VENT TO POST W/ 2 EA. 316 STAINLESS STEEL BANDS
12. 1" OPEN PATTERN RETURN BEND
13. 1" BEEHIVE STRAINER
14. PAINT PORTION ABOVE GROUND WITH TWO COATS OF BLUE PAINT

NOTES:

1) TAP WATER MAIN AT HIGH POINT LOCATION, AS APPROVED BY CITY.
2) ASSEMBLY SHALL BE INSTALLED IN NON-TRAFFIC AREA.
3) FOR ADDITIONAL REQUIREMENTS, SEE SECTION 8.7 OF THE PUBLIC WORKS STANDARDS.

CITY OF DUPONT			
1" AIR & VACUUM RELEASE ASSEMBLY			
APPROVED: CITY OF DUPONT 9/21/11 DATE			DWG. NO. 8.7-3
DATE: 9/11	DRWN: L.L.	CHKD: T.N.	SCALE: NO SCALE

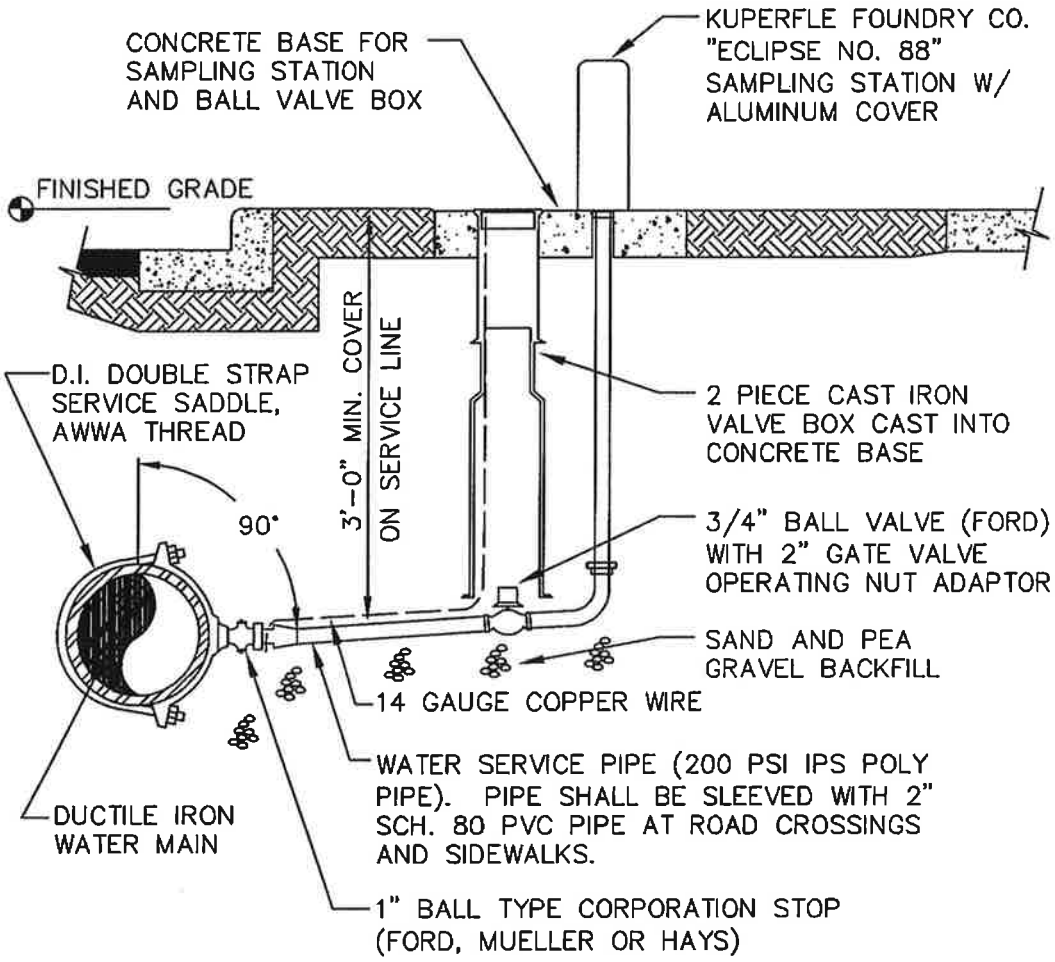


1. DOUBLE STRAP SERVICE CLAMP W/ 2" CORP. STOP
2. 2" SWING JOINT
3. 2" GALVANIZED IRON PIPE
4. 2" AWWA RESILIENT SEAT GATE VALVE W/ OPERATING NUT
5. CAST IRON VALVE BOX
6. CONCRETE METER BOX, 17"X28" FOGTITE NO. 2, W/ DIAMOND PLATE STEEL SOLID COVER
7. 2" AIR & VACUUM RELEASE VALVE, APCO OR CRISPIN MODELS ONLY
8. 2"X90° ELL
9. CONCRETE COLLAR
10. 4"X4" CONC. MARKER POST W/ DISTANCE & DIRECTION TO VALVE STENCILED IN BLACK
11. PEA GRAVEL
12. MIN. 1/4 CY OF WASHED ROCK, WRAP WITH FILTER FABRIC
13. 2, 2"X90° ELL. (GALV.) WITH WEEP HOLE IN ONE
14. 2" OPEN PATTERN RETURN BEND
15. 2" BEEHIVE STRAINER
16. PAINT PORTION ABOVE GROUND WITH TWO COATS OF BLUE PAINT

NOTES:

1) TAP WATER MAIN AT HIGH POINT LOCATION, AS APPROVED BY CITY.
2) ASSEMBLY SHALL BE INSTALLED IN NON-TRAFFIC AREA.
3) FOR ADDITIONAL REQUIREMENTS, SEE SECTION 8.7 OF THE PUBLIC WORKS STANDARDS.

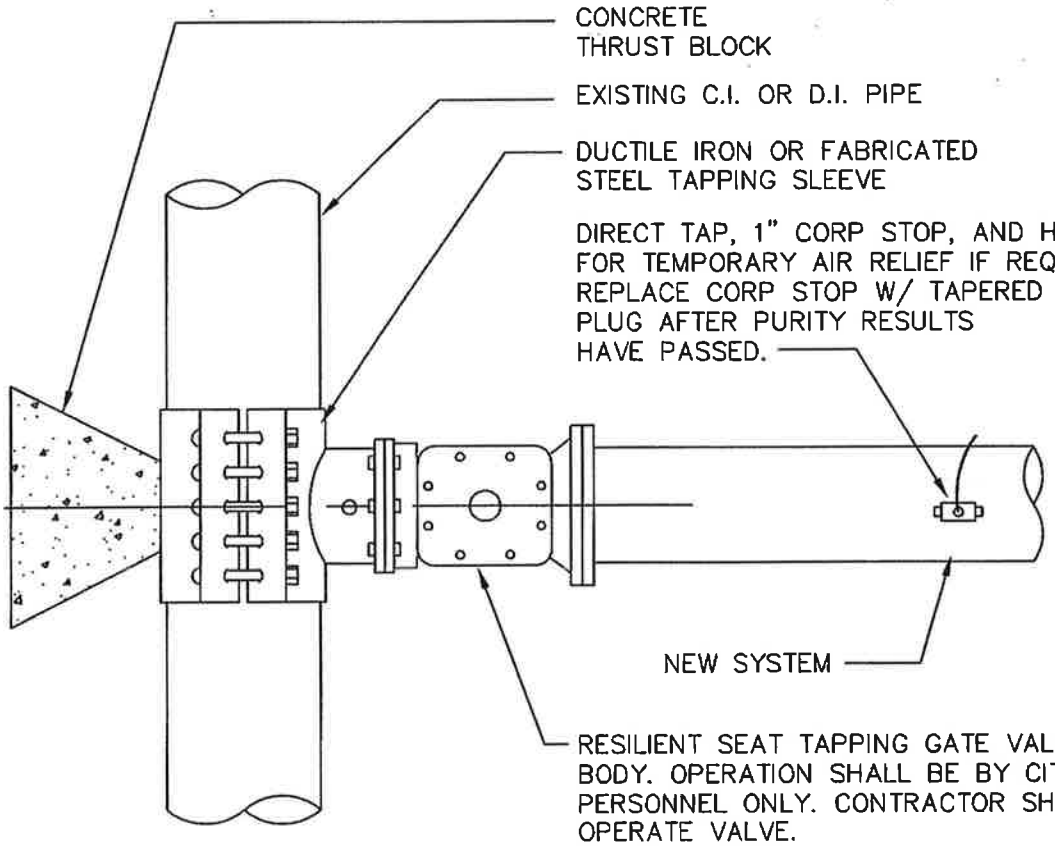
CITY OF DUPONT			
2" AIR & VACUUM RELEASE ASSEMBLY			
APPROVED: CITY OF DUPONT 9/21/11 DATE			DWG. NO. 8.7-4
DATE: 9/11	DRWN: L.L.	CHKD: T.N.	SCALE: NO SCALE



NOTES:

1) FOR ADDITIONAL REQUIREMENTS, SEE SECTION 8.8 OF THE PUBLIC WORKS STANDARDS.

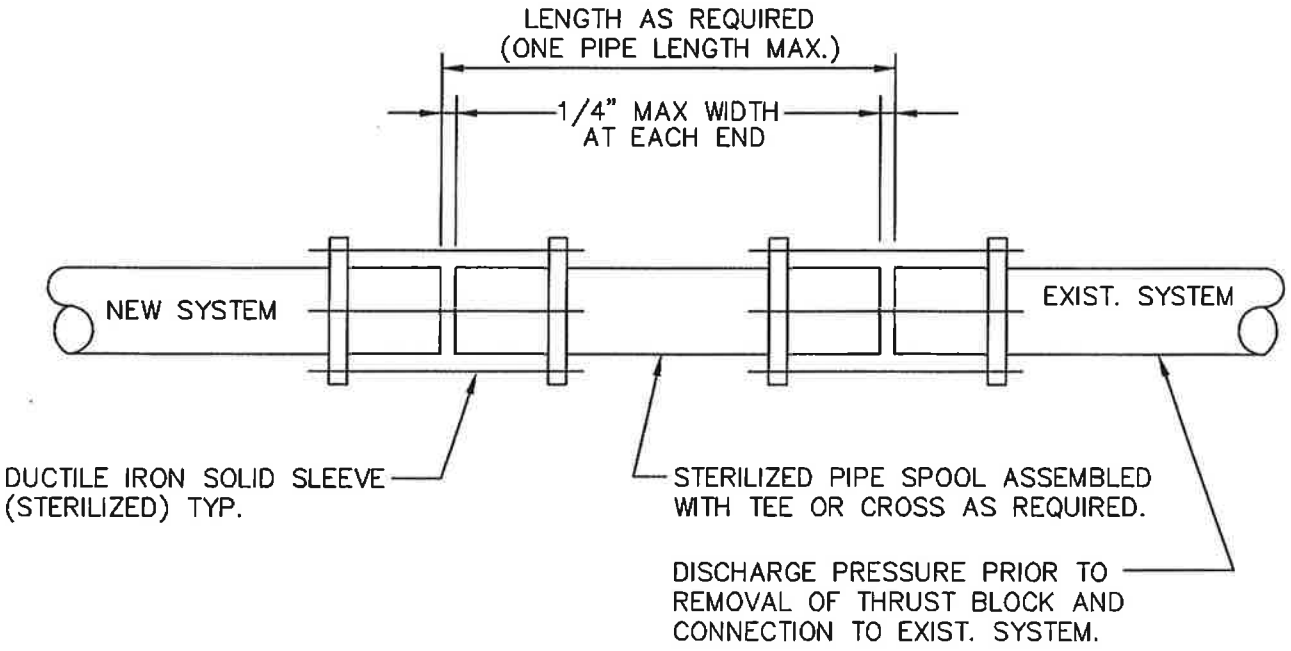
CITY OF DUPONT			
WATER SAMPLING STATION			
APPROVED: CITY OF DUPONT 9/21/11 DATE			DWG. NO. 8.8
DATE: 9/11	DRWN: L.L.	CHKD: T.N.	SCALE: NO SCALE



NOTES:

1) SIZE-ON-SIZE TAPPING TEES SHALL BE DUCTILE IRON MECHANICAL SLEEVE.
2) STEEL TAPPING TEES SHALL BE AT LEAST 2" SMALLER IN DIAMETER THAN THE EXISTING WATER MAIN AND SHALL BE EPOXY COATED.
3) TAPPING TEES SHALL BE PRESSURE TESTED TO 200 PSI
4) PLACE 2" PVC PIPE IN VALVE BOX TO INDICATE USE BY CITY STAFF ONLY
5) FOR ADDITIONAL REQUIREMENTS, SEE SECTION 8.10 OF THE PUBLIC WORKS STANDARDS.

