CITY OF DUPONT

PIERCE COUNTY, WASHINGTON

WATER SYSTEM PLAN

2011 UPDATE



G&O #10242
August 2011

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
NORTHWEST DRINKING WATER REGIONAL OPERATIONS
20425 72nd Avenue South, Suite 310, Kent, Washington 98032-2388

December 11, 2012

HONORABLE MAYOR MICHAEL GRAYUM &
COUNCIL MEMBERS
CITY OF DUPONT
1700 CIVIC DRIVE
DUPONT WA 98237

Re: City of DuPont, ID # 20500
Water System Plan - Approval
Pierce County
Submittal # 11-1009

Dear Honorable Mayor Michael Grayum and Council Members:

The City of DuPont's water system plan (WSP), received in this office on October 21, 2011, with additional submittal items received on July 26, October 25, and December 6, 2012, has been reviewed, and in accordance with the provisions of WAC 246-290-100, is **APPROVED**.

Approval of the plan amendment is valid as it relates to current standards outlined in Chapter 246-290 WAC, revised April 2012, Chapter 246-293 WAC, revised September 1997, Chapter 70.116 RCW, the Pierce County Coordinated Water System Plan (CWSP), and is subject to the qualifications herein. An approved update of this WSP is required on or before **December 11, 2018**, unless ODW requests an update or plan amendment pursuant to WAC 246-290-100(9).

APPROVED NUMBER OF CONNECTIONS

The analysis provided in this WSP shows the water system has sufficient capacity to meet the growth projections during this planning period. The City of DuPont's water system can support an **"unspecified"** designation for its approved number of connections. A specific number of approved connections will not be applied at this time. Development may occur in compliance with the schedule and information provided in this WSP. This designation may be rescinded (and replaced with a specified number of approved connections) if ODW determines that the WSP is no longer representative of system activities.

CONSTRUCTION WAIVERS

Standard Construction Specifications for distribution main extensions in this WSP are approved. Consistent with WAC 246-290-125(2), this system may proceed with the installation of distribution main extensions provided this system completes and keeps on file the enclosed construction completion report form in accordance with WAC 246-290-125(2) and WAC 246-290-120(5) and makes it available for review upon request by ODW.

Below is the regulatory language that applies to all WSP approvals.

LOCAL GOVERNMENT CONSISTENCY

The plan amendment meets local government consistency requirements for WSP approval pursuant to RCW 90.03.386 and RCW 43.20.

SERVICE AREA AND DUTY TO SERVE

Pursuant to RCW 90.03.386(2), the service area identified in this WSP service area map may now represent an expanded "place of use" for this system's water rights. Changes in service area should be made through a WSP amendment.

The City of DuPont has a duty to provide new water service within its retail service area. This WSP includes service policies to describe how your system plans to provide new service within your retail service area.

WATER RESOURCES

This approval does not provide any guarantee and should not be considered to provide any guarantee concerning legal use of water or any subsequent water right decisions by Ecology.

Ecology did not comment.

WATER SYSTEM PLANNING

We recognize the significant effort and resource commitment involved in the preparation of these plans. Thank you for your cooperation.

Sincerely,

Jennifer Kropack
Regional Planner
(253) 395-6769

John Ryding, PE
Regional Engineer
(253) 395-6757

Enclosure: Construction Completion Reports

cc: Peter Zahn, Public Works Director, City of DuPont
Frederick Foreman, City of DuPont
Dominic Miller, PE, and Eric Noah, Gray & Osborne –Olympia Office
Dan Cardwell, Pierce County, Planning and Land Services
Brad Harp, Tacoma-Pierce County Health Department
Amy Nielson, Department of Ecology

GRAY & OSBORNE, INC.
REC'D - OLYMPIA
DEC 13 2012
JOB #

CONSTRUCTION COMPLETION REPORT FOR DISTRIBUTION MAIN PROJECTS

In accordance with WAC 246-290-120(5), a ***Construction Completion Report*** is required for all construction projects. Under the submittal exception process for distribution main projects, designed by a professional engineer but not submitted to DOH for approval, the report does not need to be submitted. **However, the purveyor must keep the Construction Completion Report on file and make it available for review upon request by DOH in accordance with WAC 246-290-125 (2)(b).** Furthermore:

(1) The report form **must** bear the seal, date and signature of a professional engineer (PE) licensed in the state of Washington; and

(2) Per WAC 246-290-120(5)(c), the amount of change in the physical capacity of a system must be documented, if the project results in a change in physical capacity.

DUPONT WATER SYSTEM, CITY OF
Name of Water System

DOH System ID No.: **20500**

FREDERICK FOREMAN
Name of Purveyor (Owner or System Contact)

Date Water System Plan that includes Standard Construction Specifications

1700 CIVIC DRIVE
Mailing Address

Date Standard Specifications Approved by DOH: **12/11/2012**

DUPONT, WA 98327
City State Zip

PROJECT NAME AND DESCRIPTIVE TITLE:
(Include the name of any development project and number of services.)

Date Project or Portions Thereof Completed

PROFESSIONAL ENGINEER'S ACKNOWLEDGMENT

The undersigned professional engineer (PE), or his/her authorized agent, has inspected the above-described project that, as to layout, size and type of pipe, valves and materials, and other designed physical facilities, has been constructed and is substantially completed in accordance with construction documents reviewed by the purveyor's engineer. In the opinion of the undersigned engineer, the installation, physical testing procedures, water quality tests, and disinfection practices were carried out in accordance with state regulations and principles of standard engineering practice.

I have reviewed the disinfection procedures, pressure test results, and results of the bacteriological test(s) for this project and certify that they comply with the requirements of the construction standards/specifications approved by DOH.

P.E.'s Seal

Date Signed

Name of Engineering Firm

Name of PE Acknowledging Construction

Mailing Address

City State Zip

Engineer's Signature

State/Federal Funding Type (if any)

Please keep a completed, signed, and stamped copy on file.

☒ **NWRO Drinking Water Department of Health 20425 72nd Ave. S, Ste 310 Kent, WA 98032-2358 (253) 395-6750**	☐ **SWRO Drinking Water Department of Health PO Box 47823 Olympia, WA 98504-7823 (360) 236-3030**	☐ **ERO Drinking Water Department of Health 16201 E Indiana Ave, Suite 1500 Spokane Valley, WA 99216 (509) 329-2100**

For persons with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TTY 1-800-833-6388).

Eric Noah

om: Eric Noah <enoah@g-o.com>
Sent: Thursday, December 06, 2012 10:35 AM
To: 'Kropack, Jennifer (DOH)'
Cc: 'Peter Zahn'; 'Fred Foreman'; 'Dominic Miller'; 'Ryding, John (DOH)'
Subject: RE: City of DuPont's amended response to DOH CCC comment No. 17
Attachments: Ordinance 12_941.pdf

Hello Jennifer
Attached is City of DuPont Ordinance No. 12-941, Adopting and Updated Water System Plan for your files. Let me know if there is anything else you need. Thanks.
Eric Noah
Gray & Osborne, Inc.

From: Kropack, Jennifer (DOH) [mailto:Jennifer.Kropack@DOH.WA.GOV]
Sent: Friday, November 02, 2012 10:11 AM
To: Eric Noah
Cc: Peter Zahn; Fred Foreman; Dominic Miller; Ryding, John (DOH)
Subject: RE: City of DuPont's amended response to DOH CCC comment No. 17

11/2/12 – Hi Eric – Thank you for summarizing the CCC program at DuPont so well. John and I are ready to approve the plan as soon as you provide documentation of Council approval/adoption of the final WSP. Thank you. Jennifer

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rom: Eric Noah [mailto:enoah@g-o.com]
ent: Thursday, October 25, 2012 10:08 AM
To: Kropack, Jennifer (DOH)
Cc: Peter Zahn; Fred Foreman; Dominic Miller
Subject: City of DuPont's amended response to DOH CCC comment No. 17

Hello Jennifer
Attached is a copy of the City of DuPont's amended response to comment No. 17 from DOH's original comment letter. A copy will follow by mail. Please let me know if you have any questions or comments. Thank you.

Eric Noah
Gray & Osborne, Inc.
Olympia Office
2102 Carriage Drive SW, Bldg. I
Olympia, WA 98502

Ph(360) 292-7481
Fx(360) 292-7517

Electronic File Transfer-

Note that these electronic files are provided as a courtesy only. Gray & Osborne, Inc. in no way guarantees the accuracy or completeness of the digital data contained within these files. Furthermore, Gray & Osborne, Inc. assumes no liability for any errors or omissions in the digital data herein. Anyone using the information contained herein should consult the approved or certified hard copy drawings or reports for the most current information available.

CITY OF DuPONT
WASHINGTON
ORDINANCE NO. 12-941

AN ORDINANCE OF THE CITY OF DuPONT, WASHINGTON, ADOPTING AN UPDATED WATER SYSTEM PLAN; PROVIDING FOR SEVERABLITY; AND ESTABLISHING AN EFFECTIVE DATE

WHEREAS, pursuant to RCW 43.20.050 and .230, the City of DuPont is required to adopt a Water System Plan in compliance with the procedural and substantive requirements adopted by the Washington Department of Health and codified at WAC 246-290-100; and

WHEREAS, the City of DuPont has adopted a Comprehensive Plan pursuant to the Growth Management Act of the State of Washington and RCW 36.70A; and

WHEREAS, the City of DuPont has included a Water System Plan as one element of its adopted GMA Comprehensive Plan; and

WHEREAS, the City Council has directed the firm of Gray & Osborne, Inc. to prepare a Water System Plan update in accordance with state requirements codified at WAC 246-290-100 and sound engineering practice; and

WHEREAS, the City Council conducted a study session on the draft Water System Plan update on August 16, 2011, and held a Public Hearing on September 13, 2011; and

WHEREAS, a State Environmental Policy Act (SEPA), Determination of Non-Significance (DNS) was issued by the DuPont SEPA Responsible Official on October 27, 2011 for the City of DuPont Water Comprehensive Plan update; no comments or appeals were filed; and

WHEREAS, the draft Plan has been reviewed and approved by Pierce County for consistency with the County's Comprehensive Plan and Coordinated Water System Plan, and by the Washington State Department of Health pursuant to the requirements of WAC 246-290-100; and

WHEREAS, before the Water System Plan update may become effective, the Plan update must first be approved by the DuPont City Council pursuant to WAC 246-290-100(8)(b); and

WHEREAS, the City Council finds that the proposed Water System Plan update would advance the general welfare of the City of DuPont and its citizens;

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF DUPONT, WASHINGTON, DOES HEREBY ORDAIN AS FOLLOWS:

Section 1. Water System Comprehensive Plan Adopted. The Water System Comprehensive Plan update dated August 2011 ("Plan Update"), a copy of which is available for review in the City Clerk's Office, is hereby adopted.

Section 2. Prior Plans Superseded. The Plan Update replaces and supersedes any and all previous water system comprehensive plans adopted by the City of DuPont.

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 passage and publication.

ADOPTED BY THE CITY COUNCIL AT A REGULAR MEETING THEREOF ON THE 27 DAY OF November, 2012.