CITY OF DUPONT			
WET TAP WATER MAIN CONNECTION			
APPROVED: Dan & John 9/21/11 CITY OF DUPONT DATE			DWG. NO. 8.10-1
DATE: 9/11	DRWN: L.L.	CHKD: D.J.M.	SCALE: NO SCALE



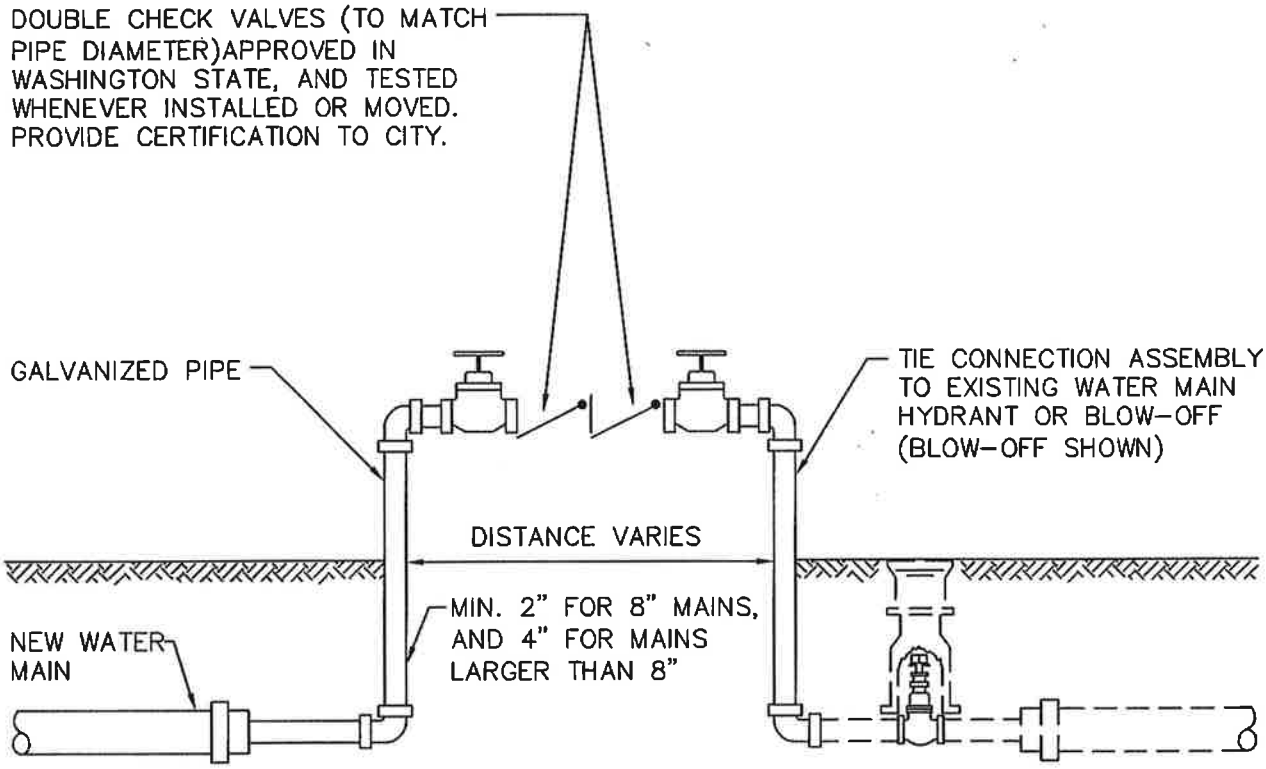
NOTES:

1) NO DEFLECTION SHALL BE ALLOWED AT EITHER COUPLING.

2) IN-LINE VALVE(S) IN EXISTING SYSTEM MAY BE REQUIRED AT THE SOLE DISCRETION OF THE CITY AT ALL NEW INTERTIE LOCATIONS. VALVE(S) ARE NOT SHOWN ABOVE FOR CLARITY.

3) FOR ADDITIONAL REQUIREMENTS, SEE SECTION 8.10 OF THE PUBLIC WORKS STANDARDS.

CITY OF DUPONT			
CUT IN WATER MAIN CONNECTION			
APPROVED: CITY OF DUPONT 9/21/11 DATE			DWG. NO. 8.10-2
DATE: 9/11	DRWN: L.L.	CHKD: D.J.M.	SCALE: NO SCALE



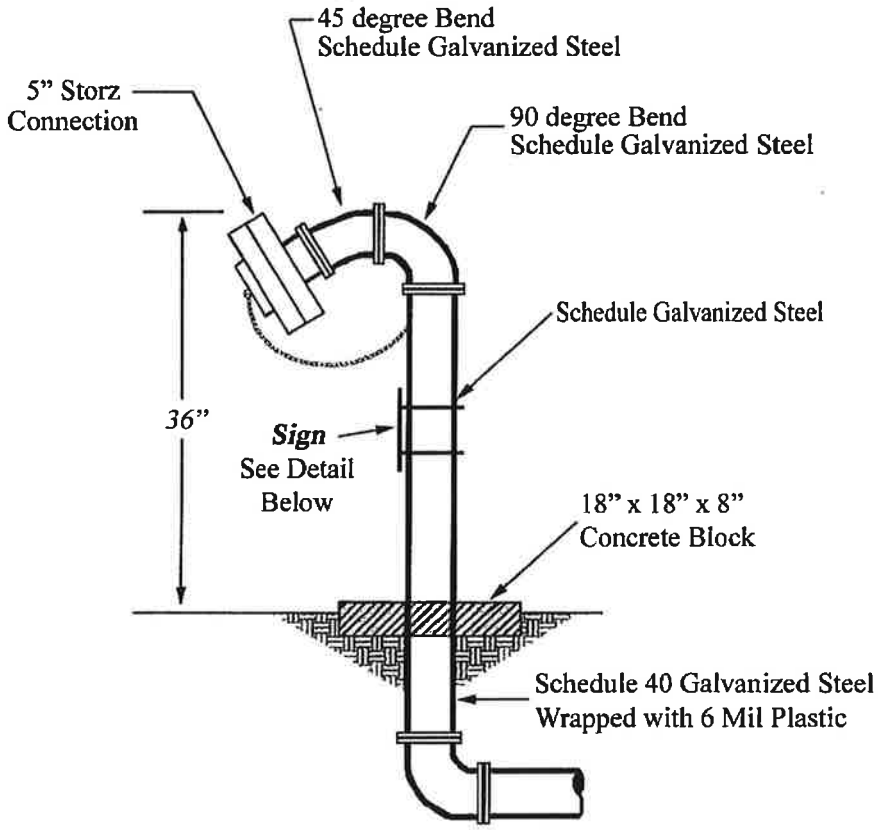
NOTES:

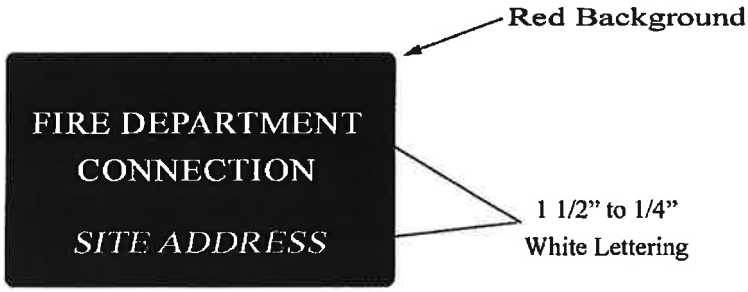
1) PROTECT INSTALLATION FROM DAMAGE AND FREEZING.

2) ALL WATER USED FOR FILLING AND FLUSHING SHALL BE METERED BY CITY. PROVIDE SPACE FOR INSTALLATION OF METER, OR INSTALL ON POINT OF DISCHARGE.

3) ALL NEW MAINS SHALL BE KEPT SEPARATE FROM THE CITY'S EXISTING SYSTEM UNTIL THE NEW MAINS ARE TESTED AND ACCEPTED. FINAL CONNECTION REQUIRES 100% INSPECTION BY THE CITY.

CITY OF DUPONT			
TESTING CONNECTION			
APPROVED: CITY OF DUPONT 9/21/11 DATE			DWG. NO. 8.11
DATE: 9/11	DRWN: L.L.	CHKD: T.N.	SCALE: NO SCALE





CITY OF DUPONT			
FIRE DEPARTMENT CONNECTION			
APPROVED: 9/21/11 CITY OF DUPONT DATE			DWG. NO. 11.3
DATE: 9/11	DRWN: J.C.	CHKD: D.J.M.	SCALE: NO SCALE

13. GUIDELINES AND FORMS

SITE WORK APPLICATION
CIVIL PLAN REVIEW

BUILDING SERVICES DIVISION
1700 Civic Drive · DuPont, WA 98327
P: (253) 912-5216 · F: (253) 964-1455
www.ci.dupont.wa.us

OFFICIAL USE ONLY
Date Received _____
Received By _____
Permit No._____

A cursory check of the plans against the plan checklist (see Street Standards/ Grading Plans Information) will be made by the City. If the plans meet the minimum checklist requirements as to content, they will be routed to the appropriate City staff and the plan review process will begin. If minimum checklist requirements are not met, plans will be returned to submitting Engineer/Applicant.

CIVIL PLAN REVIEW APPLICATION

Owner: _____
Address: _____
City & State: _____
Zip: _____ Phone: _____

Applicant: _____
Address: _____
City & State: _____
Zip: _____ Phone: _____
Contact Person: _____Phone: _____

Contractor:_____
Address:_____
Zip: _____ Phone:_____
State Contractor Number: _____
City License Number:_____

Engineer: _____
Address: _____
City & State: _____
Zip: _____ Phone: _____

GRADING INFO

(Grading activities involving **5000 cubic yards** or more requires engineering, or at the discretion of the City Building Official.)

Grading Quantities (cubic yards):
Cut: _____ Fill: _____ Total: _____

An Environmental Checklist is required for grading activities exceeding 100 cubic yards, unless otherwise exempt.

Separate Grading Permit on file with the City? ◯Y ◯N
Environmental checklist on file with the City? ◯Y ◯N
If yes above, has the SEPA determination been rendered?___

Land Use Approval To Proceed: _____ Comments:_____

I certify that I am the: ◯**Owner** ◯ **Contractor** ◯ **Agent**
I hereby certify that I have read & examined this application & state that the above information is correct. I agree to comply with all City Ordinances & State Laws, whether specified herein or not.
***By leaving the contractor information section blank, I hereby certify further that contractors (General or subcontractors) will not be hired to perform any work in association with this permit.**

_____ _____
Print Name **Signature** **Date**

SUMMARY OF REQUEST (List type of uses)

_____
No. of proposed dwelling units: _____
_____
total sq. ft. of site: _____
Total sq. ft. in buildings: _____
_____
Total sq. ft. in paved and covered surfaces (include buildings, driveways, streets, sidewalks, and parking lots) _____

PROPERTY LOCATION

North South East West side of:
(street name): _____
between (street name): _____
and (street name): _____
Property Address: _____
Section _____ Township _____ Range _____
Assessor's Parcel No. _____

FOR OFFICE USE ONLY

Fire Flow Required _____ gpm
Water connection estimate: _____
Pierce County Sewer Permit: _____
Easements required: _____
_____
Right-of-Way required: _____
_____
Bonding required: _____
_____
Misc. _____
_____

CITY OF DUPONT
PLAN CHECKLIST

Project: _____
Applicant: _____ Engineer: _____
Date Submitted: _____ Phone: _____

GENERAL

- Vicinity Map
- Legend (APWA Standard Symbols)
- North Arrow
- Scale Bar
- Datum-Bench Mark Elevation and Location (on all sheets where elevations are referenced)
- Title Block:
  - Title:
  - Design By:
  - Drawn By:
  - Date:
  - Checked By:
  - Signature Approval Block (see example below):
  - Sheet Number of Total Sheets:
- Section, Township, and Range (every plan/profile sheet)
- Engineers Stamp (signed and dated)
- Project Title (cover sheet)
- Utility System Map (showing all proposed utilities on one drawing)
- Revision Block
- Horizontal Scale: 1"=40' (or as other wise approved by the City)
- Approval Block (in upper right corner of each drawing)

APPROVED FOR CONSTRUCTION

BY: _____ DATE: _____
City Of DuPont

These drawings are approved for construction for a period of 12 months from the date shown hereon. The City reserves the right to make revisions, additions, deletions, or modifications should construction be delayed beyond this time limitation. The City, by approving these drawings, assumes no liability in regards to their accuracy or omissions.