CITY OF DUPONT

Michael Grayum, Mayor

ATTEST/AUTHENTICATED:

Erin Larsen, City Clerk

APPROVED AS TO FORM:

Bob C. Sterbank, City Attorney

Ordinance No.: 12-941
Filed with the City Clerk: 12-4-12
Passed by the City Council: 11-27-12
Date of Publication: 12-6-12
Effective Date: 12-11-12

Gray & Osborne, Inc.
CONSULTING ENGINEERS

October 25, 2012

Ms. Jennifer Kropack
Washington State Department of Health
Northwest Drinking Water Regional Operations
20435 – 72nd Avenue South, Suite 200
Kent, Washington 98032-2358

SUBJECT: WATER SYSTEM COMPREHENSIVE PLAN
CITY OF DUPONT (ID #20500), PIERCE COUNTY, WASHINGTON
G&O #10242.00

Dear Ms. Kropack:

On behalf of the City of DuPont, we are providing this amended response to the Department of Health (DOH) comment No. 17 regarding the 2011 Water System Comprehensive Plan for the City of DuPont. DOH comment and question appears in italics followed by the City's response.

1. *Appendix J. Cross Connection Control (CCC). Per sanitary survey comment #3, please explain the roles of City departments with authority, and how communication is occurring for program success. Please also add a summary to describe the findings of your last CCC report. Where have efforts been focused the past years, where are the successes, where are future commitments needed for the next six years, and describe the resources for this program. See enclosed example. Please clarify. Will the draft August 2011 CCCP be adopted with this plan?*

   The City department with authority to administer Cross Connection Control (CCC) is a combination of the Building Department and the Water Department. The Building Department is responsible for ensuring that CCC devices are included in planning documents for all new construction. The Building Department relies on the Water Department to determine the type of CCC that is required in a particular application, if necessary. The Water Department is responsible for ensuring annual backflow testing is performed and reported to its Department on an annual basis. Authority for ensuring compliance once CCC devices have been installed is the sole responsibility of the Water Department.

The Annual Summary Report for Year 2011 for Public Water System Cross-Connection Control Activities shows the City served 16 connections considered High-Hazard Premises. Of these 16 connections, 13 had an installed Air Gap (AG) or Reverse Pressure device (RP) for premises isolation in place. All of those 13 connections were inspected (AG) or tested (RP). Three systems were granted an exception from premises isolation and include: a car wash, a chiropractors practice, and a boarding house. A total of 1,071 Premises Isolation Preventers (303) and In-Premises Protection Preventers (768) including those to be High-Hazard Premises were tested or inspected during 2011. Of the 1,071 devices, 44 failed the inspection or testing, equating to approximately 4 percent.

During the past few years, the City has been focused on standardizing its policy on departmental responsibilities for cross connection control and record keeping. In addition, the City of DuPont Water Department has performed the following tasks:

- Monitored over 1,000 backflow assemblies annually. Monitoring requires notifying customers of the requirement for annual testing of their backflow assembly devices.
- The City has worked with key businesses that were not formerly sufficiently isolated and brought them into compliance with City Code and DOH regulations.
- Instituted a computer database of all known backflow prevention devices within its water service area and is able to update testing and inspection records quickly and accurately.

In the next six years the City of DuPont will perform the following tasks:

- Continue to streamline its customer follow-up notification procedures when a testing or notification report is not received on time.
- Continue to work with customers (existing and new) on industry premises isolation advances to ensure City Code compliance.
- Focus on customer installation of premises isolation that currently has in-premises protection prevention at the tenant space or fixture (dentists, medical care facility).

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- Complete a "Memorandum of Understanding" between the CCC Program Manager (under the Public Works Department) and the City of DuPont Building Official (under the Building Department). This will allow the departments to work together on cross-connection control to more effectively serve the City of DuPont.

Resources for the City's CCC program are sufficient to maintain the database that has been developed and conduct the necessary follow-up with customers that are out of compliance with CCC regulations. The financial responsibility of installation and testing/inspecting the backflow prevention devices is borne by the customer.

We hope this response adequately addresses your comment. If you have any questions, please contact me at (360) 292-7481.

Very truly yours,

GRAY & OSBORNE, INC.

Eric Noah

EN/sp
Encl.

cc: Mr. Peter Zahn, City of DuPont
Mr. Fred Foreman, City of DuPont

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Office of Drinking Water

Public Water System Cross-Connection Control Activities
Annual Summary Report for Year 2011

Part 1: Public Water System (PWS) and Cross-Connection Control Specialist (CCS) Information

PWS ID: 20500	PWS Name: DUPONT WATER SYSTEM, CITY OF	County: PIERCE
Provide name and Cert No. of CCS who develops and implements your CCC program		
CCS Name (last, first & mi): Foreman, Fred		CCS Phone: (253) 912-5381
CCS Cert No.: 2854	BAT Cert. No. (if applicable): B5778	
CCS is (check one):	PWS owner or employee ☑ On contract to PWS ☐ Volunteer or other ☐	

Part 2: Status of Cross-Connection Control (CCC) Program at end of 2011

PWS has(check one box in each column below):	
A written CCC program plan Y ☑ N ☐	CCC implementation activities Y ☑ N ☐

(Written program may be a separate document, or part of water system plan or small water system management program).

Provide information regarding PWS's specific CCC Program Elements

Program Element Number	Description of Element [See WAC 246-290-490(3)]	This Program Element is Currently:	
		Included in Written Program	Being Implemented or Is Completed
1	Legal Authority Established	Y ☑ N ☐	Y ☑ N ☐
2	Hazard Evaluation Procedures and Schedules	Y ☐ N ☑	Y ☑ N ☐
3	CCC Procedures and Schedules	Y ☐ N ☑	Y ☑ N ☐
4	Certified CCS Provided	Y ☑ N ☐	Y ☑ N ☐
5	Backflow Preventer Inspection and Testing	Y ☑ N ☐	Y ☑ N ☐
6	Testing Quality Control Assurance Program	Y ☑ N ☐	Y ☑ N ☐
7	Backflow Incident Response Procedures	Y ☐ N ☑	Y ☑ N ☐
8	Public Education Program	Y ☑ N ☐	Y ☑ N ☐
9	CCC Records	Y ☑ N ☐	Y ☑ N ☐
10	Reclaimed Water Permit	Y ☐ N ☐ N/A ☑	Y ☐ N ☐ N/A ☑

Part 3A: System Characteristics at End of 2011

Indicate the number of connections of each type that the PWS serves (whether or not they are protected by backflow preventers). **Estimate if necessary.**

Type of Service Connection	Number
Residential (As defined by PWS)	3374
All Other (Include dedicated fire sprinkler and irrigation lines and PWS-owned facilities such as water and wastewater treatment plants and pumping stations, parks, piers and docks.)	276
Total Number of Connections	3650

Part 3B: Cross-Connection Control for High-Hazard Premises or Systems Served by the PWS

If PWS does not serve any high-hazard premises or systems, check here ☐ and go to Part 4A.

- Complete all cells. Enter zero (0) in cells if PWS does not serve such premises.
- Estimate number of connections served if necessary (OK to use phone book).
- Hazard evaluations do not need to be done to complete this table.

Type of High-Hazard Premises or Systems [WAC 246-290-490(4)(b)]	Number of Connections at end of 12/31/2011			
	A. Being Served Water by PWS[1]	B. With Premises Isolation by AG/RP	C. With Column B AG Inspected or RP Tested [2]	D. Granted Exception from Mandatory Premises Isolation
Agricultural (farms and dairies)	0	0	0	0
Beverage bottling plants (including breweries)	0	0	0	0
Car washes	1	0	0	1
Chemical plants	0	0	0	0
Commercial laundries and dry cleaners	2	2	2	0
Both reclaimed water and potable water provided	0	0	0	0
Film processing facilities	0	0	0	0
Dedicated fire protection systems with chemical addition or using unapproved auxiliary supplies	0	0	0	0
Food processing plants (including canneries, slaughter houses, rendering plants)	0	0	0	0
Hospitals, medical centers, nursing homes, veterinary, medical and dental clinics, and blood plasma centers	8	6	6	2
Separate irrigation systems using purveyor's water supply and chemical addition[4]	1	1	1	0
Laboratories	0	0	0	0
Metal plating industries	0	0	0	0
Petroleum processing or storage plants	0	0	0	0
Piers and docks	0	0	0	0
Radioactive material processing plants or nuclear reactors	0	0	0	0
Survey access denied or restricted	0	0	0	0
Wastewater lift/pump stations (non-residential only)	3	3	3	0
Wastewater treatment plants	0	0	0	0
Unapproved auxiliary water supply interconnected with potable water supply	1	1	1	0
	0	0	0	0
Totals	16	13	13	3

[1]Count multiple connections or parallel installations as ***separate*** connections.

[2]Count only those connections with AG or RPBA installed for premises isolation. Don't include connections with in-premises protection only, or connections with DCVA/DCDAs installed for premises isolation.

[3]Count only those connections whose premises isolation preventers were inspected (AG) or tested (RPBA) during 2011.

[4]For example, dedicated lines to irrigation systems in parks, playgrounds, golf courses, cemeteries, estates, etc.

[5]Premises with hazardous materials or processes (requiring isolation by AG or RPBA) such as: aircraft and automotive manufacturers, pulp and paper mills, metal manufacturers, military bases, and wholesale customers that pose a high hazard to the PWS. May be grouped together in categories, e.g.: other manufacturing or other commercial. If needed, attach additional sheet giving same information as requested in table.

Part 3C: Cross-Connection Control for Medical Category High-Hazard Premises Served by the PWS

If PWS does not serve any medical type premises, check here ☐ and go to Part 4A.

- Complete all cells. Enter zero (0) in cells if PWS does not serve such premises.
- Estimate number of connections served if necessary (OK to use phone book).
- Hazard evaluations do not need to be done to complete this table.

Type of High-Hazard Premises or Systems [WAC 246-290-490(4)(b)]	Number of Connections at end of 12/31/2011			
	A. Being Served Water by PWS[1]	B. With Premises Isolation by AG/RP	C. With Column B AG Inspected or RP Tested[2]	D. Granted Exception from Mandatory Premises Isolation
Hospitals				
Hospitals (include psychiatric hospitals and alcohol and drug treatment centers)	0	0	0	0
Facilities for Treatment and Care of Patients Not Located in Hospitals Counted Above				
Same day surgery centers	0	0	0	0
Out-patient clinics and offices	1	1	1	0
Alternative health out-patient clinics and offices	0	0	0	0
Psychiatric out-patient clinics and offices	0	0	0	0
Chiropractors	1	0	0	1
Hospice care centers	0	0	0	0
Childbirth centers	0	0	0	0
Kidney dialysis centers	0	0	0	0
Blood centers	0	0	0	0
Dental clinics and offices	5	5	5	0
Facilities for Housing Patients				
Nursing homes	0	0	0	0
Boarding homes	1	0	0	1
Residential treatment centers	0	0	0	0
Other Medical-Related Facilities				
Mortuaries	0	0	0	0
Morgues and autopsy facilities (not in hospitals)	0	0	0	0
Veterinarian offices, clinics and hospitals	0	0	0	0
All other (describe in Part 6: Comments on page 6)	0	0	0	0
Totals	8	6	6	2

[1]Count multiple connections or parallel installations as ***separate*** connections.

[2]Count only those connections with AG or RPBA installed for premises isolation. Don't include connections with in-premises protection only, or connections with DCVA/DCDAs installed for premises isolation.

[3]Count only those connections whose premises isolation preventers were inspected (AG) or tested (RPBA) during 2011.

Part 4A: Backflow Preventer Inventory and Testing Data During Year 2011

- Complete all cells. Enter zero (0) if there are no backflow preventers in that category.
- Count only the backflow preventers that the PWS relies upon for protection of the distribution system. If your records do not distinguish between premises isolation and in-premises protection preventers, enter all data in Premises Isolation section and check the box.
- Count AVBs on irrigation systems only. **If you do not track AVBs, enter "UNK".**
- Count multiple tests or failures for any particular backflow preventer as one test or failure for that backflow preventer.
- Multiple Service or Parallel Connections: Count each assembly separately.
- Assemblies on Dedicated Fire or Irrigation Lines: Count as Premises Isolation Assemblies.

If PWS does not track AVBs Check here: ☐

	Backflow Preventer Category and Testing/Inspection Information	Air Gap	RPBA	RPDA	DCVA	DCDA	PVBA	SVBA	AVB
Premises Isolation, including preventers isolating PWS-owned facilities. ***If In-Premises Protection preventers are also included, check here.*** ☐									
Rows 1-3 pertain ONLY to Premises Isolation preventers in service at beginning of 2011									
1	In service on 1/1/2011	0	13	0	240	48	0	0	0
2	Inspected and/or Tested in 2011[1]	0	13	0	240	48	0	0	0
3	Failed Inspection or Test in 2011	0	3	0	14	2	0	0	0
Rows 4 - 6 pertain ONLY to NEW Premises Isolation preventers installed during 2011									
4	New preventers installed in 2011[2]	0	1	0	1	0	0	0	0
5	Inspected and/or Tested in 2011[1]	0	1	0	1	0	0	0	0
6	Failed inspection or test in 2011[3]	0	0	0	0	0	0	0	0
7	Preventers taken out of service in 2011[3]	0	0	0	0	0	0	0	0
Premises Isolation Total at end of 2011[4]		0	14	0	241	48	0	0	0
In-Premises Protection (Fixture Protection or Area Isolation), including preventers within PWS-owned facilities.									
Rows 8 - 10 pertain ONLY to In-Premises Protection Preventers in service at beginning of 2011									
8	In service on 1/1/2011	0	60	0	684	0	6	0	4
9	Inspected and/or Tested in 2011[1]	0	0	0	0	0	0	0	0
10	Failed Inspection or Test in 2011	0	4	0	19	0	0	0	0
Rows 11 - 13 pertain ONLY to NEW In-Premises Protection Preventers installed during 2011									
11	New preventers installed in 2011[2]	0	0	0	14	0	0	0	0
12	Inspected and/or Tested in 2011[1]	0	0	0	14	0	0	0	0
13	Failed inspection or test in 2011	0	0	0	2	0	0	0	0
14	Preventers taken out of service in 2011[3]	0	0	0	0	0	0	0	0
In-Premises Protection Total at end of 2011[4]		0	60	0	698	0	6	0	4
Grand Total at end of 2011		0	74	0	939	48	6	0	4

[1]Initial and/or routine annual inspection (for proper installation and approval status) and/or test (for testable assemblies only using DOH/USC test procedures).Includes preventers installed on connections where backflow prevention was not previously required and any preventers that replaced those in service at beginning of 2011. Replacement preventers may be of a different type than the original.

[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 2011. Replacement preventers may be of a different type than the original.

[3]New or existing preventers taken out of service, whether or not they were replaced by the same type or different type of preventer.

[4]Total at end of 2011 should be equal to the number of preventers in service at beginning of 2011 plus those installed during 2011 minus the number of preventers taken out of service during 2011.

Part 4B: Other Implementation Activities in 2011

Complete all cells. Enter zero (0) if not applicable.

Activity or Condition	Number
New service connections evaluated for cross-connection hazards to PWS in 2011.	57
New service connections requiring backflow protection to protect PWS.[1]	1
Existing service connections evaluated for cross-connection hazards to PWS in 2011.	14
Existing service connections requiring backflow protection to protect PWS.[1,2]	14
Exceptions granted to high-hazard premises per WAC 246-290-490(4)(b) in 2011.[3]	0
CCC enforcement actions taken by PWS during 2011.[4]	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]A DOH Exceptions to Hazard Premises Form *must* be attached for each exception granted during the year.

[4]"Enforcement actions" mean actions taken by the PWS (such as water shut-off, PWS installation of backflow preventer) when the customer fails to comply with PWS's CCC requirements.

Part 5: Backflow Incidents and "Off-Normal" Events in 2011

	Backflow Incidents, Risk Factors and Indicators during 2011	Number (Enter 0 if none)	Check if Data Not Available
Backflow Incidents during 2011			
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 2011			
3	Distribution main breaks per 100 miles of pipe.	0.00	☐
4	Low pressure events (<20 psi in PWS distribution system).	0	☐
5	Water outage events.	0	☐
Indicators of Possible Backflow during 2011			
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.).	2	☐
10	Received during BWA or PN events.[7]	0	☐
11	Number of these complaints received during low pressure or water outages events.	0	☐

[5]Complete and submit a Backflow Incident Report form for each known backflow incident.

[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 or clarifications to any of the information included in this report. Note for on-screen completion: Comments will not "word wrap" from one line to the next. Press to continue on new line. Maximum length of each comment is 255 characters, including spaces.

Part No.	Date Added	Comment
Gener	3/9/06	All new buildings and tenant improvements get a site survey, all new commercial & multi-family get premises isolation on fire & irrigation services, starting in 2005 all new commercial get premises isolation backflow preventer at the meter, existing commercial facilities that get plumbing permits get a site survey.
Gener	3/14/11	November of 2010 the City of DuPont's satellite Water System 22613R was connected to the DuPont Water System 20500P, backflow preventers in that system are counted as existing and had been evaluated and tracked
Pt 3A	3/14/11	Residential (as defined by PWS) This number is single family residential homes plus residential units in multifamily buildings
Pt 3A	4/24/12	Previous year, I incorrectly added the meters for the multifamily & the units, 2011 number is lower
Pt 4B	5/1/12	FYI 2011 was the first year we had to turn off water to an occupied residence due to no response to notices.

Part 7: Report Completion Information

I certify that the information provided in this CCC Activities Report is complete and accurate to the best of my knowledge.		
CCC Program Mgr. Name[1]: Fred Foreman		Title: Water Quality Spec. MW III
Signature:		Date: 05/01/2012
Phone: (253) 912-5381	E-mail: fforeman@ci.dupont.wa.us	
I have reviewed this report and certify that the information provided is complete and accurate to the best of my knowledge.		
PWS Mgr./Owner Name[2]: Scott Hein		Title: Public Works Supervisor
Signature:	Op. Cert. No.: 007319	Date: 05/01/2012

[1] CCC Program Manager is generally the CCS who is responsible for development and implementation of the PWS's CCC Program.

[2] The person that the CCC Program Manager reports to or other manager having direct responsibility and/or oversight of the CCC program.

Health

Office of Drinking Water

Cross-Connection Control Program Summary Report For 2011

Describe the characteristics of the PWS's CCC Program at the end of 2011. Complete this form only if PWS had written CCC program plan, policies or procedures at end of 2011.

Part 1: Public Water System (PWS) Identification

PWS ID: 20500	PWS Name: DUPONT WATER SYSTEM, CITY OF	County: PIERCE

Part 2: Cross-Connection Control (CCC) Program Characteristics

A. Type of Program Currently Implemented

Type of Program	Check One
Premises isolation only.	☐
Combination program: reliance on both premises isolation and in-premises protection.	☑
In transition from a combination program to a premises isolation only program.	☐

B. Coordination with Authority Having Jurisdiction (AHJ) on Cross-Connection Issues

Indicate the status of coordination with AHJs in your service area. The AHJ is the entity that enforces the Uniform Plumbing Code. *Check one box in each of last 3 columns for each AHJ in your service area.*

AHJ No.	Name of AHJ (e.g., the City or County Building Department)	PWS Currently:		AHJ Declined to Coordinate
		Coordinates with AHJ	Has Written Agreement with AHJ	
1	City of DuPont Building Department	Y ☑ N ☐	Y ☐ N ☑	Y ☑ N ☐
2		Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐
3		Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐
4		Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐
5		Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐

[1] If more than 5 AHJs, attach separate sheet giving the above information.

C. Corrective or Enforcement Actions Available to the Purveyor

Type of Corrective Action	Indicate Whether Available	Most Often Used (Check One)
Denial or discontinuance of water service.	Y ☑ N ☐	☑
Purveyor installs backflow preventer and bills customer.	Y ☐ N ☑	☐
Assessment of fines (in addition to elimination or control of cross-connection).	Y ☐ N ☑	☐
Other corrective actions (describe):	Y ☐ N ☐	☐

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 Protection 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 protection systems(FPS).	Y ☑ N ☐ N/A ☐
PWS coordinates with ***local Fire Marshal*** on CCC issues for FPS.	Y ☑ N ☐ N/A ☐
PWS ensures backflow prevention is installed before serving ***new*** connections with FPS.	Y ☑ N ☐
PWS requires retrofits to ***high***-hazard FPS.	Y ☐ No. of days allowed: 0 N ☐ N/A ☑
PWS requires retrofits to ***low***-hazard FPS.	Y ☐ No. of days allowed: 0 N ☐ N/A ☑

F. Backflow Protection 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.	Y ☑ N ☐ N/A ☐
PWS currently inspects AVBs upon repair, reinstallation or relocation.	Y ☑ N ☐ N/A ☐

G. Used Water

PWS prohibits, by ordinance, rules, policy or agreement, the intentional return of used water (e.g. for heating or cooling) into the distribution system.	Y ☑ N ☐
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 Protection for Auxiliary Water Supplies[1] NOT Interconnected with PWS

Indicate the minimum backflow preventer and type of protection required for service connections having unapproved auxiliary water supplies when they are NOT interconnected to the PWS. Check one box per row.

Existing service connections.	None ☐ DCVA ☑ RPBA ☐ AG ☐
Type of protection required.	None ☐ In-premises protection ☐ Premises isolation ☑
New service connections.	None ☐ DCVA ☑ RPBA ☐ AG ☐
Type of protection required.	None ☐ In-premises protection ☐ 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 Protection for Tanker Trucks and Temporary Water Connections

Minimum level of backflow protection (installed on or associated with the truck) required for tanker trucks taking water from PWS.	AG ☑ DCVA ☐ RPBA ☐ Not Specified ☐ Tanker trucks not allowed ☐
PWS requires tanker trucks to obtain water at designated filling sites each equipped with permanently installed backflow preventer(s).	Y ☐ (Min. protection: DCVA ☐ RPBA ☐) N ☐ N/A ☐ No sites provided ☑
PWS currently accepts tanker trucks approved by other PWSs without further inspection or testing.	Y ☐ N ☑ N/A ☐
Minimum level of backflow protection required for temporary water connections (e.g. for construction sites).	AG ☐ DCVA ☐ RPBA ☐ Not specified ☑ Temp. connections not allowed ☐
PWS requires testing each time the temporary connection backflow preventer is relocated.	Y ☐ N ☑ N/A ☐ (Temp. connections not allowed)
PWS provides approved backflow preventer for temporary connections.	Y ☑ N ☐ N/A ☐ (Temp. connections not allowed)

J. Backflow Protection for Non-Residential Connections

For each category shown, indicate whether PWS has non-residential connections of that type and the **minimum** level of ***premises isolation*** backflow protection required (whether or not PWS currently has that type of customer).