DRAWING STANDARD ITEMS

- Centerline and Stations
- Edge of Pavement and Width
- Right-of-Way and Width
- Proposed Survey Monumentation Locations and Details
- Sidewalk and Width
- Roadway Sections
- Existing Utilities (above and below ground)
- Adjacent Property Lines, Ownership, Parcel Number, and Street Address
- Identify Street Names, Right-of-Way, Lots
- Identify/Match Existing Sheet Numbers and Stations
- Easements, Width, and Type
- Define Survey Baseline
- Stations for Structures
- Flow Direction Arrows

PROFILE PORTION STANDARD ITEMS

- Profile Grades (decimal FT./FT.)
- Existing Ground
- Scale (horizontal and vertical)
- Stationing
- Vertical Elevation Increments
- Existing Utilities (if available)

Miscellaneous:

- Detail Sheet
- General Notes

WATER

References: Section 8 of the City of DuPont Public Works Standards (Available at City Hall or thru the City of DuPont's website).

Plan View:

- System Map Showing Existing and Proposed with line size, valves, and hydrants
- Existing Utility Conflicts
- Fixtures (need horizontal and vertical control):
  - Fire Hydrants (at all intersections)
  - Blow-Off (at end of line)
  - Vacuum and Air Release Valves When Required
- Tees, Crosses, Elbows, Adapters, and Valves Need Coupling Type, Meter Locations
- Valves (2 each tee, 3 each cross)
- Thrust Blocking Required at all Fittings Including In-Line Valves
- Distance from Sewer
- Service to Each Lot (include open tracts)
- All valves larger than 12" shall be butterfly valves
- All valves 12" and smaller are resilient seated gate valves
- Water sample stations have been provided, as required
- Minimum service line size between water main and a single residential meter is 1-inch
- All dead end mains closed with MJ caps, plugs, thrust blocks, and/or blow-off assemblies
- Thrust blocks have been provided for all fittings and bends
- Pipes connecting hydrants to mains are at least 6 inches in diameter and not longer than 50 feet
- Mains are located 5' northerly or easterly of street centerline (or City approved location
- Irrigation system cross connection control

Profile View:

- Existing Utility Crossings
- Show Fixtures (tees, crosses, hydrants)
- Show Valves and Couplers
- Size of Water Main
- Length of Water Main in LF
- Cover Over Pipe (36" min for distribution and 42" cover for transmission)
- Grades

Miscellaneous

- Detail Sheet
- Water General Notes

STORM

References: Stormwater Management Ordinance, Ord. #95-514
Stormwater Maintenance Requirements, Ord. #95-515
State of Washington, Department of Ecology (DOE) Stormwater Management Manual for Western Washington (2005)
Standard Specifications for Road, Bridge, and Road Construction

- Stormwater Site Plan (Report), which includes applicable minimum requirements per DOE manual:
  - Cover Sheet
  - Table of Contents
  - Section 1 - Project Overview
  - Section 2 - Site Plan including:
    - Vicinity Map
    - Location of structures, other impervious surfaces
    - Locations of stormwater runoff control facilities
    - Lot Layout
    - Setback Requirements
    - Existing Site Features
    - Water Quality Sensitive Areas
    - Road Rights-of-Way and Easements
    - Acreage and outlines of all drainage basins (including Off-Site Contributing Areas)
    - Average Slope
    - Routes of existing, construction, and future flows at all discharge points
    - Overland Flow Paths and Distances
    - Soil Types
    - Spot Water Surface Elevations, Discharges and Velocities for the Design Event
    - Existing stormwater drainage to and from the site
    - The length of travel from the farthest upstream end of a proposed drainage system to any proposed flow control and treatment facility
  - Section 3 – Existing Conditions Summary
  - Section 4 – Off -Site Analysis
  - Section 5 – Permanent Stormwater Control Plan
    - Existing Site Hydrology
    - Developed Site Hydrology
    - Performance Standards and Goals
    - Flow Control System
    - Water Quality System
    - Conveyance System Analysis and Design
  - Section 6 – Construction Stormwater Pollution Prevention Plan (SWPPP)
    - Section I – Construction SWPPP Narrative
      - Construction Stormwater Pollution Prevention Elements
        - Mark Clearing Limits
        - Establish Construction Access

        - Control Flow Rates
        - Install Sediment Controls
        - Stabilize Soils
        - Protect Slopes
        - Protect Drain Inlets
        - Stabilize Channels and Outlets
        - Control Pollutants
        - Control De-Watering
        - Maintain BMP's
        - Manage the Project
      - Project Description
      - Existing Site Conditions
      - Adjacent Areas
      - Critical Areas
      - Soils
      - Erosion Problem Areas
      - Construction Phasing
      - Construction Schedule
      - Financial/Ownership Responsibilities
      - Engineering Calculations
    - Section II – Erosion and Sediment Control Plans
      - General
      - Site Plan
      - Conveyance Systems
      - Location of Detention BMPs
      - Erosion and Sediment Control Facilities
      - Detailed Drawings
      - Other Pollutant BMPs
      - Monitoring Locations
  - Section 7 – Special Reports and Studies
  - Section 8 – Other Permits
  - Section 9 – Maintenance and Operations Manual and Agreement:
    - Required Type and Frequency of Long-Term Maintenance Organization
    - Frequency of Sediment Removal
    - Cleaning of Catch Basins
    - Vegetation Control
    - City of DuPont Agreement for Inspection and Maintenance of Privately Maintained Storm Drainage Facilities, Form No. 6
  - Section 10 – Bond Quantities Worksheet, Retention/Detention Facility Summary Sheet and Sketch, and Declaration of Covenants
  - Project Engineers Certification

- Drawings and Specifications:
  - Vicinity Map
  - Project Boundaries
  - Contours
  - Major Drainage Features
  - Flow Path

- Site Map:
  - Existing Topography at Least 50 Feet Beyond Site Boundaries
  - Finished Grades
  - Existing Structures within 1,000 Feet of Project Boundary
  - Utilities
  - Easements, Both Existing and Proposed
  - Environmentally Sensitive Areas
  - 100-Year Flood Plain Boundary
  - Existing and Proposed Wells within 1,200 feet of Proposed Retention Facility
  - Existing and Proposed Fuel Tanks
  - Existing and Proposed On-Site Sanitary Systems within 100 Feet of Detention/Retention Facilities
  - Proposed Structures Including Roads and Parking Surfaces
  - Lot Dimensions and Areas
  - Proposed Drainage Facilities and Sufficient Cross-Sections and Details to Build

- Plan View - Conveyance System:
  - Station and Number at each Manhole/Catch Basin
  - Manhole/Catch Basin Type and Size
  - Manhole/Catch Basin Rim Elevation
  - Flow Direction with Arrow on Pipe/Channel
  - Type and Size of Pipe
  - Length of Pipe in Lineal Feet

- Profile View - Conveyance System:
  - Station and Number at each Manhole/Catch Basin
  - Rim Elevation
  - Invert In and Out
  - Length of Pipe in Lineal Feet
  - Grades (FT/FT)

<u>Miscellaneous</u>

- Detail Sheet
- Storm General Notes

STREET

Plan View:

- Flow Direction Arrows at Curb Returns Showing Grade
- Spot Elevations on Curb Returns
- Station PC, PT, PI, and Intersections
- Curve Information Delta, Radius, Length, and Tangent
- BCR and ECR (Begin Curb Radius, End Curb Radius)
- Identify All Field Design Situations
- Typical Sections
- Pavement Marking Details with Station and Offset
- Sidewalks:
    - Driveway Entrances:
        - Station
        - Width, Material
        - Driveway Type
    - Handicap Ramps-Detail and Type

Profile View:

- Vertical Information VPI, BVC, EVC, Low Point, High Point
- Show Grades in Decimal Form with (+ Or -) Slope
- Super Elevated Roadways:
    - Detail-Show Transitions
    - Special Detail Showing Gutter Flowing Adequately

Miscellaneous:

- Detail Sheet
- Street General Notes

ILLUMINATION

- Lighting
    - Station and Offset to Fixtures
    - Pole Type, Including Manufacturer and Model Number
    - Mounting Height, Arm Length, Anchor Bolt Size, and Pattern
    - Power Source:
        - Wire Size, Type, Conduit
        - Line Loss Calculations
    - Luminaire Type, Lamp Wattage
    - Location of Service Disconnects
    - J-Box Location (include station and offset)

Miscellaneous:

- Detail Sheet
- Lighting General Notes

MISCELLANEOUS

- Easements and/or Dedication Deeds

SANITARY SEWER

- Pierce County Utilities owns, maintains, and operates the sanitary sewer system within the City of DuPont. Pierce County must approve the sewer plans prior to grading or civil construction permit issuance. Letter from Pierce County approving sewer plans must be submitted for plan approval.

CITY OF DUPONT
PERFORMANCE BOND

Developer: _____

Project Name/Permit No.: _____

Surety: _____

Amount: _____

KNOW ALL MEN BY THESE PRESENTS: Whereas the City has approved construction plans dated _____ day of _____, 20_____ for the construction of _____ **[project name and improvement description]**, in accordance with the City's regulations.

NOW, THEREFORE, we, the Developer and surety, are held and firmly bound to the State of Washington and to the City in the amount named above for the payment of which we do jointly and severally bind ourselves, our heirs, personal representatives, successors, and assigns by these presents.

THE CONDITIONS OF THIS OBLIGATION are such that if the Developer, or the Developer's heirs, personal representatives, successors, and assigns shall well and truly keep all the provisions of the regulations of the City applicable to the work described in the City's regulations, and pay all laborers, mechanics, subcontractors, and materialman, and all persons who shall supply such person or subcontractors with provisions and supplies for carrying on such work and shall indemnify and save harmless the City, its officers and agents, from any pecuniary loss resulting from the breach of said regulations, including the obligation of the Developer to replace or correct any defective work or materials discovered by the City within two years from the date of acceptance of the completed work, then this obligation shall become void; otherwise, it shall remain in full force and effect.

No change, extension of time, alteration or addition to the work to be performed by the Developer shall affect the obligation of the principal or surety on this bond, and the surety waives notice of any such change, extension, alteration, or addition thereunder.

This bond is furnished pursuant to the requirements of Chapter 39.08 of the Revised Code of Washington, and the regulations of the City, and in addition to the foregoing, is made for the benefit of the City, together with all laborers, mechanics, subcontractors, materialmen, and all persons who supply such person or subcontractors with supplies and equipment for the carrying on of the work covered by this agreement, whether or not such work is deemed to be "public work" under the laws of the State of Washington.

In witness whereof, the principal and surety have caused this bond to be signed and sealed by their duly authorized officers or representatives this ____ day of _____, 20_____.

_____	_____
Principal	Surety
_____	_____
Address	Address
_____	_____
City, State & Zip	City, State & Zip
Phone No. _____	Phone No. _____
_____	_____
Signature of Principal	Signature of Surety Official
_____	_____
Print Name and Title	Print Name and Title

Accepted by the City of DuPont this _____ day of _____, 20_____.

_____
Mayor, City of DuPont

CITY OF DUPONT
ASSIGNMENT OF FUNDS IN LIEU OF PERFORMANCE BOND

Project Name/Permit No.: _____
Developer: _____

In lieu of a performance bond at the direction of _____ for the proposed construction of _____ we are holding funds in the amount of _____ ($_____) in Account Number _____ for the sole purpose of completing the referenced construction to standards acceptable to the City of DuPont, Washington by _____.

We have been instructed by _____ that these funds are to be used for the sole purpose described above. In the event said principal fails to complete said construction to standards acceptable to the City of DuPont, said funds in Account Number _____ will be made available to said City of DuPont for the sole and specific purpose of completing the above described construction. Failure of the above noted financial institution to hold the minimum required amount until released by City of DuPont will bind the financial institution for the amount owed, and for legal fees and costs necessary to enforce collection of the assignment.

Signed and dated at _____, Washington, this _____ day of _____, 20_____.

This authorization to remain in full force and effect until a written release is received from the City of DuPont, which shall be at the time the specified construction is completed to standards acceptable to the City.

ACKNOWLEDGED:

_____
Print or Type Name of Principal

_____
Signature of Principal

_____
Address

_____
City State Zip

_____
Telephone Number

DATE: _____

_____
Financial Institution

_____
Bank Officer's Signature

_____
Address

_____
City State Zip

_____
Telephone Number

STATE OF WASHINGTON:)
) ss.
COUNTY OF PIERCE:)

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

Dated: _____
(seal or stamp)

_____
Notary Public (Title) in and for the State of Washington,
Residing at _____

_____
Print Name
My appointment expires: _____

CITY OF DUPONT
MAINTENANCE BOND

Developer: _____

Surety: _____

Development: _____

Amount: _____

Bond No.: _____

We, _____, as principal, and _____, a corporation organized under the laws of the State of _____, and duly authorized to transact business in the State of Washington, as surety, are held and firmly bound unto the City of DuPont, Pierce County, Washington, in the amount of $_____, for the payment of which sum we bind ourselves, and each of our executors, administrators, successors, and assigns, jointly and severally.

Now, therefore, the conditions of these obligations are such that if the principal shall replace or correct any part of parts of principal's _____ _____ **[describe project/improvements]** built by principal or principal's Contractor as required by Plans approved by the City on _____ day of _____, 20_____ discovered by the City of DuPont to be defective in material or inefficient or otherwise unsatisfactory in operations, through faulty construction, materials or workmanship, or through any fault of design or detail arising with Contractor or manufacturer within two years of the acceptance of the completed work and transfer of title, then the obligation of Principal and Surety under this Bond shall be void, but otherwise it shall remain in full force and effect.

Such parts shall be replaced with parts constructed in accordance with designs and of material satisfactory to the City.

Upon the failure of the principal to perform the terms of this Bond, the Surety shall either perform the terms of the Bond itself or shall, upon demand by the Mayor of the City, release up to the full bonded amount to the City. We further agree that up to the full bonded amount shall be released to City of DuPont upon written demand by the Mayor of the City. The amount demanded by the City will be a good faith estimate of the actual cost of repairs.

We further agree that if it is necessary for the City to take any legal action against any signatory to this agreement to assure compliance with its terms, the City shall be entitled to its reasonable costs and attorney's fees.

We further agree that nothing of any kind or nature that will not discharge the principal shall operate as a discharge or release of the Surety, regardless of law, rule of equity or usage relating to the liability of sureties to the contrary notwithstanding.

It shall be the responsibility of both the principal and the surety to inform the City of DuPont, in writing, of any change of mailing address. The City will mail only to the last known address of principal and surety.

In witness whereof, the principal and surety have caused this bond to be signed and sealed by their duly authorized officers or representatives this ____ day of _____, 20_____.

_____	_____
Principal	Surety
_____	_____
Address	Address
_____	_____
City, State & Zip	City, State & Zip
Phone No. _____	Phone No. _____
_____	_____
Signature of Principal	Signature of Surety Official
_____	_____
Print Name and Title	Print Name and Title

Accepted by the City of DuPont this _____ day of _____, 20_____.

_____
Mayor, City of DuPont

CITY OF DUPONT
ASSIGNMENT OF FUNDS IN LIEU OF MAINTENANCE BOND

Project Name/Permit No.: _____
Developer: _____

In lieu of a maintenance bond, we hereby agree that the sum of $_____ will be held in savings account number _____ in _____ in the name of _____ to assure maintenance requirements hereunder.

Now, therefore, the conditions of these obligations are such, that the principal shall replace or correct any part or parts of all improvements, installed under Plans approved by the City of DuPont _____ day of _____, 20_____ discovered by the City of DuPont to be defective in material or inefficient or otherwise unsatisfactory in operations, through faulty construction, materials or workmanship, or through any fault of design or detail arising with Contractor or manufacturer within two years of the acceptance of the completed work **(date)** and transfer of title. Such parts shall be replaced with parts constructed in accordance with designs and of material satisfactory to the City.

We further agree that up to the full amount of the funds in the above referenced account shall be released to the City of DuPont upon written demand by the Mayor of the City. The amount demanded by the Mayor will be a good faith estimate of the actual cost of the repairs.

We further agree that if it is necessary for the City of DuPont take any legal action against any signatory to this agreement to assure compliance with its terms, the City shall be entitled to its reasonable costs and attorney's fees.

It shall be the responsibility of both the principal and the financial institution to inform the City of DuPont, in writing, of any change of mailing address. The City will mail only to the last known address of principal and financial institution.

Signed this _____ day of _____, 20__.

_____	_____
Print or Type Name of Principal	Name of Financial Institution
_____	_____
Signature of Principal	Signature of Bank Official
_____	_____
Address	Address
_____	_____
City, State, Zip	City, State, Zip
_____	_____
Telephone Number	Telephone Number

STATE OF WASHINGTON:)
) ss.
COUNTY OF PIERCE:)

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

Dated: _____
(seal or stamp)

_____
Notary Public (Title) in and for the State of Washington,
Residing at _____
_____
Print Name
My appointment expires: _____

EASEMENT FOR UTILITIES

THIS EASEMENT is made on the _____ day of _____, 20_____ ("Effective Date") by _____, a Washington corporation ("Grantor").

1. Grant and Location of Easement. Grantor hereby grants and conveys to the City of DuPont, a municipal corporation ("Grantee"), its successors and assigns, a non-exclusive utility easement ("Easement") with immediate right of entry and continued access over, under, and across the real property legally described on Exhibit "A" and depicted on Exhibit "B"(easement area), attached hereto and incorporated herein.

2. Purpose of Easement. The purpose of this Easement is for the construction, improvement, maintenance, and repair of underground utilities, including but not limited to underground water, storm drainage, and other appurtenant structures.

3. Maintenance of Easement. Grantee shall maintain and repair the utility pipes, water mains, and its appurtenant structures so as not to damage the property burdened by this Easement, or any other property.

4. Interference. Grantor may use the surface above the Easement, PROVIDED that its use does not interfere with or cause damage to the utility pipes, water mains, and appurtenant structures, PROVIDED FURTHER that prior to constructing any building or planting any trees within the Easement Grantor shall obtain the written consent of Grantee, which consent shall not be unreasonably withheld. Grantor may construct a fence or other obstruction on Grantor's property, PROVIDED however that Grantor does not prohibit or impede Grantee's access to the Easement. Grantor may grant other non-exclusive easement rights in and to the Easement; PROVIDED, however, that no other utility pipe, line, or structure shall be located closer than five (5) feet parallel to the Grantee's utility pipe, water main, and/or appurtenances; and, PROVIDED FURTHER, that prior to installation of any utility pipe, line, or structure that crosses the Easement, Grantor shall obtain the written consent of Grantee, which consent shall not be unreasonably withheld. If, in exercising any right to use the surface above the Easement or grant other easements, the Easement is disturbed, Grantor shall return the Easement to its condition prior to its disruption, at Grantor's sole cost and expense.

5. Title. The Grantor warrants that the Grantor has good title to the above property.

6. Successor and Assigns. This agreement shall run with the property and be binding on the parties, their successors, and assigns.

_____
A Washington corporation

By: _____
Its: _____

STATE OF WASHINGTON)
: ss.
County of Pierce)

On this day personally appeared before me _____ to me known to be the person who executed the within instrument as the _____ of _____, the corporation that executed the within and foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that he/she is authorized to execute the said instrument and that the seal affixed in the corporate seal of said corporation.

GIVEN under my hand and official seal this _____ day of _____, 20_____.

_____
_____
(Type/Print Name)
Notary Public in and for the State of Washington, residing at _____. My appointment expires: _____.

Accepted by the City of DuPont this _____ day of _____, 20_____.

_____
Mayor, City of DuPont

CITY OF DUPONT
AGREEMENT FOR INSPECTION AND MAINTENANCE OF PRIVATELY MAINTAINED STORM DRAINAGE FACILITIES

Declaration of Covenant

In consideration of approval of the development known as

_____,

relating to real property legally described as follows:

The undersigned, as owner(s), covenant and agree that:

1. The owner and subsequent owners of the above described property shall maintain the approved storm drainage system shown on Exhibit A in compliance with the Operation and Maintenance Schedule, Exhibit B.

2. The owner shall, in accordance with the Operation and Maintenance Schedule, record and log maintenance performed. The Operation and Maintenance records shall be retained by the Owner for a minimum of three years and shall be available to the City for inspection at all reasonable times.

3. The owner shall provide access to the storm drainage system at reasonable times for regular inspection by the City or its authorized representative to ensure that the facility is maintained in proper working condition in accordance with the Operation and Maintenance Schedule.

4. If at any time, in accordance with the Operations and Maintenance Schedule, the City of DuPont reasonably determines that maintenance or repair work is required to be done to the existing, approved storm drainage facilities installed on the property described above the City shall give the current owner seven days notice that the City intends to perform such maintenance or repairs, or to have them performed by others.

5. If the owner has not completed or is not diligently pursuing the repair or maintenance of the system and it becomes necessary for the City of DuPont to perform the work, the current owners will assume responsibility for the cost of such maintenance or repair and will reimburse the City within thirty days of the receipt of the invoice. Overdue payments will require payment of interest at the current legal rate for liquidated judgments, and any costs or fees incurred by the City, should any legal action be required to collect such payments, will be borne by the parties responsible for said reimbursements.

6. If at any time the City of DuPont reasonably determines that the existing and approved storm drainage system on the property poses a hazard to life and limb, or endangers property, or adversely affects the safety and operations of a public way, due to failure, damage or non-maintenance of the existing on-site storm system, and that the situation is so adverse as to preclude written notice to said owners, the City may take the measures necessary to eliminate the hazardous situation (which will mean repair or clean out of the existing system only to the same standards as originally installed and approved) provided the City has first made a reasonable effort to locate said owner before acting.

   The current owners will assume responsibility for the cost of such maintenance or repair; and will reimburse the City within thirty days of receipt of the invoice. Overdue payments will require payment of interest at the current legal rate for liquidated judgments, and any costs or fees incurred by the City, should any be borne by the parties responsible for said reimbursements.

7. The owner shall keep the City of DuPont informed at all times as to the name, address and telephone number of the contact person responsible for the performance of maintenance or repair work to the storm drainage facilities.

   These covenants are intended to protect the value and desirability of the real property described above, and to benefit all the citizens of the City of DuPont. They shall run with the land and be binding on all parties having or acquiring from the current owners or their successors, any right, title or interest therein, and to the benefit of all the citizens of the City of DuPont.

8. Lien: The City shall have a lien for costs expended by it for any repairs or maintenance properly chargeable to the owner hereunder, which lien shall be prior in right to the lien of secured parties under deeds of trust, mortgages or real estate contracts, regardless of the date of their recordation, and which shall be recordable and enforceable in the manner provided for materialmens' contractors' liens pursuant to RCW Ch. 60.04 or any successor statute thereto.