Type of Connection	PWS has Customers of this Type	Minimum Premises Isolation Backflow Protection Required
Commercial	Y ☑ N ☐	Not Required ☐ DCVA ☑ RPBA ☐
Industrial	Y ☑ N ☐	Not Required ☐ DCVA ☑ RPBA ☐
Institutional	Y ☑ N ☐	Not Required ☐ DCVA ☑ RPBA ☐

K. Backflow Protection for Wholesale Customers

Indicate whether the PWS requires backflow protection at interties with wholesale customers (other PWSs).

Type of Intertie	PWS has (plans to have) Customers of this Type	Backflow Protection Required
Existing	Y ☑ N ☐	Not specified / Not required ☑ Always required ☐ Required only if purchaser's CCC program is inadequate ☐ Minimum required (if applicable): DCVA ☐ RPBA ☐
New	Y ☐ N ☑	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).	Y ☐ N ☐ Doesn't Address ☑
PWS currently grants new Exceptions.	Y ☐ N ☑
PWS granted Exceptions in previous reporting years.	Y ☑ N ☐

Part 3: CCC Program Record-Keeping and Inventory

Indicate the type or name of computer software used by the PWS to track CCC records.

Cross-Track (BMI) ☐ BPMS ☐ XC2 (Engsoft) ☑ Tokay ☐ Other commercial CCC software (specify) ☐

Custom developed for or by PWS[1] ☐ Other non-CCC software (e.g. Excel) ☐ 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 4: Comments and Clarifications

Enter comments or clarifications to any of the information provided in this report.

Part No.	Date Added	Comment

Part 5: CCC Program Summary Completion Information

I certify that the information provided in this CCC Program Summary is complete and accurate to the best of my knowledge.		
CCC Program Mgr. Name[1]: Fred Foreman		Title: Water Quality Spec. MW III
Signature:		Date: 05/01/2012
Phone: (253) 912-5381	E-mail*: fforeman@ci.dupont.wa.us	
I certify that the information provided in this report accurately represents the status and description of this water system's CCC Program.		
PWS Mgr/Owner Name[2]: Scott Hein		Title: Public Works Supervisor
Signature:	Op. Cert. No.: 007319	Date: 05/01/2012

*Required Field. For security reasons, an e-mail address must be provided. DOH will e-mail you to confirm any changes made to your data

[1] The CCC Program Manager is generally the CCS responsible for developing and implementing the PWS's CCC program.

[2] The person that the CCC Program Manager reports to or other manager having direct responsibility and/or oversight of the CCC program. This person doesn't need to be in charge of the entire water system.

Office of Drinking Water

Exceptions to High Hazard Premises Isolation Requirements for 2011 Annual Summary Report

Exceptions forms must be completed and submitted to the Department of Health (DOH) with the Annual Summary Report per WAC 246-290-490(4)(b)(iii).

Complete and submit one form for each exception PWS granted:

- In 2011,
- Before 2011, if PWS didn't previously submit an Exceptions form to DOH.

Don't

- Duplicate previously submitted Exceptions forms.
- Submit any Exceptions forms for 2011, if PWS didn't grant any exceptions in 2011, and already submitted forms for exceptions granted before 2011.

This Exception is: Expired 12/31/2011

Part 1: Public Water System (PWS) Information

PWS ID: 20500	PWS Name: DUPONT WATER SYSTEM, CITY OF	County: PIERCE

Part 2: Premises Information

Name of Premises	PATRIOTS LANDING OPERATIONS LLC
Service Address	1600 MARSHALL CIRCLE, DuPont, WA 98327
Premises Type or Category - Refer to Table 9 of WAC 246-290-490(4)(b)	Hospitals, medical centers, nursing homes, veterinary, medical and dental clinics, and blood plasma centers
Additional Information or Description of Premises (to help explain why exception is appropriate):	During the orginal evlauation no indication that the facilty was any thing more than a over 55 mulityfamily apartment building. With the new tools "Resource Information for Completing 2006 ASR Medical Category Table". We now know that the facility has a Dementia care unit.

Part 3: Information Regarding Exception to Premises Isolation

Date of Hazard Evaluation	10/14/2010
Date Exception Granted or Renewed	01/01/2011
Expiration Date of Exception (If Any)	12/31/2011
Date of Next Hazard Evaluation	10/01/2011

Part 4: Justification for not Requiring Premises Isolation Using AG, RPBA, or RPDA.

- The following table shows typical reasons for not requiring mandatory premises isolation. *The WAC doesn't require purveyors to grant exceptions – exceptions are optional.*
- Purveyors may provide other reasons consistent with WAC 246-290-490(4)(b)(ii), i.e. no hazard exists for this particular service.

Reason that the Premises Do Not Pose a High Health Hazard to Public Water System	Check if Applicable
Medical/Health Services Facility not having laboratory or similar facilities, no water-connected X-ray equipment, e.g. Psychiatric or Counseling Office, outpatient clinics, etc.	☑
Dental Office having independent water supplies for dental work (no interconnection with purveyor's water system) and digital X-ray equipment, i.e. no water-connected X-ray or other dental equipment.	☐
"Bottling Plant" without bottling processes, e.g. Warehousing only.	☐
Laundry or Dry Cleaners without cleaning processes on premises, e.g. customer drop-off and/or pick-up only.	☐
Marina/Dock for small boat moorage only (no water/sewage facilities on board).	☐
Agricultural Premises with "hobby farm" (non-commercial) activities only.	☐
Chiropractor's office with digital X-ray equipment, i.e. no water-connected X-ray or other medical equipment.	☐
Mortuary facility with funeral services only, no water-connected equipment for processing or embalming bodies.	☐
Nursing or boarding home with no water-connected medical equipment, specialized plumbing, or other hazards.	☐

Part 5: Form Completion Information

I am the Cross-Connection Control Specialist (CCS) who granted this exception to mandatory premises isolation and certify that the information provided is complete and accurate to the best of my knowledge.		
Name: Fred Foreman		CCS Cert. No.: 2854
Signature:		Date: 03/14/2011
Phone: (253) 912-5381	E-mail*: fforeman@ci.dupont.wa.us	
I am the manager of the PWS and I concur with the granting of this exception to mandatory premises isolation and certify that the information provided is complete and accurate to the best of my knowledge.		
Name: Scott Hein		Title: Public Works Supervisor
Signature:	Op. Cert. No.: 007319	Date: 03/14/2011

*Required Field. For security reasons, an email address must be provided. DOH will email you to confirm any changes made to your data.

Gray & Osborne, Inc.
CONSULTING ENGINEERS

July 24, 2012

Ms. Jennifer Kropack
Washington State Department of Health
Northwest Drinking Water Regional Operations
20435 – 72nd Avenue South, Suite 200
Kent, Washington 98032-2358

SUBJECT: WATER SYSTEM COMPREHENSIVE PLAN
CITY OF DUPONT (ID #20500), PIERCE COUNTY, WASHINGTON
G&O #10242.00

Dear Ms. Kropack:

On behalf of the City of DuPont, we are providing this response to the Department of Health (DOH) comments regarding the 2011 Water System Comprehensive Plan for the City of DuPont. DOH comments and questions appear in italics followed by City's response.

PLANNING DATA

1. *Page 1-17. It is recommended that the intertie intergovernmental agreement with Joint Base Lewis-McChord be addressed now since the military base is working on a Water System Plan for the Fort Lewis water system which is due to be turned in during the winter of 2012.*

   The City of DuPont concurs that an intertie agreement with Joint Base Lewis-McChord be updated and the City will pursue this recommendation in the coming year.

2. *Page 1-6 and Figure 1-7. Please identify your retail service area (RSA) on the map and correct existing service area subtitle to say "RSA." Please also add narrative to this page regarding RSA and DuPont's duty to serve within it. The map now depicts both an existing and future service area. According to Pierce County's Coordinated Water System Plan (CWSP), the CWSP boundary equals the retail service area boundary, and includes both existing and future service area. If DuPont*

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wants a future service area beyond the CWSP boundary, please note on a separate map in your plan, and it will be kept on file with DOH.

Retail Service Area (RSA) characteristics and discussion appear on pages 1-24 and 1-25 and reference Figure 1-7. The discussion on page 1-6 only refers to the service area in general terms. Changes have been made to Figure 1-7 eliminating reference to 'Future Service Area.' The following text has been added under the heading, 'Retail Service Area' on page 1-24:

> The City of DuPont has identified its Retail Service Area in Figure 1-7. The City has a duty to provide service to all requests within its Retail Service Area unless the City can describe how a situation does not meet one or more of the following four threshold factors bulleted below. Additional detail is included in DOH's Duty to Provide Service Requirement fact sheet (DOH 331-366) in Appendix C.
>
> - **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.

3. *Please clarify. Since DuPont is a planned community, does this mean that the City will not provide service remotely within your RSA? Does it mean the City does not allow any exempt wells drilled within the retail service area?*

The City of DuPont has identified its Retail Service Area and has a Duty to Provide Service that is outlined in the previous response. Since the City is a planned community, any future development will be provided service within the Retail Service Area. The City has no plans to provide water service remotely within the Retail Service Area. The City currently does not allow the drilling of exempt wells within the Retail Service Area.

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4. *Please provide a signed local government consistency statement from the City and Pierce County for consistency with CWSP, as the County has no land use jurisdiction.*

Appended to this document is the Consistency Statement Checklist signed by the City of DuPont on October 25, 2011 and by Pierce County on January 26, 2012 (attached).

SYSTEM DEMAND, ANALYSIS, AND STANDARD SPECIFICATIONS

5. *Page 1-17. The plan states that there is a noticeable hydrogeological interference between Bell Hill Wells No. 1 and No. 3. What is the total available flow from these wells? Table 1-5 indicates that the combined capacity of the two wells is 1,900 gpm. Does this total take the interference into account?*

Yes. The well levels in Bell Hill Wells Nos. 1 and 3 are monitored and the operator is alerted when the water level is 10 feet above the pump level. When the water level drops to 5 feet above the pump level, the pump will shut down and the operator is alerted. When the water level in Bell Hill Well No. 1 is 10 feet above the pump level the well pumps approximately 840 gpm. Bell Hill Well No. 3 is operated using "Well Saver" software feature that automatically controls the wells output necessary to maintain the 10 feet water level above the pump. During peak season, Bell Hill Wells Nos. 1 and 3 operate for approximately 18 hours daily, which maintains the 10 feet of water above the pump and supplies the demand capacity.

6. *Page 6-5. Table 1-5 indicates that Bell Hill Well No. 2 has a capacity of 1,000 gpm. However the text indicates that the flow rate of the well is restricted to 400 gpm to avoid manganese MCL exceedances. Does the source capacity for the City take this into account?*

The source capacity analysis on page 3-23 states the City has the source capacity of 4,700 gpm. This reflects 600 gpm from Bell Hill No. 2, which is the quantity that can be pumped and blended with the other Bell Hill wells necessary to maintain a manganese level below the MCL. Page 6-5 states that flow is restricted to 400 gpm in order to maintain manganese levels below the MCL; however, the current 400 gpm set point can be adjusted upwards to 600 gpm, if needed, and still remain below the

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manganese MCL. The 400 gpm set point is simply a conservative level that allows the City to supply its customer's demands without affecting water quality.