9. Attorneys' fees and costs: Should any party institute proceedings to enforce any right hereunder, including filing a lien under paragraph 8, reasonable costs and attorneys' fees thereby incurred shall be awarded to the prevailing party in such proceeding.

_____
Signature

_____
Owner

_____
Address

_____
City, State, Zip

_____
Phone

STATE OF WASHINGTON

ss. (INDIVIDUAL ACKNOWLEDGMENT)

City of DuPont

I, _____, Notary Public in and for the State of Washington, residing at _____, do hereby certify that on this _____ day of _____, 20___, personally appeared before me _____ to be known to be the individual described in and who executed the within instrument and acknowledged that _____ signed and sealed the same as _____ free and voluntary act and deed for the uses and purposes herein mentioned.

GIVEN UNDER MY HAND AND OFFICIAL SEAL
this ____ day of _____, 20 ___.

_____
Notary Public in and for the State of Washington, residing at
_____ in
said County. My commission expires
_____.

Accepted by the City of DuPont this _____ day of _____, 20_____.

_____
Mayor, City of DuPont

CITY OF DUPONT
WATER SYSTEM BILL OF SALE

KNOW ALL BY THESE PRESENTS that for and in consideration of the sum of One Dollar ($1.00) and other good and sufficient consideration, receipt whereof is hereby acknowledged, the undersigned grantor(s)_____
do(es) by these presents hereby convey, set over, assign, transfer and sell to the City of DuPont, Pierce County, Washington, a municipal corporation, the water distribution lines and all appurtenances thereto, located within _____
[project name and location] as situated in the City of DuPont, Pierce County, Washington. The location of the water distribution mains and appurtenances thereto are depicted on Exhibit "A" and are more particularly described on Exhibit "B" attached hereto.

the said grantor(s) hereby warrants that he, they, it, is/are the sole owner(s) of all the property above described; that they have full power to convey all rights herein conveyed and agree to hold the City of DuPont harmless from any and all claims which might result from execution of this document.

IN WITNESS WHEREOF the grantor(s) has/have executed these presents this _____ day of _____, 20__.

By_____ Date_____
Grantor

STATE OF WASHINGTON)
) ss.
PIERCE COUNTY)

On this _____ day of _____, 20__, before me the undersigned Notary Public personally appeared _____, to me known to be the individual(s) who executed the within and foregoing instrument and acknowledged that___ he___ signed and sealed the same as _____ free and voluntary act and deed, for the uses and purposes therein mentioned.

GIVEN under my hand and official seal the day and year in this certificate above written.

_____
Notary Public in and for the State of Washington

Residing at_____
_____

City of DuPont
1700 Civic Drive
DuPont, Washington 98327

WATER AVAILABILITY FORM

Part A
To Be Completed By Applicant

Project Address: _____ Application Number: _____

Subdivision/Project Name: _____ Parcel: _____

Proposed Water Usage: _____ (Commercial) Residential # of Units: _____

Customer Type (circle one) Rural Residential Residential Multi-family Commercial Industrial

I, the undersigned, or my appointed representative have requested the following purveyor to certify willingness and ability to provide the indicated service. I have read and understand the information provided by the water purveyor on this Certificate, and acknowledge that the proposed project may require improvements to the water system which would incur my financial obligation. Prior to final approval for water service, operational responsibility, and financial obligation may be required.

Print Name _____ Signature _____

Address _____ City _____ State _____ Zip _____

Part B
To be completed by Water Purveyor

Water system to provide service: **CITY OF DUPONT** State ID# **20500P**

The proposed development is / is not within our approved service area (circle one).

This water utility will / will not be providing service (circle one).

Approved number of connections: **Unspecified**

Number of current/existing users: **2,300** Existing Storage: **4,000,000 gallons**

Water service will be provided by:

_____ Direct connection to approved, existing water main

_____ Extension of existing water main(s)

_____ New water system in accordance with WAC 246-290

_____ _____
Water Purveyor Signature Date

Revised: 1/1/2009

Form No. 8

APPENDIX M

SEPA ENVIRONMENTAL CHECKLIST

CITY OF DUPONT

Department of Community Development
1700 Civic Drive, DuPont, WA 98327
Telephone: (253) 964-8121
www.dupontwa.gov

WAC 197-11-970 Determination of Nonsignificance (DNS)

DETERMINATION OF NONSIGNIFICANCE

Description of proposal: Required 5 year update to the City of DuPont adopted Water System Plan (File No. SEPA2019-007).

Proponent: City of DuPont, Department of Public Works.

Location of proposal, including street address if any: All properties within the City of DuPont water system planning area.

Tax Parcel Number: N/A

Lead agency: City of DuPont

The lead agency has determined that the requirements for environmental analysis and protection have been adequately addressed in the development regulations and comprehensive plan adopted under chapter 36.70A RCW, and in other applicable local, state, or federal laws or rules, as provided by RCW 43.21C.240 and WAC 197-11-158 and/or mitigating measures have been applied that ensure no significant adverse impacts will be created;

An environmental impact statement 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.

__XX__ 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 **5:00 pm on November 25, 2019**.

Responsible Official: Jeffrey S. Wilson, AICP
Director of Community Development

Contact Information: City of DuPont | 1700 Civic Drive, DuPont, WA 98327 | 253-912-5393

Date: November 10, 2019 **Signature:** _____

__XX__ You may appeal this determination to Jeffrey Wilson, Planning Director, at 1700 Civic Center, DuPont, WA 98327, by filing a **written appeal** citing the specific reasons for the appeal with the required appeal fee, adjacent property owners list and notarized affidavit form no later than **5;00 pm on November 25, 2019**. You should be prepared to make specific factual objections. Contact Jeffrey S. Wilson to read or ask about the procedures for SEPA appeals.

__XX__ Posted on **November 8, 2019**, at the DuPont City Hall.

__XX__ Published in the Tacoma News Tribune on **November 10, 2019**.

__XX__ Emailed to the Department of Ecology SEPA Center (SEPAunit@ecy.wa.gov) on **November 8, 2019**.

__XX__ Environmental Checklist attached.

__XX__ Draft Plan: http://www.dupontwa.gov/238/Water-System-Plan

__XX__ Distribute to "Checked" Agencies on the following page.

SEPA Distribution List

XX Indicates notice emailed/mailed to the following:

Dist.	Agency/Contact		Dist.	Agency/Contact
XX	WA State Dept. of Archaeology & Historic Preservation SEPA@dahp.wa.gov		XX	WA State Dept. of Labor and Industries PO Box 44000 Olympia, WA 98504
XX	WA State Dept. of Commerce Anne Fritzel, AICP Anne.fritzel@commerce.wa.gov		XX	WA State Dept. of Natural Resources SEPA Center SEPACENTER@dnr.wa.gov
XX	WA State Dept. of Ecology SEPA Unit Separegister@ecy.wa.gov		XX	WA State Dept. of Natural Resources South Puget Sound Region Southpuget.region@dnr.wa.gov
XX	WA State Dept. of Ecology Environmental Review Section SEPAunit@ecy.wa.gov		XX	WA State Dept. of Social and Health Services Lands & Bldg Div Elizabeth McNagny PO Box 45848 Olympia, WA 98504-5848
XX	WA State Dept. of Ecology SW Regional Office Shorelands & Environmental Assistance Donna Joblonski Donna.joblonski@ecy.wa.gov			WA State Dept. of Social and Health Services Robert J. Hubenthal hubenbj@dshs.wa.gov
XX	WA State Dept. of Ecology SW Regional Office Toxic Clean-up Program Marian Abbett Marian.abbett@ecy.wa.gov		XX	WA State Dept. of Transportation OR-SEPA-REVIEW@wsdot.wa.gov
XX	WA. State Dept. of Ecology SW Regional Office Toxic Clean-up Program Eva Barber Eva.Barber@ecy.wa.gov			WA State Parks and Recreation Commission PO Box 42650 Olympia, WA 98504
XX	WA State Dept. of Ecology SW Regional Office Shorelands & Environmental Assistance Zachary Meyer Zachary.meyer@ecy.wa.gov		XX	Puget Sound Partnership Heather Saunders Benson Environmental Planner Heather.benson@psp.wa.gov
XX	WA State Dept. of Health SEPA.reviewteam@doh.wa.gov			Puget Sound Clean Air Agency 1904 3rd Ave #105 Seattle, WA 98101 SEPA@pscleanair.org
XX	WA State Dept. of Fish & Wildlife(WDFW) SEPA Coordinator SEPAdesk@dfw.wa.gov			BNSF Railway General Manager 2454 Occidental Ave. South, Ste 1A Seattle, WA 98134-1451
XX	WA State Dept. of Fish & Wildlife (WDFW) Michele Culver Regional Director Teammontesano@dfw.wa.gov			FEMA John Graves John.graves1@dhs.gov

XX	WA State Dept. of Fish & Wildlife (WDFW) Kelly Still Area Habitat Biologist, Region 6 Kelly.Still@dfw.wa.gov		XX	DuPont City Clerk Karri Muir Kmuir@dupontwa.gov
XX	JBLM Public Works Charles Markham Deputy for Programs and Operations Charles.s.markham2.civ@mail.mil		XX	Nisqually Indian Tribe Joe Cushman Cushman.joe@nisqually-nsn.gov
XX	JBLM Steven Perrenot Director Public Works Steven.t.perrenot.civ@mail.mil		XX	Yakama Nation Elizabeth Sanchey Elizabeth_sanchey@yakama.com
XX	US Army Corps of Engineers (Regulatory Branch) Suzanne Anderson Suzanne.l.anderson@usace.army.mil			Lakewood Community & Economic Development Courtney Brunell Planning Manager cbrunell@cityoflakewood.us
XX	USDA-Natural Resources Conservation Service 941 Powell Ave SW. Ste 102 Renton, WA 98057		XX	Steilacoom Community Development Doug Fortner Town Planner Doug.fortner@ci.steilacoom.wa.us
	DuPont Post Office Attn: Post Master 1313 Thompson Circle DuPont, WA 98327			Clover Park School District 10903 Gravelly Lake Dr. SW Lakewood, WA 98499
XX	National Marine Fisheries Service Northwest Regional Office 7600 Sand Point Way NE Seattle, WA 98115-0070			Steilacoom Historical School District Celeste Johnston cjohnston@steilacoom.k12.wa.us
XX	Nisqually Nat'l Wildlife Refuge Glynnis Nakai Glynnis Nakai@fws.gov			LeMay Cust2180@wcnx.org
XX	Environmental Official-Pierce County Kathleen Larrabee Klarrab@co.pierce.wa.us			PSE Jeff Payne Jeff.payne@pse.com
XX	Land Use Review Capital Development-Pierce Transit PO Box 99070 Lakewood, WA 98499-0070			AHBL Lisa Klein Lklein@AHBL.com
XX	Pierce Co. Assessor/Treasurer-Commercial Dept. Darci Brandvold Darci.brandvold@piercecountywa.gov			Gray & Osborne Dominic Miller, PE dmiller@g-o.com
XX	Pierce Co. Environmental Services Bldg Public Works Kip Julin 9850 64th St. West University Place, WA 98467			Geri Reinart, P.E. greinart@msn.com
XX	Pierce Co. PALS Adonais Clark aclark@co.pierce.wa.us			CalPortland Pete Stoltz Pstoltz@calportland.com

	Pierce Co. Public Works Debbie Germer debbie.germer@piercecountywa.gov		**XX**	NWL Association Emily Griffith nwlassistdirector@reachone.com
XX	Tacoma Pierce Co. Health Dept. Sara Bird SEPA@tpchd.org		**XX**	NWL Associates David Sadlemyer nwldirector@reachone.com
XX	Nisqually Indian Tribe Annette Bullchild, THPO Bullchild.annette@nisqually-nsn.gov		**XX**	Nisqually Indian Tribe Brad Beach, THPO beach.brad@nisqually-nsn.gov
	Name Title Address Address Email			Name Title Address Address Email
	Name Title Address Address Email			Name Title Address Address Email

Permit Applicant Information

XX	Gus Lim Public Works Director 1700 Civic Drive DuPont, WA 98327 glim@dupontwa.gov		**XX**	Gray & Osborne Dominic Miller, PE dmiller@g-o.com
	Name Title Address Address Email			Name Title Address Address Email

A. Background

1. Name of proposed project, if applicable:

City of DuPont 2018 Water System Plan Update

2. Name of applicant:

City of DuPont

3. Address and phone number of applicant and contact person:

City of DuPont
1700 Civic Drive
DuPont, Washington 98327
(253) 912-5380

Contact Person: Gus Lim, Public Works Director, City of DuPont

4. Date checklist prepared:

January 2019

5. Agency requesting checklist:

City of DuPont

6. Proposed timing or schedule (including phasing, if applicable):

Comprehensive Plan approval by Washington State Department of Health and official adoption by City Council anticipated in 2019. Water system comprehensive plans are typically effective for ten years as specified under WAC 246-290. Capital improvement projects proposed in plan are prioritized for consideration by City officials. Individual capital improvement projects will be constructed to meet water use requirements and to serve future growth.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

This plan establishes recommended capital improvements for the City of DuPont municipal water system, which may be implemented as individual projects at the City's discretion.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

City of DuPont Comprehensive Plan Periodic Update, adopted October 27, 2015
City of DuPont Land Use Code (Title 25 of DuPont Municipal Code)

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.

None known.

10. List any government approvals or permits that will be needed for your proposal, if known.

Department of Health – Water System Plan Approval
DuPont City Council – Water System Plan Adoption
Pierce County - Water System Plan Approval

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.)

The Water System Plan is a planning document for the City's municipal water system, which has been prepared in accordance with the requirements of WAC 246-290. The Plan addresses the ability of the water system to provide municipal potable water supply within the city limits of DuPont. The Plan identifies recommended water system capital improvement projects according to a prioritization schedule. These identified projects are anticipated to be necessary to provide adequate water service for anticipated growth and development over a 20-year planning horizon. Each individual water system capital improvement project will be subject to environmental evaluation and assessment as the projects are implemented in their various stages.

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.

The Water System Plan has been developed to address the anticipated potable water service needs for the City of DuPont city limits.

B. Environmental Elements

1. *Earth*

a. General description of the site:

(circle one): Flat, rolling, hilly, steep slopes, mountainous, other _____

b. What is the steepest slope on the site (approximate percent slope)?

Slopes are approximately 50 percent along waterfront bluffs adjacent to Puget Sound and along portions of Sequalitchew Creek.

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.

The majority of the area is glacial sands and gravels, with shallow topsoil. Some peats, clays, silts, and organic soils are also included in marshy areas.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

None are known.

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.

No grading or filling is expressly proposed by the Water System Comprehensive Plan. Grading and or filling associated with individual recommended capital improvement projects may be required during the construction and implementation of individual projects. Such impacts will be evaluated on a project specific basis.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

Construction associated with recommended water system capital improvement projects will include protective measures for erosion control where necessary. Appropriate best management, erosion control, and mitigative measures will be determined on a project specific basis prior to the actual time of construction.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

To be determined on a project specific basis prior to the actual time of construction for recommended water system capital improvement projects.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

No earth impacts are anticipated as a result of Water System Comprehensive Plan adoption. Project specific impacts will be evaluated 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.

Recommended water system capital improvement construction projects should not result in impacts to air quality with the possible exception of dust and vehicle emissions from construction equipment. Project specific impacts will be evaluated 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.

None.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

No air impacts are anticipated as a result of Water System Comprehensive Plan adoption. Project specific impacts will be evaluated on a project specific basis.

3. Water

a. Surface Water

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.

Yes. Puget Sound, Nisquallly Reach/Delta/River, Sequalitchew Creek/Lake, Edmond Marsh/Pond/Lake, Strickland Lake, Grant Lake, Hodge Lake, Lake Sellers, Hammer Marsh, MacKay Marsh, other small ponds, marshes, and wetlands.

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.

No. The proximity of recommended improvements to surface water will be more specifically evaluated 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.

None anticipated.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

None anticipated.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

To be determined 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.

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.

Yes. In year 2019, the projected peak day instantaneous production from ground water is projected to be approximately 3,800 gpm. It is predicted that the instantaneous water right limit of 5,100 gpm will be exceeded in year 2031. The projected annual water right production in year 2019 is approximately 1,750 acre-feet per year. The permitted annual withdrawal is 3,160 acre-feet/year. A projected surplus of annual water rights of approximately 370 acre-feet/year is predicted at the end of the 20-year planning period.

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.

None anticipated.

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.

Not Applicable. Project specific impacts will be evaluated on a project specific basis.

2) Could waste materials enter ground or surface waters? If so, generally describe.

Not anticipated.

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

Not anticipated.

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:

None required. Appropriate water rights application to appropriate additional withdrawals of groundwater will be filed with the Washington State Department of Ecology as additional groundwater well drinking water supply sources are developed and constructed to accommodate future growth.

4. Plants

a. Check the types of vegetation found on the site:

_X_ deciduous tree: alder, maple, aspen, other
_X_ evergreen tree: fir, cedar, pine, other
_X_ shrubs

_X_ grass
____pasture
____crop or grain
____ Orchards, vineyards or other permanent crops.
_X_ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
_X_ water plants: water lily, eelgrass, milfoil, other
____other types of vegetation

b. What kind and amount of vegetation will be removed or altered?

None. Project specific impacts will be evaluated on a project specific basis.

c. List threatened and endangered species known to be on or near the site.

No threatened and endangered species have been identified within the City of DuPont city limits. Oak Savannas are located within the City and are listed as priority habitat by the Washington State Department of Wildlife.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

To be determined on a project specific basis.

e. List all noxious weeds and invasive species known to be on or near the site.

To be determined 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:

birds: hawk, heron, eagle, songbirds, other:
mammals: deer, bear, elk, beaver, other:
fish: bass, salmon, trout, herring, shellfish, other _____

To be determined on a project specific basis.

b. List any threatened and endangered species known to be on or near the site.

To be determined on a project specific basis. No endangered species have been identified as having home territory within the City of DuPont city limits.

c. Is the site part of a migration route? If so, explain.

Yes. The whole of western Washington is part of the Pacific Flyway. Potential impacts will be evaluated on a project specific basis.

d. Proposed measures to preserve or enhance wildlife, if any:

None. Potential impacts will be evaluated on a project specific basis.

e. List any invasive animal species known to be on or near the site.

To be determined 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.

No energy consumption is associated with Water System Comprehensive Plan adoption. Potential impacts such as providing electrical power to operate future facilities will be evaluated on a project specific basis.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

None anticipated.

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:

Not applicable.

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.

Not applicable. To be determined on a project specific basis.

1) Describe any known or possible contamination at the site from present or past uses.

Not applicable. To be determined 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. To be determined 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. To be determined on a project specific basis.

4) Describe special emergency services that might be required.

Not applicable. To be determined on a project specific basis.

5) Proposed measures to reduce or control environmental health hazards, if any:

Not applicable. To be determined 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)?

None anticipated.

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.

Not applicable. Project specific impacts will be evaluated on a project specific basis.

3) Proposed measures to reduce or control noise impacts, if any:

None required.

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.

Land use within the City of DuPont city limits is detailed in the City of DuPont Comprehensive Plan (2015).

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?

The area has not been used for agricultural purposes for at least 120 years with the exception of cattle grazing. Changes in agricultural or forest land use are not part of this proposal.

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:

The City of DuPont has a wellhead protection program, which is discussed in Chapter 5 of this Water System Plan. Potential impacts to the quality of the City's water supply from surrounding land use will be evaluated on a project-specific basis.

c. Describe any structures on the site.

Not Applicable.

d. Will any structures be demolished? If so, what?

To be determined on a project specific basis.

e. What is the current zoning classification of the site?

To be determined on a project specific basis. All proposed projects will be constructed in accordance with City of DuPont land use and zoning standards and ordinances.

f. What is the current comprehensive plan designation of the site?

To be determined on a project specific basis. All proposed projects will be constructed in accordance with City of DuPont land use and zoning standards and ordinances.

g. If applicable, what is the current shoreline master program designation of the site?

To be determined on a project specific basis.

h. Has any part of the site been classified as a critical area by the city or county? If so, specify.

To be determined on a project specific basis.

i. Approximately how many people would reside or work in the completed project?

The recommended water system capital improvement projects in the Plan may require additional City Staff for operation and maintenance of facilities. The number will be determined on a project specific basis.

j. Approximately how many people would the completed project displace?

None.

k. Proposed measures to avoid or reduce displacement impacts, if any:

None required.

L. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

Proposed water system capital improvements will receive City permits prior to the commencement of construction to ensure consistency with City ordinances covering land use, planning, and zoning.

m. Proposed measures to reduce or control impacts to agricultural and forest lands of long-term commercial significance, if any:

Not applicable. Changes in agricultural or forest land use are not part of this proposal.

9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

Not applicable.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

Not applicable.

c. Proposed measures to reduce or control housing impacts, if any:

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?

To be determined on a project specific basis.

b. What views in the immediate vicinity would be altered or obstructed?

To be determined on a project specific basis.

b. Proposed measures to reduce or control aesthetic impacts, if any:

To be determined 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?

Not applicable.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

Not applicable.

c. What existing off-site sources of light or glare may affect your proposal?

Not applicable.

d. Proposed measures to reduce or control light and glare impacts, if any:

Not applicable. To be determined on a project specific basis.

12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?

Pedestrian trails, parks, and other natural, historic, and outdoor recreational activities are available within the DuPont city limits, Retail Water Service Area, and Urban Growth Area (UGA). Boating, fishing, and beach combing activities are available along Puget Sound.

b. Would the proposed project displace any existing recreational uses? If so, describe.

No.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

Not applicable. To be determined on a project specific basis.

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 ? If so, specifically describe.

To be determined 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.

To be determined 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.

Potential impacts to cultural and historic resources will be determined 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.

To be determined 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.

To be determined 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?

Not applicable.

c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?

The proposed water system capital improvement projects would not create or eliminate any public parking spaces.

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).

No.

e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

No.

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?

To be determined on a project specific basis.

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.

To be determined on a project specific basis.

h. Proposed measures to reduce or control transportation impacts, if any:

To be determined on a project specific basis.

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.

To be determined on a project specific basis.

b. Proposed measures to reduce or control direct impacts on public services, if any.

To be determined on a project specific basis.

16. Utilities

a. Circle utilities currently available at the site:
electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other _____

All of the above.

c. 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.

To be determined on a project specific basis. The recommended capital improvement projects involve extensions and enhancements to the City's existing public drinking water supply systems.

C. Signature

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: Josh Finley

Position and Agency/Organization: Civil Engineer, Gray & Osborne, Inc.

Date Submitted: 10/28/2019

D. Supplemental sheet for nonproject actions

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?

The proposal will facilitate development of the DuPont Water System based on the City's Comprehensive Plan. No water, air, hazardous substance, or noise impacts are specifically associated with the proposal, though these elements will be evaluated on a project specific basis.

Proposed measures to avoid or reduce such increases are:

Not applicable. To be determined on a project specific basis.

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

No impacts are anticipated as a result of the proposal. Separate environmental reviews will determine if significant adverse environmental impacts will occur as a result of individual water system improvement projects.

Proposed measures to protect or conserve plants, animals, fish, or marine life are:

Not applicable. To be determined on a project specific basis.

3. How would the proposal be likely to deplete energy or natural resources?

Not applicable. To be determined on a project specific basis.

Proposed measures to protect or conserve energy and natural resources are:

Not applicable. To be determined on a project specific basis.

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?

Specific water system improvements will be consistent with the City's existing Land Use Plan and Sensitive Areas Ordinance.

Proposed measures to protect such resources or to avoid or reduce impacts are:

Not applicable. To be determined on a project specific basis.

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 proposal will facilitate development consistent with the City's Comprehensive Plan.

Proposed measures to avoid or reduce shoreline and land use impacts are:

Not applicable. To be determined on a project specific basis.