7. *Page 1-20. The text states that the distribution system for the Historic Village has been replaced. However, Table 1-2 indicates that this improvement is incomplete. Please resolve this apparent discrepancy.*

The water mains in Historic Village that dated back to the 1920s have all been replaced. However, subsequent modest community expansion in the 1960s and 1970s installed asbestos cement (AC) water mains that have exceeded their useful life. It is these water mains which are now scheduled to be replaced. Additional details are included in Chapter 8 – Capital Improvement Program as project D-5.

8. *Page 3-27, Table 3-15. It is not clear how the values in the "Total" column were derived. The values appear to be understated from the required storage. Please verify the amount of required storage for the given years.*

It appears that 'Footnote 2' was mistakenly left out. Footnote 2 has been added and reads:

(2) WAC 246-290-235 (4) states, "Standby and fire suppression storage volumes may be nested with the larger of the two volumes being the minimum available, provided the local fire protection authority does not require them to be additive." However, since City of DuPont has adequate storage capacity, nesting has not been used in this analysis.

9. *Page 6-2. Please update the Hoffman Hill operation description to include Hoffman Hill Well No. 2. The description indicates that the smallest Bell Hill booster pump is the first to turn on as the Hoffman Hills reservoir level drops. However, the following paragraph indicates that Pump No. 6 runs continuously. Please resolve this apparent discrepancy.*

Page 6-2 has been revised to include the following Hoffman Hill operation description,

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"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 pump station to be the lead or the lag depending on set point settings. During peak demands, the smallest Bell Hill booster pump cannot meet demand and runs 24 hours per day, 7 days per week, providing approximately 300 gpm. When a Hoffman Hill well pump runs at 1,000 gpm, both pumps fill the upper reservoir and the Bell Hill booster pump turns off."

10. *Hydraulic Model. It is not clear whether the fire flow scenarios were run using Maximum Day Demand conditions. Please clarify the demand characteristics for the fire flow scenarios. Also, please clarify the status of operation, equalizing, and fire storage for the reservoir levels given in the simulation table.*

The fire flow scenarios were run using Maximum Day Demand conditions. The Hoffman Hill and Bell Hill Reservoirs were depleted of operational, equalizing, standby, and fire suppression storage by an amount equal to the totals shown in Table 3-15. For the purposes of modeling, 25 percent of the volume was removed from the Bell Hill Reservoir and 75 percent of the volume was removed from the Hoffman Hill Reservoir.

11. *It does not appear that a design detail for water main crossing with sanitary sewer crossings has been included in the City's Standard Details. Please include one. Thank you for including a detail on pipe encasements.*

The City of DuPont has a standard detail for Typical Utility Crossing 8.2-3 but does not specifically refer to sanitary sewer crossings since required separation between potable waterlines and sanitary sewers is governed by the State of Washington Department of Ecology Criteria for Sewage Works Design (revised August 2008, Publication No. 98-37 WQ). Details are described in Section C1-9 Special Requirements and shown in Figures C1-2 and C1-3 (appended to the end of this document). Additionally, the City of DuPont Public Works Standards Section 8.3.4.5 includes the following description regarding sanitary sewer separation:

"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

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underground power, telephone, and other facilities unless otherwise approved by the City."

12. *Page 3-5, Table 3-1. Will the system's general facility standards be adopted upon plan adoption?*

The City of DuPont Public Works Standards, which is referred to on page 3-5, Table 3-1 were adopted on September 13, 2011 by Ordinance No. 11-923, which is appended to this letter. The text in the table has been updated to reflect adoption of the Standards.

WATER QUALITY, AND OPERATION AND MAINTENANCE

13. *Chapter 6. Please describe how the following 2009 sanitary survey items have been addressed:*

Comment #1. Bell Hill overflow outlet screened or outfitted.
Comment #2. Create a tracking system of all valve locations, identify number of total valves, and annual exercising targets.
Comment #3. Bell Hill reservoir vent modified to downward facing.
Comment #4. Source sample taps added to your wells (see comment #16).

Comment #1: Bell Hill overflow outlet has been screened.
Comment #2: The City has developed a tracking system of all valve locations for 2-inch and larger within their GIS database. The database can be queried and includes information on size, manufacturer, date of last exercise, and installation date.
Comment #3: The Bell Hill Reservoir vent has been modified to face downward.
Comment #4: Source sample taps have been added prior to disinfection.

14. *Page 6-16. Please define the differences between Tier 1, 2, and 3 violations and the Public Notification timelines for each.*

The Public Notification guidelines and timelines have been added to the Public Notification section beginning on Page 6-16.

15. *The Coliform Monitoring Plan appears to require major revisions. One or more pages appear to be missing from the Coliform Monitoring Plan.*

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The number of required monthly coliform samples is 10 rather than 7 as the plan indicates. It appears the map may be outdated as it only includes seven sample locations plus one in the El Rancho Madrona distribution system. Please show the connection of the two distribution systems. Repeat sample locations do not appear to be identified for the routine sample site locations. It is not clear what the non-bolded locations are used for. It is not clear what the first column in the table indicates. It only goes up to number 3. Please include Groundwater Rule sample requirements for sources after a positive routine sample in the distribution system.

The Coliform Monitoring Plan has been updated and is appended to this response.

16. *Page 3-5 and 3-14. Add Groundwater Rule (GWR) narrative to Tables 3-2, 3-3, and 3-10. For water systems serving a population of 1,000 or greater: Your Coliform Monitoring Plan (CMP) needs to address the Triggered Source Monitoring (TSM) requirements of the GWR. Per GWR, you will need to collect a source sample from each operating groundwater source whenever a routine coliform sample is unsatisfactory. If you have multiple sources and not all sources contribute water to all routine coliform sample sites, you may use your TSM plan to gain approval to reduce the number of triggered source samples that are required on a site-by site basis for each routine sample site. If you have questions about developing the TSM portion of your CMP please contact John Ryding or Carol Stuckey for assistance, (253) 395-6775.*

Narrative discussing the Groundwater Rule (GWR) has been added to Chapter 3 (page 3-14). In addition, GWR sampling requirements have been added to the Coliform Monitoring Plan.

17. *Appendix J. Cross Connection Control (CCC). Per sanitary survey comment #3, please explain the roles of City departments with authority, and how communication is occurring for program success. Please also add a summary to describe the findings of your last CCC report. Where have efforts been focused the past years, where are the successes, where are future commitments needed for the next six years, and describe the resources for this program. See enclosed example. Please clarify. Will the draft August 2011 CCCP be adopted with this plan?*

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The City of DuPont has updated their Cross Connection Control Program for this current Water System Plan Update. This most current CCCP has replaced the draft in Appendix J.

SOURCE PROTECTION

18. *Please provide documentation that educational and notification letters have been sent to all residences in the 1-year time of travel (TOT), and all businesses in the 10 year TOT, and to all responder agencies.*

The City of DuPont has compiled a list of residences within the 1-year time of travel (TOT) for the Bell Hill and Hoffman Hill wells. An inserted letter will be mailed with an upcoming billing that notifies the resident that they live within the wellhead protection area and inform them of proper material handling and disposal within this zone. In the case of the Hoffman Hill wells, almost the entire area outside the 1-year TOT but within the 10-year TOT is outside the City of DuPont city limits. The only business located within the 10-year TOT is the JBLM Golf Course. Similarly, the 10-year TOT (excluding the 1-year TOT) for the Bell Hill wells is located outside the City of DuPont city limits. In addition, as stated in the text of the Water System Plan, a majority of the wellhead protection areas outside the 1-year TOT is located on JBLM property. The City of DuPont will coordinate with JBLM public works staff on the most appropriate method to notify military base businesses of their location within the City's wellhead protection areas and to inform them of proper material handling and disposal within this protection zone.

FINANCIAL

19. *Table 8-1. It is good to see dedicated expenditures for increasing irrigation efficiency in 2012 since page 2-3 identifies a low usage day as 269,000 gallons in February 2005, and a high day of 2,990,000 gallons in July 2009.*

Noted.

OTHER

20. *Please provide documentation of the customer meeting to discuss the plan.*

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The City of DuPont held a public workshop to discuss the Water System Plan Update on August 16, 2011 at City Hall. Appended to the end of this letter are the minutes from that workshop.

21. *Please provide documentation of Elected's approval of the plan prior to our final approval per WAC 246-290-100 (8) (b).*

The City of DuPont requests that the Office of Drinking Water, once they are ready to approve this WSP, contact the City, which will then schedule a date for adoption.

22. *Please provide SEPA Register documentation and threshold determination.*

Appended to the end of this document is the City's SEPA Determination of Non-Significance for the DuPont Water System Comprehensive Plan Update dated October 27, 2011.

These responses should adequately address all of your comments. If you have any questions, please contact me at (360) 292-7481.

Very truly yours,

GRAY & OSBORNE, INC.

Dominic J. Miller, P.E.

DJM/sp
Encl.

cc: Mr. Dan Cardwell, Senior Planner, Pierce County Planning and Land Services
Tacoma-Pierce County Health Department
Ms. Amy Nielson, Ecology, SWRO
Mr. Peter Zahn, City of DuPont
Mr. Fred Foreman, City of DuPont

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Attachment 5: Water System Plan and Small Water System Management Program Consistency Statement Checklist

This checklist is intended to ensure consistency of water system planning documents with adopted local comprehensive plans and development regulations. Each local planning jurisdiction in which the water utility provides service will review the relevant water system planning information and provide a signed consistency statement to the utility for submittal to the Department of Health. If the local planning agency will not respond, the highest authority within the utility (chair of governing body, executive director of private companies, etc.) must sign to verify consistency of the plan information.

Water System Name: **DuPont Water System** PWS ID: **20500 P**

Planning Document Title: **Water System Comprehensive Plan** Plan Date: **October 2011**

Local Planning Jurisdiction: **Pierce County**

Consistency Statement (Reference Municipal Water Law Section 5 and 8, amendment to chapter 90.03.386 and chapter 43.20 RCW)	Page(s) in Planning Document (completed by utility)	Yes – No – Not Applicable
The retail service area, and any other areas not served by a separate public water system, and land use identified in the WSP is consistent with the *adopted comprehensive plan and adopted development regulations and policies.*	Figure 1-7 in WSP and pages 1-21 through 1-26.	Yes
For WSPs only: The growth projection used to forecast water demand for the retail service area is consistent with the adopted city/county's population growth projections (and commercial development projection if applicable). If a different growth projection was used, the alternative growth projection and methodology proposed is acceptable based on explanation given.	Page 2-11 through 2-15 in the WSP.	Yes
For WSPs only: New potential large water users (that may have a significant impact on the water system) that the city/county is aware of have been identified in the WSP.		N/A
For city-owned systems only: All policies regarding water service outside the corporate boundaries are included in this WSP. These policies are consistent with the adopted *comprehensive plan* and *development regulations.*	Pages 1-25 through 1-26 in WSP and Appendix C	Yes
Where the local planning agency is unable to sign a Consistency Statement: Provide documentation of efforts to coordinate with local agencies with a 60-day timeline for local agency to respond. Include: name of contact, date, type of effort attempted, and response from local agency.		N/A

I certify that the above statements are true to the best of my knowledge and that these statements support the conclusion that the subject-planning document is consistent with adopted comprehensive plans, development regulations, and other policies.