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

The increased demands would be growth related. The water system capital improvement projects discussed in the Water System Plan are necessary to maintain the public water system and serve this projected population growth, but do not themselves increase demands on transportation or public services and utilities.

Proposed measures to reduce or respond to such demand(s) are:

Not applicable. To be determined on a project specific basis.

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

No conflicts are anticipated. All applicable local, state, and federal laws will be followed when implementing each proposed capital improvement project in the Plan.

APPENDIX N

PFAS TECHNICAL MEMORANDUM

Gray & Osborne, Inc.
CONSULTING ENGINEERS

TECHNICAL MEMORANDUM

TO: GUS LIM, P.E.
SCOTT HEIN
FRED FOREMAN
FROM: JOE PLAHUTA, P.E.
DATE: JULY 25, 2019
SUBJECT: PFAS TREATMENT FOR HOFFMAN HILL AND BELL HILL WELLS
CITY OF DUPONT, PIERCE COUNTY, WASHINGTON
G&O #19206.00

PURPOSE

The purpose of this memo is to evaluate activated carbon treatment for removal of PFAS compounds at each of the City of DuPont's well sources. Specifically, this memo will address the treatment options, sizing of the treatment facilities, and the approximate cost of the treatment systems.

BACKGROUND

Per- and polyflouroalkyl substances (PFASs) have become a groundwater contaminant of increased concern over the last few years. PFAS are a class of man-made chemicals used ubiquitously in a variety of industrial and consumer products including firefighting foams, medical equipment, food packaging, cleaning products, non-stick cookware, textiles, inks, and cosmetics. Since PFAS compounds are characterized by a high degree of halogen saturation, they are not easily destroyed or transformed through oxidative pathways, making them persistent in the environment and biological tissues.

The City of DuPont is located downgradient from Joint Base Lewis McChord. Therefore, it is believed that the PFAS compounds detected in the City's sources are from firefighting foams used at Joint Base Lewis McChord.

Two of the most prevalent PFAS compounds include perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS). Both of these compounds have been phased out of production in the United States but remain persistent in the environment. The United States Environmental Protection Agency (EPA) has not established a maximum contaminant level (MCL) for PFAS compounds; however, they have developed health advisory levels for both PFOA and PFOS.

The City of DuPont obtains their water from five different well sources located in two separate well fields. The Hoffman Hill area contains two wells, Hoffman Hill Well 1 and Hoffman Hill Well 2. The Bell Hill Well site contains three wells, Bell Hill Well 1, Bell Hill Well 2, and Bell Hill Well 3. PFAS has been detected in four of the City's wells at concentrations less than the EPA advisory level of 70 parts per trillion (ppt). A summary of the City of DuPont's source infrastructure and the capacity associated with each well are detailed in Table 1 below:

TABLE 1

City of DuPont Well Sources

Well Source	Capacity (gpm)
Hoffman Hill Wells	
Hoffman Hill Well 1	1,100
Hoffman Hill Well 2	1,100
Total Hoffman Hill	**2,200**[(1)]
Bell Hill Wells	
Bell Hill Well 1	900
Bell Hill Well 2	1,000
Bell Hill Well 3	1,000
Total Bell Hill	**2,900**

(1) The City is in the process of acquiring water rights to expand capacity to 2,400 gpm

PFAS REGULATIONS

As mentioned previously, the EPA has not established maximum contaminant levels for PFAS compounds but instead established an advisory level of 70 ppt. However, many states have adopted their own guidelines and MCLs for PFAS compounds. Many states have adopted more stringent standards than those promulgated by the EPA. For example, California and New Jersey have established guidelines of 14 ppt for PFOA and 13 ppt for PFOS. While Washington has not yet developed an action level, establishment of action levels for individual PFAS species in the range of 15 to 20 ppt is expected in the near future.

TREATMENT TECHNOLOGIES

Granular activated carbon adsorption, ion exchange, and membrane filtration are three viable technologies for removal of PFAS from groundwater. Granular activated carbon

Printed on recycled paper

and ion exchange can be classified as adsorption treatment methods and remove PFAS through adsorption to a granular media. Reverse osmosis is a membrane technology that can remove PFAS by filtration through a very fine membrane. Each treatment method is described further below:

Activated Carbon Treatment

Granular activated carbon treatment systems provide treatment by passing raw water through a granular media bed consisting of activated carbon. The activated carbon provides a high-area surface for the adsorption of PFAS. However, over time, binding sites on the surface become filled and the carbon requires offsite regeneration. The regeneration process involves removal of the carbon from the adsorber vessel and replacement with virgin or regenerated activated carbon. Generally, activated carbon is more effective at removing longer-chain PFAS compounds.

Ion Exchange Treatment

Ion exchange treatment systems provide treatment by passing raw water through a bed of granular ion exchange resin. The PFAS are removed from solution through adsorption to the ion exchange resin. PFAS are then removed from the resin through an ion exchange regeneration process. The regeneration process creates a PFAS enriched waste stream that can present a disposal concern.

Reverse Osmosis Treatment

Reverse osmosis is a much less common approach to PFAS treatment. Since reverse osmosis involves filtration at the molecular level, expensive pumping equipment is required and the process produces a liquid waste stream that is concentrated in PFAS and can present a disposal concern.

RECOMMENDED TREATMENT APPROACH

Given that all of the City's affected sources have relatively low levels of PFAS, if the City elects to provide treatment for PFAS, activated carbon is the preferred treatment method. While activated carbon is an appropriate treatment method for all concentrations of PFAS, it is particularly well suited to low concentrations where carbon life and the interval between regenerations will be greatly increased. Activated carbon treatment is also the simplest and easiest technology to implement since no pumping or regeneration cycles are required.

Printed on recycled paper

For the purposes of the memo, only activated carbon treatment will be evaluated and discussed.

PROPOSED TREATMENT SYSTEM

Separate treatment facilities would need to be provided at both the Bell Hill and Hoffman Hill well sites. In both cases, treatment facilities would need to be constructed adjacent to each reservoir in order to provide treatment before the raw water enters the reservoirs.

Per conversations with Calgon Carbon, an activated carbon and treatment equipment manufacturer, activated carbon systems for treatment of PFAS are typically arranged in series configuration and sized to provide a combined empty bed contact time (EBCT) of 20 minutes. This criterion is used to select the appropriate size and number of treatment vessels for each site. Calgon Carbon has recommended their Model M12-40 vessels for treating water at the Bell Hill and Hoffman Hill reservoir sites. Each M12-40 system is capable of treating up to 1,000 gpm while maintaining an EBCT of 20 minutes.

Bell Hill Site

Currently, the Bell Hill wells produce water with PFAS levels below 10 ppt. This level is significantly less than the EPA advisory level and below the expected Washington State action levels for PFAS compounds.

Treatment System

The recommended treatment system for the Bell Hill site consists of three Model M12-40 systems, filled with F400 activated carbon. At the design capacity of 2,900 gpm, the system will provide an EBCT of 20.6 minutes in series operation. It should be noted that an EBCT of 20.6 minutes is conservative given the relatively low concentrations of PFAS from the Bell Hill Wells.

Site Piping

The Bell Hill well site will require some site piping in order to accommodate the new treatment equipment. The transmission line from Well 3 will need to be connected to a line from Well 1 and Well 2 via a common manifold. The manifold will then distribute untreated water to the treatment vessels. The outlets for each of the treatment vessels will be combined through a common manifold and fed through a chlorination vault to the reservoir.

Printed on recycled paper

Site Layout

There is sufficient space to accommodate the treatment facilities behind the existing Bell Hill Booster Pump Station. A proposed site layout is shown in Figure 1.

Hoffman Hill Site

Currently, the Hoffman Hill wells produce water with PFAS levels in the range of 40 ppt. This level is less than the EPA advisory level, but above the expected Washington State action levels for PFAS compounds.

Treatment System

The recommended treatment system for the Hoffman Hill site consists of three Model M12-40 systems, filled with F400 activated carbon. At the design capacity of 2,400 gpm, the system will provide an EBCT of 25 minutes in series operation. It should be noted that an EBCT of 25 minutes is conservative given the relatively low concentrations of PFAS from the Hoffman Hill Wells.

Site Piping

The Hoffman Hill well site will also require some site piping in order to accommodate the new treatment equipment. The inlet line to the reservoir will be intercepted downstream of where the Well 1 and Well 2 discharge piping converges. The outlets for each of the treatment vessels will then be combined through a common manifold and fed through a chlorination vault to the reservoir.

Site Layout

There is sufficient space to accommodate the treatment facilities on the Hoffman Hill reservoir site. The treatment facility would need to be located either to the east or to the south of the reservoir. Both locations would require regrading in order to accommodate the treatment vessels. A proposed site layout is shown in Figure 2.

PROPOSED TREATMENT SYSTEM COST

Costs were developed to implement the treatment approaches described in the section above at both the Bell Hill and Hoffman Hill well sites. The costs include engineering, construction, and construction management. The cost associated with implementing PFAS treatment at the Bell Hill site is shown in Table 2. The cost associated with implementing PFAS treatment at the Hoffman Hill site is shown in Table 3.

Printed on recycled paper

TABLE 2

Estimated Total Project Cost – Bell Hill Site

No.	Item	Quantity		Unit Price	Amount
1	Mobilization and Demobilization	1	LS	$200,000	$ 200,000
2	Site Work	1	LS	$ 30,000	$ 30,000
3	Reinforced Concrete Slab (110' x 20')	1	LS	$125,000	$ 125,000
4	Carbon Filter Treatment System	3	EA	$550,000	$1,650,000
5	Piping, Valves, and Appurtenance	1	LS	$100,000	$ 100,000
6	Electrical, Telemetry, and Instrumentation	1	LS	$ 20,000	$ 20,000
	Subtotal				$2,125,000
	Contingency (~10%)				$ 211,688
	Washington State Sales Tax (9.3%)				$ 217,312
	Engineering and CM (15%)				$ 384,000
	Total				**$2,938,000**

TABLE 3

Estimated Total Project Cost – Hoffman Hill Site

No.	Item	Quantity		Unit Price	Amount
1	Mobilization and Demobilization	1	LS	$200,000	$ 200,000
2	Site Work	1	LS	$ 30,000	$ 30,000
3	Retaining Wall	550	SF	$ 50	$ 27,500
4	Reinforced Concrete Slab (110'x20')	1	LS	$125,000	$ 125,000
5	Carbon Filter Treatment System	3	EA	$550,000	$1,650,000
6	Piping, Valves and Appurtenance	1	LS	$100,000	$ 100,000
7	Electrical, Telemetry, and Instrumentation	1	LS	$ 20,000	$ 20,000
	Subtotal				$2,152,500
	Contingency (~10%)				$ 213,465
	Washington State Sales Tax (9.3%)				$ 220,035
	Engineering and CM (15%)				$ 388,000
	Total				**$2,974,000**

Printed on recycled paper

As presented in Table 2 and Table 3 above, the cost associated with constructing a PFAS treatment facility at the Bell Hill Site is approximately $2,938,000 and the cost associated with installing a treatment facility at the Hoffman Hill site is approximately $2,974,000. It may be sufficient to use a lower EBCT at one or both of the treatment sites, which would allow for shorter filter vessels with a shallower carbon bed depth. This change could result in a capital cost savings of up to $400,000 per site, or up to $800,000 total.

All of the City's well sources produce water with PFAS levels below the EPA advisory level of 70 ppt. Furthermore, the Bell Hill wells have PFAS levels below the likely future Washington state action levels. For this reason, if the City elects to move forward with providing treatment for PFAS, treatment improvements at the Hoffman Hill site should be prioritized.

OPERATION AND MAINTENANCE COSTS

The operations and maintenance (O&M) costs associated with carbon filtration include additional pumping costs associated with overcoming head losses in the filtration vessels and periodic exchange of carbon media. For the purposes of this analysis, the additional pumping costs associated with headloss are neglected.