William D. Kingman
Signature

10/25/11
Date

WILLIAM D. KINGMAN, PLANNING MGR, CITY OF DUPONT
Printed Name, Title, & Jurisdiction

**For any issues of inconsistency, please provide comments on how they can be resolved. **

Pierce County
Department of Planning and Land Services

CHUCK KLEEBERG
Director

2401 South 35th Street
Tacoma, Washington 98409-7460
(253) 798-7210 • FAX (253) 798-7425

January 26, 2012

Peter L. Zahn
Public Works Director
City of DuPont
1700 Civic Drive
DuPont, WA 98327

RE: City of Dupont Water System Plan (DOH ID #20500 P) – Pierce County Final Approval

Dear Mr. Zahn:

Thank you for submitting the City of Dupont Water System Plan (WSP) on October 27, 2011 for Pierce County review per the Coordinated Water System Plan (CWSP). We have reviewed your submittal and find that it is not inconsistent with the County's Comprehensive Plan and Coordinated Water System Plan (CWSP). A Consistency Statement, signed by the County, is attached for your use. We will utilize the water service area (WSA) map dated November 7, 2011 to adjust our GIS data to reflect the changes depicted in this map.

Should you have any questions please contact me directly at 253-798-3683 or at cwillia@co.pierce.wa.us.

Sincerely,

Chad Williams
Associate Planner

cc: Jennifer Kropack, Washington State Department of Health
Joyce Chavez, Water Program Manager, JBLM
Brad Harp, Tacoma-Pierce County Health Department
Lou Dooley, Pierce County DEM
Tom Poste, Interim Fire Marshal, Pierce County
Dominic J. Miller, Gray & Osborne Inc.

Attachments (addressee and DOH only)

Printed on recycled paper

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

Local Government Consistency Review Checklist

Water System Name: CITY OF DUPONT PWS ID: 20500 P

Planning/Engineering Document Title: WATER SYSTEM Plan Date: 10/2011

Local Government with Jurisdiction: PIERCE COUNTY

WAC 246-290-108 Consistency with local plans and regulations:
Consistency with local plans and regulations applies to planning and engineering documents under WAC 246-290-106, 246-290-107, and 246-290-110(4)(b (ii).

1) Municipal water suppliers must include a consistency review and supporting documentation in its planning or engineering document describing how it has addressed consistency with **local plans and regulations**. This review must include specific elements of local plans and regulations, as they reasonably relate to water service as determined by Department of Health (DOH). Complete the table below and see instructions on back.

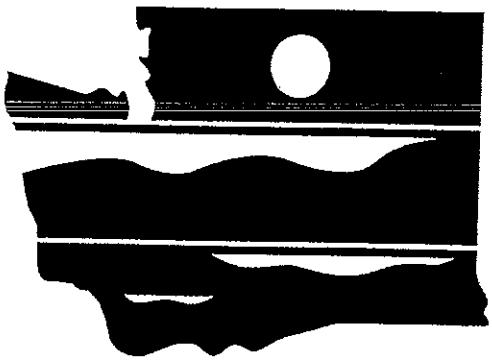
Local Government Consistency Statement	Page(s) in Planning Document	Yes – No – Not Applicable
a) The water system service area is consistent with the adopted land use and zoning within the applicable service area.		NA
b) The six-year growth projection used to forecast water demand is consistent with the adopted city/county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.		NA
c) Applies to cities and towns that provide water service: All water service area policies of the city or town are consistent with the utility service extension ordinances of the city or town.		NA
d) Service area policies for new service connections are consistent with the adopted local plans and adopted development regulations of all jurisdictions with authority over the service area [City(ies), County(ies)].		NA
e) Other relevant elements related to water supply are addressed in the water system plan, if applicable; Coordinated Water System plans, Regional Wastewater plans, Reclaimed Water plans, Groundwater Area Management plans, and Capital Facilities Element of Comprehensive plans.	1-12 THRU 1-24	Y

I certify that the above statements are true to the best of my knowledge and that these specific elements are consistent with adopted local plans and development regulations.

Chad R. Williams — Signature

1/26/12 — Date

CHAD R. WILLIAMS, ASSOCIATE PLANNER, PIERCE CO.
Printed Name, Title, & Jurisdiction



WASHINGTON STATE
DEPARTMENT OF
ECOLOGY

Criteria for Sewage Works Design

Water Quality Program

Revised August 2008
Publication No. 98-37 WQ

State of Washington
Department of Ecology
Olympia, Washington 98504

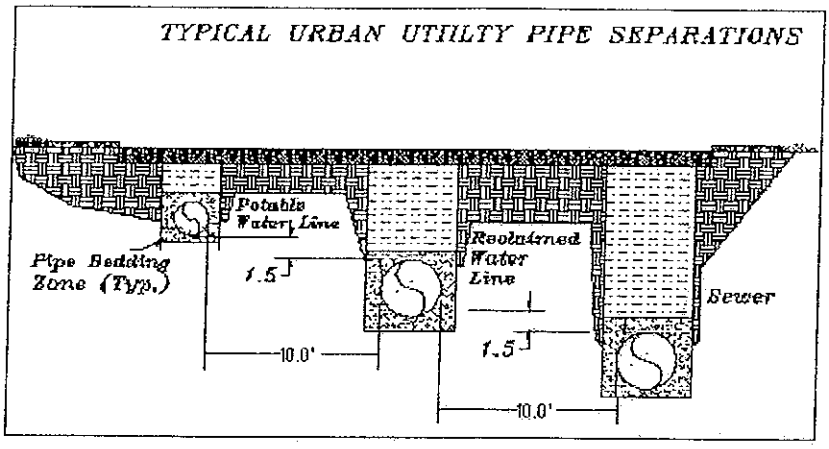


Figure C1-2 Required Separation between Potable Water Lines, Reclaimed Water Lines, and Sanitary Sewers, Parallel Construction

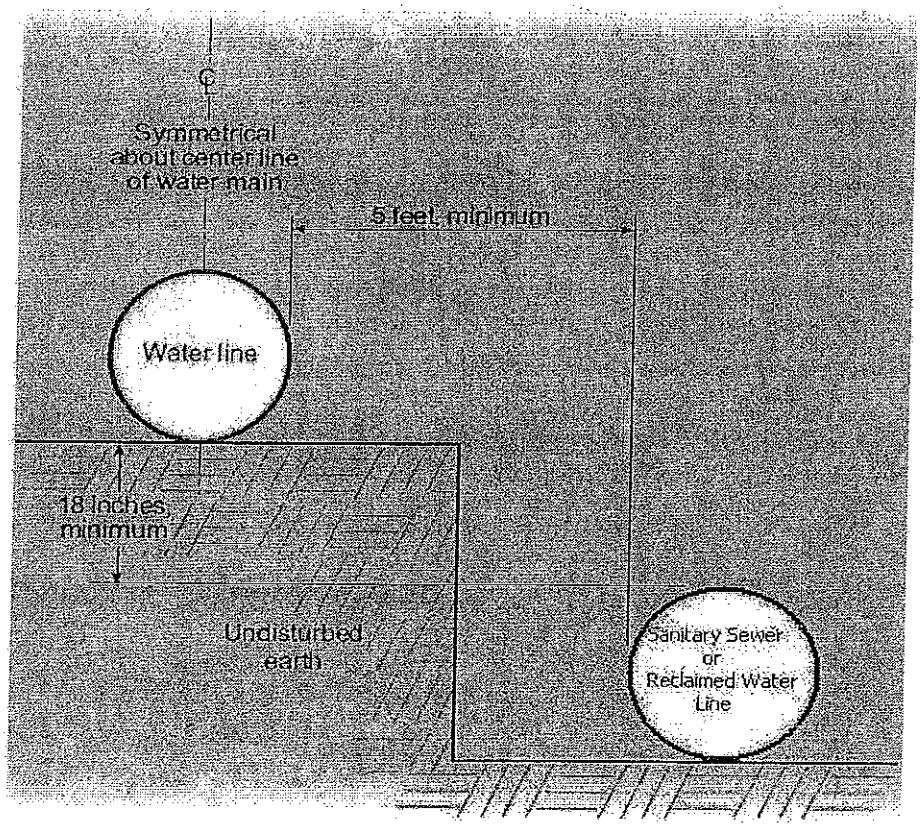


Figure C1-3 Required Separation between Water Lines and Sanitary Sewers, Unusual Conditions Parallel Construction

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

Month ??, 2012

Mr. / Ms. Resident
123 Your Street
DuPont, WA 98327

SUBJECT: DUPONT WATER SYSTEM, NOTIFICATION OF WELLHEAD PROTECTION AREA, PIERCE COUNTY, WASHINGTON

Dear Resident:

To protect the drinking water supply for the customers of the DuPont Water System, we are updated our wellhead protection program as required by state law. As part of our wellhead protection program, we have mapped the 6-month, 1-, 5-, and 10-year time-of-travel boundaries for our drinking water supply well (enclosed). This is called our wellhead protection area. We have enclosed a list of activities of concern that are typically associated with residential development that could impact water quality in our drinking water well(s).

Thank you for your support in protecting our drinking water. If you have any questions or concerns regarding the wellhead protection area, please contact me at (253) 964-8121.

Very truly yours,

DUPONT WATER SYSTEM

Peter Zahn
Public Works Director

Encl.

Month ??, 2012

Dear Owner/Operator:
123 Your Street
DuPont, WA 98327

SUBJECT: DUPONT WATER SYSTEM, NOTIFICATION OF WELLHEAD PROTECTION AREA, PIERCE COUNTY, WASHINGTON

Dear Owner/Operator:

To protect the drinking water supply for the customers of the DuPont Water System, we have updated our wellhead protection program as required by state law. As part of our wellhead protection program, we have mapped the area overlying the short-term recharge zone of our drinking water supply wells (these are available at City Hall). These are called our wellhead protection areas.

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 and its location within our wellhead protection area means that your activities have the potential to affect our customer's 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.

Thank you for your support in protecting our drinking water. If you have any questions or concerns regarding the wellhead protection area, please contact me at (253) 964-8121.

Very truly yours,

DUPONT WATER SYSTEM

Peter Zahn
Public Works Director

Encl.

DATE: August 16, 2011

TITLE: City of DuPont Water System Plan Update

ORIGINATOR: Peter Zahn, Public Works Director; Dominic Miller, Gray & Osborne

PREVIOUS ACTIONS, DISCUSSION, AND/OR PRESENTATION:
The City's current Water System Plan was adopted in late 2004 and approved by the Washington State Department of Health (DOH) in 2005. DOH requires municipal Water System Plans to be reviewed and updated every 6 years; therefore our current Plan is due to be updated. Staff began review of the current Water System Plan last year with the goal of completing the Water System Plan update for adoption and DOH approval in 2011.

BUDGET INFO: Update of the City's Water System Plan is funded by the Water Utility Fund, for which sufficient funds are appropriated in the adopted 2011 Budget.

BACKGROUND:
The City adopted its current Water System Plan in 2004, receiving approval of the Plan from DOH in 2005. Municipal Water System Plans are required to be updated every six years to reflect the most current State standards and regulations and to reflect the most current and planned functional and operational aspects of the related water system. Staff has been working with our consultants for several months to prepare the City's 2011 Water System Plan update.

The draft 2011 City of DuPont Water System Plan update provides a long-term planning strategy for the City's water system over six-year and twenty-year planning periods as required by DOH. The objectives of the Plan are to evaluate the performance and adequacy of the existing City of DuPont water system, to determine what will be necessary to meet the infrastructure needs for the next twenty years, and to identify compliance issues that may affect the operation of the water system. The updated Plan incorporates the capital projects and financial planning for ongoing operations and maintenance of the City's water system as discussed during the water utility rate study completed last year. In addition, the updated Plan incorporates the required elements of the Municipal Water Supply – Efficiency Requirements Act, Chapter 5 Laws of 2003 as they are currently interpreted. The 2011 Water System Plan update was prepared in accordance with the Washington State Department of Health (DOH) requirements specified in the Washington Administrative Code (WAC) 246-290.

RECOMMENDATION: This item is brought forward to provide an overview and discussion of the 2011 Water System Plan update, and to receive any comments and questions from the Council on the draft prior to submitting it to the State (Department of Health and Ecology), to Pierce County, and to JBLM (adjacent water purveyor)for their initial review and comment.

COORDINATING DEPARTMENT/STAFF CONTACTS:
Public Works / Peter Zahn, Public Works Director; Dominic Miller, PE, Gray & Osborne

City of DuPont
SEPA Determination of Non-Significance

DuPont Water System Comprehensive Plan Update
DuPont File No. SEPA 11-05

Description
The proposal is to update the DuPont Water System Comprehensive Plan, evaluate the performance and adequacy of the existing City of DuPont water system, determine what will be necessary to meet the infrastructure demands of the next twenty years, and identify compliance issues that may affect operation of the water system. In addition, the Plan incorporates the elements of the Municipal Water Supply – Efficiency Requirements Act, Chapter 5 Law of 2003 as they are currently interpreted. The Plan was prepared in accordance with applicable Washington State Department of Health requirements specified in Washington Administrative Code (WAC) 246-290.

The DuPont Water System Comprehensive Plan Update is an update of previous water system plans prepared for and adopted by the City of DuPont in accordance with the requirements set forth in WAC 246-290-100. The previous 2004 DuPont Water System Comprehensive Plan was completed with the assistance of Gray & Osborne, Inc., and was approved by the Washington Department of Health on January 7, 2005.

Proponent
City of DuPont

Location
City–wide. The City of DuPont is located in Sections 15, 22, 23, 24, 25, 26, 27, 28, 33, 34, 25, and 36, Township 19 North, Range 1 East, Pierce County, Washington State.

Lead Agency
City of DuPont.

Findings
1. The Applicant submitted:
   a. Draft DuPont Water System Comprehensive Plan Update dated August 2011.
   b. SEPA Checklist dated October 25, 2011.

2. The proposed DuPont Water System Comprehensive Plan Update is an update of the previously adopted 2004 DuPont Water System Comprehensive Plan that was completed with the assistance of Gray & Osborne, Inc., approved by the Washington Department of Health on January 7, 2005.

3. The proposal is consistent with DuPont Comprehensive Plan policies regarding utilities and capital facilities.

CITY OF DUPONT

PIERCE COUNTY, **WASHINGTON**

WATER SYSTEM COMPREHENSIVE PLAN

DOMINIC J. MILLER
STATE OF WASHINGTON
35679
REGISTERED
PROFESSIONAL ENGINEER
12/12/12

G&O #10242
AUGUST 2011

Gray & Osborne, Inc.
CONSULTING ENGINEERS

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EXECUTIVE SUMMARY

The 2011 City of DuPont Water System Plan provides a long-term planning strategy for the City's water department over six-year and twenty-year planning periods. The objectives of this Plan are to evaluate the performance and adequacy of the existing City of DuPont water system, to determine what will be necessary to meet the infrastructure demands for the next twenty years, and to identify compliance issues that may affect operation of the water system. In addition, the Plan incorporates the elements of the Municipal Water Supply – Efficiency Requirements Act, Chapter 5 Laws of 2003 as they are currently interpreted. The Plan was prepared in accordance with the Washington State Department of Health (DOH) requirements specified in Washington Administrative Code (WAC) 246-290.

The following elements are required by DOH to be addressed in a Plan:

- Chapter 1: Water system history, inventory of facilities, policies and the relationship of this Plan to other planning documents.

- Chapter 2: Basic planning data including existing and future estimates of population, water production, and water consumption.

- Chapter 3: Overview of water quality standards, monitoring results, and a schedule of future monitoring requirements. Identification of system performance standards, and facility analyses of source capacity, water rights, storage capacity, booster pumping stations, treatment and distribution. Analysis of distribution system hydraulic capacity to meet existing and future peak hour demand and fire flow demand.

- Chapter 4: Water Use Efficiency Program. Discussion of existing and future water efficiency measures and goals.

- Chapter 5: Wellhead Protection Program description and management plan.

- Chapter 6: The Operation and Maintenance section contains an analysis of existing operation and maintenance procedures, cross-connection control program, coliform monitoring plan, and recommendations for improvements to the operation and maintenance of the water system.

- Chapter 7: Discussion of the City of DuPont's distribution facilities design standards and construction standards.

- Chapter 8: Discussion of proposed capital improvements to address system deficiencies.

- Chapter 9: A six and twenty-year financial plan for improvements identified in Chapter 8 along with identification of potential funding mechanisms.

- Appendices: Additional required planning elements, including developer construction standards, hydraulic model results, detailed cost estimates for the proposed capital improvements, and a SEPA checklist.

The City of DuPont formerly operated two discrete water systems; the main City of DuPont system and the small El Rancho Madrona system. The larger system contains two storage reservoirs and serves three pressure zones, the El Rancho Madrona system was connected to the larger system in 2010. The existing El Rancho Madrona well, reservoir, and booster pump station are now decommissioned from service.

The City of DuPont meets all applicable DOH regulations required for water quality. The City has consistently provided a high quality of drinking water to its service area. No system deficiencies are noted with the exception of the high manganese concentrations in Bell Hill Well No. 2, which is blended to reduce levels below the minimum contaminant level (MCL).

As shown in Tables 3-12 and 3-13, the City of DuPont has adequate instantaneous water rights to meet projected demands through year 2026 and annual water rights to meet demands for the entire 20-year planning period. In planning for buildout, the City of DuPont will pursue transferring existing water rights from one point of withdrawal to another. This should be pursued with the no longer utilized wells at Historic Village and El Rancho Madrona. In addition, the City of DuPont has already submitted an application to transfer/change Weyerhaeuser water rights in the vicinity of the golf course, which will be used for both irrigation and consumption. From Table 1-6, the City of DuPont has 5,390 gpm of instantaneous water rights, however actual capacity is reduced to 5,100 gpm without use of the Historic Village and El Rancho Madrona wells. Assuming projected peak day production verse existing instantaneous water rights of 5,100 gpm, the City of DuPont has an instantaneous water right deficit of approximately 675 gpm at the end of the 20-year planning period.

From the same Table 1-6, the City of DuPont has annual water rights totaling 3,360 acre-feet per year. Once again minus the Historic Village and El Rancho Madrona wells, the total is reduced to 3,160 acre-feet per year, which equates to a surplus of 593 acre-ft in annual water rights through the 20-year planning period.

DOH requires that source production capacity meet or exceed Maximum Day Demand (MDD) of the water system and recommends that source capacity is capable of supplying MDD within an 18-hour period. For the City of DuPont, source capacity is exceeded in year 2024. However, when supplying MDD in a 24-hour period, there is no deficit.

With the recently upgraded chlorination treatment system at Bell Hill, no further treatment deficiencies exist within the City of DuPont.

No known storage deficiencies exist within the City based on the storage analysis presented in Chapter 3 and summarized in Table 3-15.

The City of DuPont operates two booster pump stations; the Bell Hill Booster Station and the Hoffman Hill Booster Station. The Bell Hill Booster Station will be upgraded with six new control valves and pumps to allow the booster station to operate more efficiently in the wide pressure ranges the booster station experiences. The Hoffman Hill Booster Station is not currently operating at peak efficiency. Modifications to this booster station will be reviewed in an engineering report in year 2012.

An analysis of both the condition and hydraulic capacity of the existing distribution system was conducted as part of this Plan. The primary recommendation is continuing to replace remaining asbestos cement (AC) water distribution lines in Historic Village. The AC water lines in El Rancho Madrona will be entirely replaced in 2012.

A hydraulic model of the City of DuPont water supply system was created using MWHSoft's H_20 NET software. Analysis of the water distribution system's ability to meet peak hour demands and fire flow plus maximum day demands was performed. Chapter 3 of the Plan describes the hydraulic analysis and lists a single project necessary to meet the 6 and 20-year distribution system demands.

Capital Improvement Projects (CIPs) to be funded by the City are located in Table 9-1 for the 6- and 20-year planning period of 2012 through 2031.

The financial status of the water system is described in Chapter 10 of this Plan. Past revenues and expenses are detailed, along with a projected 6-year budget. A budget for the financing of capital improvements has been provided. The City of DuPont water utility is in a sound financial position. The City should continue to secure various means of funding infrastructure improvements including grants (if available), loans, and developer financing where appropriate.

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 2004 Water System Plan was completed with the assistance of Gray & Osborne, Inc., and was approved by the Washington Department of Health (DOH) on January 7, 2005. This Plan is intended to meet all requirements of Part 246-290-100 WAC, including revisions of the Water Regulations known as the Water Use Efficiency Rule adopted in February 2007, and 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. Gray & Osborne's scope of work on this Plan was authorized by contract dated March 2010.

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 Improvement Options
- 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. In 2010, the El Rancho Madrona water system (22613R), consisting of 33 residential connections, was permanently connected to 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 1-7 shows the location of the retail water service area. A copy of the Water Facilities Inventory (WFI) 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 May 14, 2010 Comprehensive Land Use Plan 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 and 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.

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 No. 2, which has experienced higher concentrations of manganese. In 2000 and 2003, the majority of the water mains in the Historic Village were replaced with 8-inch ductile iron pipe.

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 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 and a 38,000 gallon concrete, ground level reservoir, all of which have been or are in the process of being decommissioned.

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 are 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.

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)	1970s
38,000-Gallon Concrete reservoir (El Rancho Madrona)	1970s
Bell Hill Well No.1 (S03)	1990
Bell Hill Well No.2 (S04)	1990
1,000,000 gal. Bell Hill Reservoir (NW Historic Village)	1992
Bell Hill Booster Pump Station	1992
3,535,000-Gallon Hoffman Hill Reservoir	1999
Hoffman Hill Well No.1 (S05)	1997
Bell Hill Well No.3 (S06)	1998
Hoffman Hill Booster Pump Station	2003
Hoffman Hill Well No.2 (S05)	2009
Integrate El Rancho Madrona/City of DuPont water systems(3)	2010

(1) Water rights currently being transferred to the City of DuPont.
(2) Not in operation since 1992.
(3) 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.

PROJECTS COMPLETED SINCE THE 2004 PLAN

Table 1-2 is the Capital Improvement prioritized summary from the previous City of DuPont Water System Comprehensive Plan, 2004. The summary shows the estimated cost, anticipated date of completion, and date completed.