The interval between carbon exchanges will depend upon the volume of water pumped through the carbon filters, the concentration of PFAS in the raw water, and the type of PFAS compounds being removed. According to Calgon Carbon, a carbon life of one to two years should be assumed. After this period of time, the carbon in the lead filter vessel on each skid would be replaced and the valve configuration changed to switch the position of the lead and lag vessels.

The approximate cost for a carbon change is $65,000 per vessel. Therefore, the cost associated with a carbon change is approximately $200,000 per treatment site, or approximately $400,000 for both of the treatment plant sites. Assuming a carbon life of one to two years, the cost associated with carbon replacement may range from $200,000 to $400,000 annually.

SUMMARY

A summary of the capital, O&M and annualized lifecycle costs associated with PFAS treatment are shown in Table 4. The annualized lifecycle cost is computed by summing the annualized capital cost (over an assumed asset life of 30 years, at a discount rate of 3 percent) and the annual O&M cost.

Printed on recycled paper

TABLE 4

Summary of Project Capital, O&M, and Lifecycle Costs

Bell Hill Site	
Capital Cost	$2,938,000
O&M Cost	$ 400,000
Annualized Lifecycle Cost(1)	$ 550,000
Hoffman Hill Site	
Capital Cost	$2,974,000
O&M Cost	$ 400,000
Annualized Lifecycle Cost(1)	$ 552,000
Both Sites	
Capital Cost	$5,912,000
O&M Cost	$ 400,000
Annualized Lifecycle Cost(1)	$1,102,000

(1) The annualized lifecycle cost is the annualized cost of capital over a 30 year lifespan at a 3 percent discount rate, plus the annual O&M cost.

The range of anticipated capital cost associated with providing PFAS treatment is thus $2,974,000 to $5,912,000 depending upon whether treatment is provided at both well sites or only at the Hoffman Hill well site. The corresponding range of annualized lifecycle cost, assuming a 30-year lifespan and a 3-percent discount rate is $552,000 (Hoffman Hill well site) to $1,102,000 (both well sites).

Printed on recycled paper

40' 20' 0 20' 40'
SCALE: 1"=40'



N

CITY OF DUPONT

PFAS TREATMENT SYSTEM LAYOUT

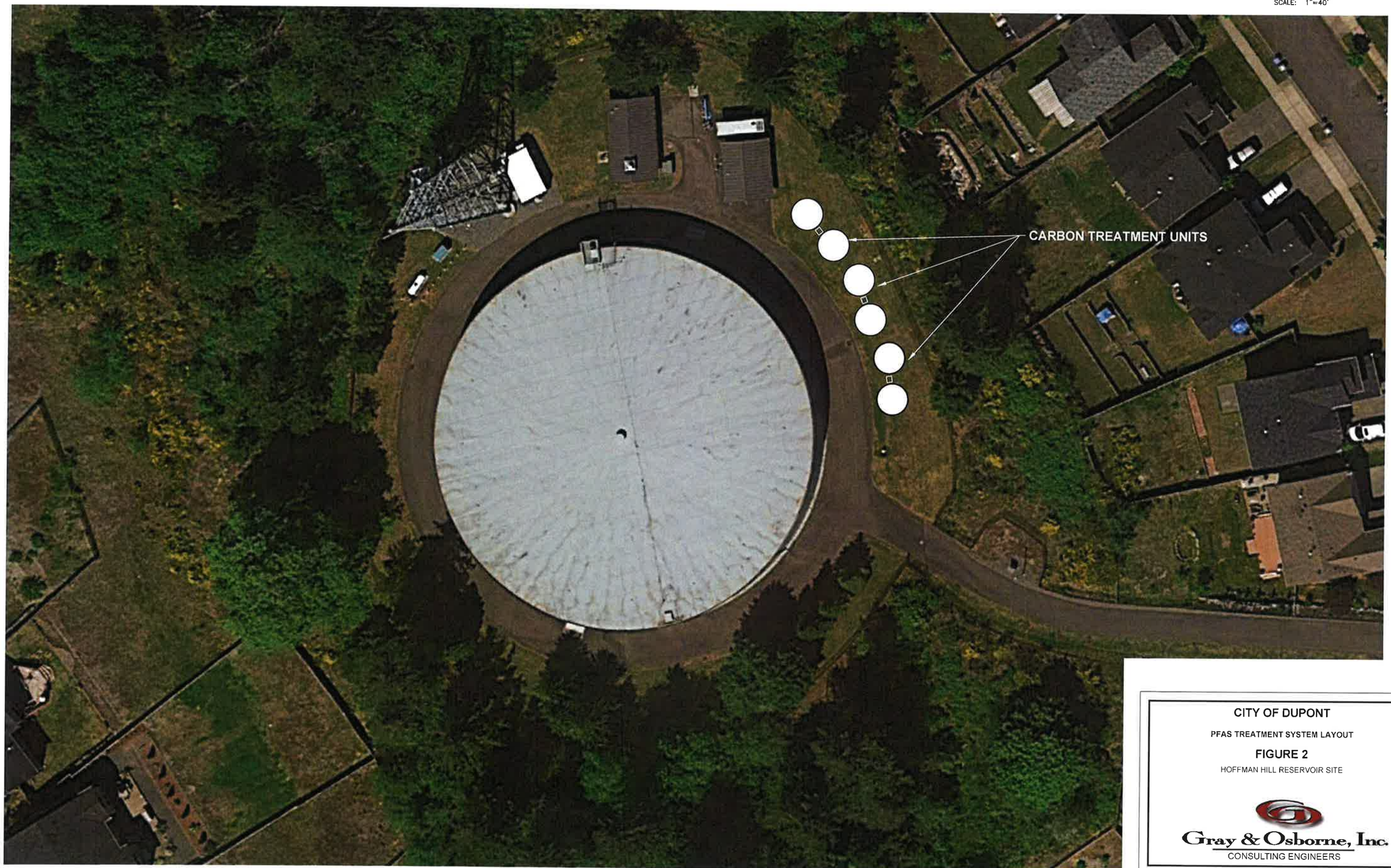
FIGURE 1

BELL HILL RESERVOIR SITE

Gray & Osborne, Inc.
CONSULTING ENGINEERS

L:\DUPONT\Bell & Hoffman Hill Aerial Figure\Aerial Bell&Hoffman.dwg, 7/9/2019 4:06 PM, BEN BROSMER

40' 20' 0 20' 40'
SCALE: 1"=40'



N

CITY OF DUPONT

PFAS TREATMENT SYSTEM LAYOUT

FIGURE 2

HOFFMAN HILL RESERVOIR SITE

Gray & Osborne, Inc.
CONSULTING ENGINEERS

I:\DUPONT\Well 6 Hoffman Hill Aerial Figure\Aerial Well6Hoffman.dwg, 7/9/2019 4:08:08 PM, BEN PROTSMAN

Legend

- FIRE HYDRANT

MODELED WATER MAINS

- 4" OR LESS
- 6"
- 8"
- 10"
- 12"
- 16"

2038 AVAILABLE FIRE FLOW

- LESS THAN 1,000 GPM
- 1,000 TO 2,500 GPM
- 2,500 TO 4,000 GPM
- MORE THAN 4,000 GPM

REQUIRED FIRE FLOW

- 1,000 GPM
- 2,500 GPM
- 4,000 GPM
- **PARCELS**

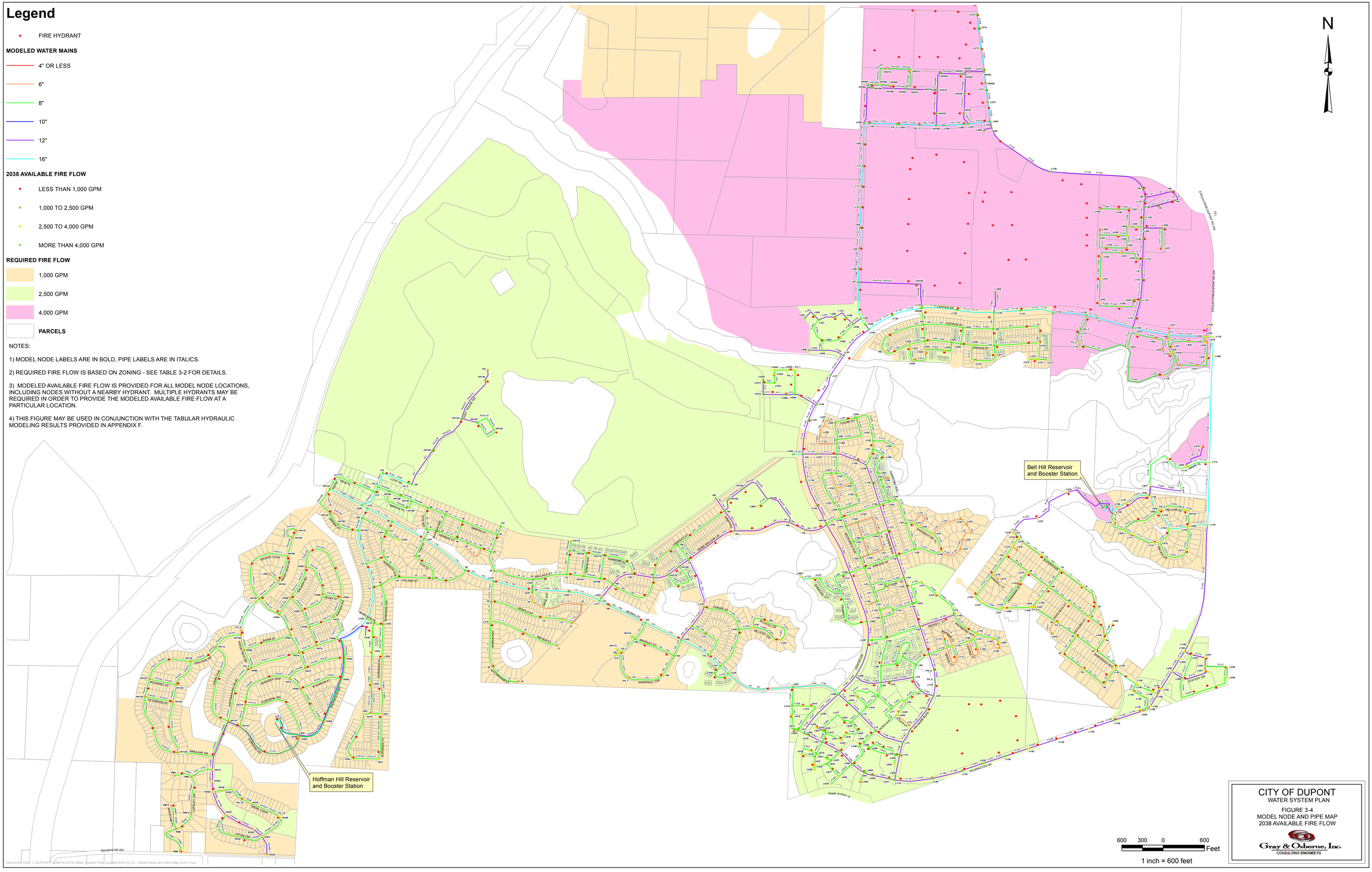
NOTES:

1) MODEL NODE LABELS ARE IN BOLD, PIPE LABELS ARE IN ITALICS.

2) REQUIRED FIRE FLOW IS BASED ON ZONING - SEE TABLE 3-2 FOR DETAILS.

3) MODELED AVAILABLE FIRE FLOW IS PROVIDED FOR ALL MODEL NODE LOCATIONS, INCLUDING NODES WITHOUT A NEARBY HYDRANT. MULTIPLE HYDRANTS MAY BE REQUIRED IN ORDER TO PROVIDE THE MODELED AVAILABLE FIRE FLOW AT A PARTICULAR LOCATION.

4) THIS FIGURE MAY BE USED IN CONJUNCTION WITH THE TABULAR HYDRAULIC MODELING RESULTS PROVIDED IN APPENDIX F.



CITY OF DUPONT
WATER SYSTEM PLAN

FIGURE 3-4
MODEL NODE AND PIPE MAP
2038 AVAILABLE FIRE FLOW

Gray & Osborne, Inc.
CONSULTING ENGINEERS