TABLE 1-2

2004 Capital Improvement Plan Summary

Improvement Project	Estimated Cost in 2004 Dollars	Scheduled Date to Complete (year)	Date Completed (year)
Replace "Druck Probe" at Bell Hill Well No. 2	$3,000	2004	2009
Replace all six control valves at Bell Hill Booster Station	$21,000	2004	Incomplete
Irrigation control modifications (weather station)	$25,000	2004	Partially Complete

TABLE 1-2 – (continued)

2004 Capital Improvement Plan Summary

Improvement Project	Estimated Cost in 2004 Dollars	Scheduled Date to Complete (year)	Date Completed (year)
Internal inspection/routine cleaning at Bell Hill Reservoir	$7,000	2004	2009
Pursue additional water rights through WDOE	$10,000	2004	In process
GIS System Components (computer, software)	$15,000	2004	In process
Prepare Vulnerability Analysis	$20,000	2004	2004
Install security measures at various locations	$30,000	‘04, ‘05, ‘06	In process
Identify suitable location for new well	$65,000	2005	In process
Formalize Intertie Agreement with Joint Base Lewis-McChord	$5,000	2005	Incomplete
Convert Historic Village Reservoir to park equipment storage	$50,000	2005	2008
Install fluoride treatment at Bell/Hoffman Hills	$200,000	‘05, ‘06	Removed from list
Install VFDs at the Bell Hill Booster Station	$115,000	2005	In process
Upgrade telemetry at Bell Hill Booster Station	$25,000	2005	Incomplete
Replace El Rancho Madrona water mains	$326,000	2007	Incomplete
Connect El Rancho to DuPont water system	$100,000	2007	2010
Replace old Historic Village water mains	$439,000	2009	Incomplete
Internal inspection/routine cleaning at Hoffman Hill Reservoir	$7,000	2009	2009
Update Water System Comprehensive Plan	$65,000	2009	2010/2011
Internal inspection/routine cleaning at Bell Hill Reservoir	$14,000	’10, ‘16	Future
Internal inspection/routine cleaning at Hoffman Hill Reservoir	$14,000	’15, ‘21	Future
Complete additional well with 1,050 gpm	$1,000,000	2010	Removed from list
Complete additional well with 1,050 gpm	$1,000,000	2015	Future
Complete additional well with 1,050 gpm	$1,000,000	2019	Future
Leak Detection Survey(1)	$5,000	Annually	Annually
Conservation Program	$1,500	Annually	Annually
Annual Consumer Confidence Report	$1,500	Annually	Annually

(1) No leak detection survey has been completed.

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. A vicinity map is shown in Figure 1-1.

RETAIL SERVICE AREA

The City's last approved Comprehensive Land Use Plan was in 2001. A draft plan was completed in 2006 but never adopted by the City due to changes with Growth Management Act (GMA) timelines. An extension was granted by the Governor (SSB 6611, effective 6/10/2010) that moved the deadline for the review and evaluation of comprehensive land use plans and development regulations to on or before December 1, 2014 for Pierce County and all the cities within the county. Therefore, the City is subject to the approved 2001 Plan, which established 20-year land use and growth projections within the City limits as shown in Figure 1-2. The City limits encompass approximately 3,736 acres, the majority of which is still undeveloped. Development within the service area was 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 previous Comprehensive Land Use Plan. The 2001 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 most recent Comprehensive Plan.

TABLE 1-3

City of DuPont Village Names

Previous Village Designations	2001 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



CITY OF DUPONT

WATER COMPREHENSIVE PLAN

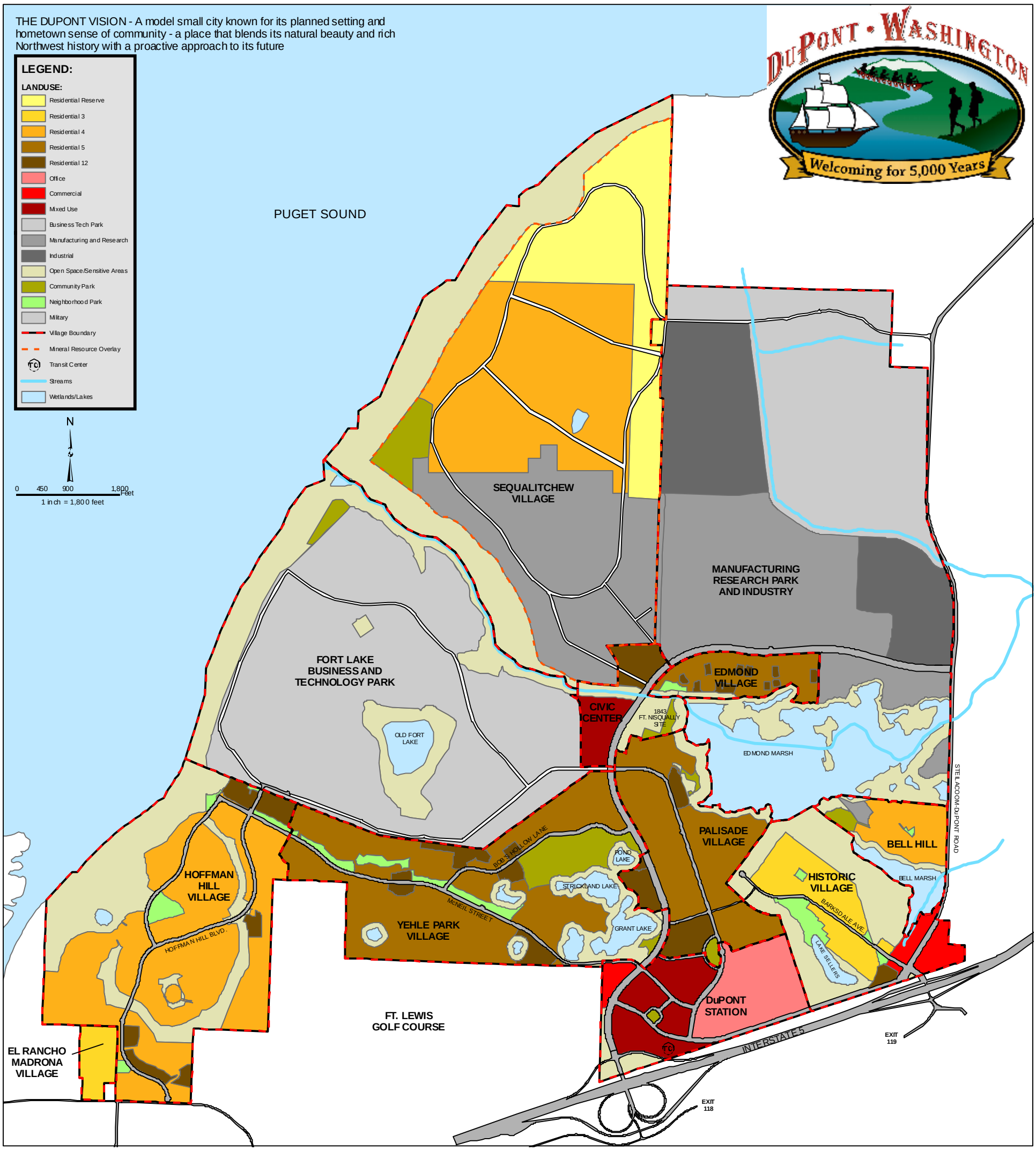
FIGURE 1-1

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



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 COMPREHENSIVE PLAN
FIGURE 1-2
LAND USE MAP

Gray & Osborne, Inc.
CONSULTING ENGINEERS

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.

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 1-5.

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.

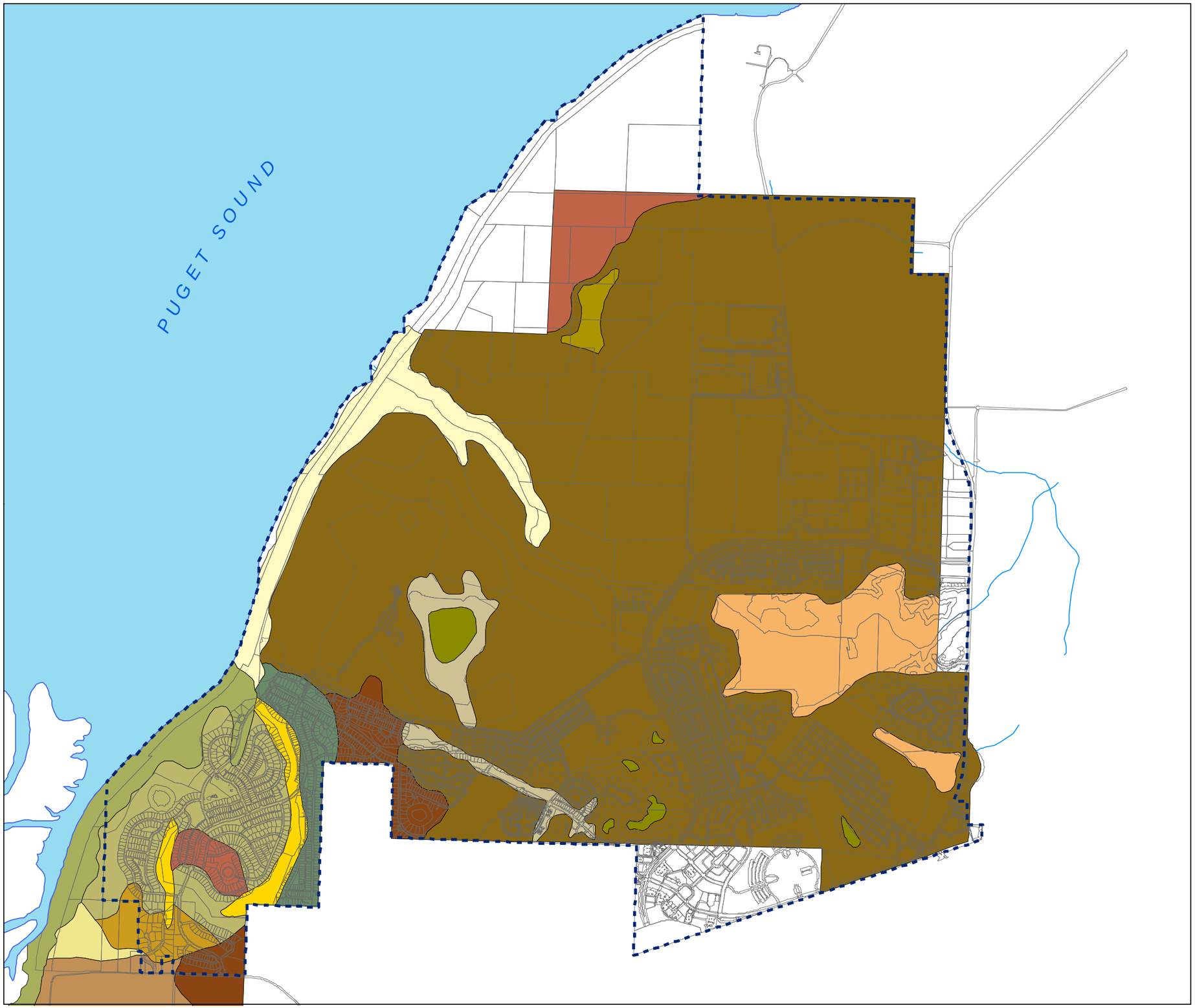
Sequalitchew Creek

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 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 2001 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



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 COMPREHENSIVE PLAN

FIGURE 1-3

SOILS MAP

Gray & Osborne, Inc.

CONSULTING ENGINEERS

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 Well Nos. 1 and 3 and Hoffman Hill Well Nos. 1 and 2). Bell Hill Well No. 2 is not developed in the same aquifer as Well Nos. 1 and 3 and Hoffman Hill Well Nos. 1 and 2. Bell Hill Well No. 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 1-4. 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 1-5 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 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, booster stations, and pressure reducing valves (PRVs).

SOURCE OF SUPPLY

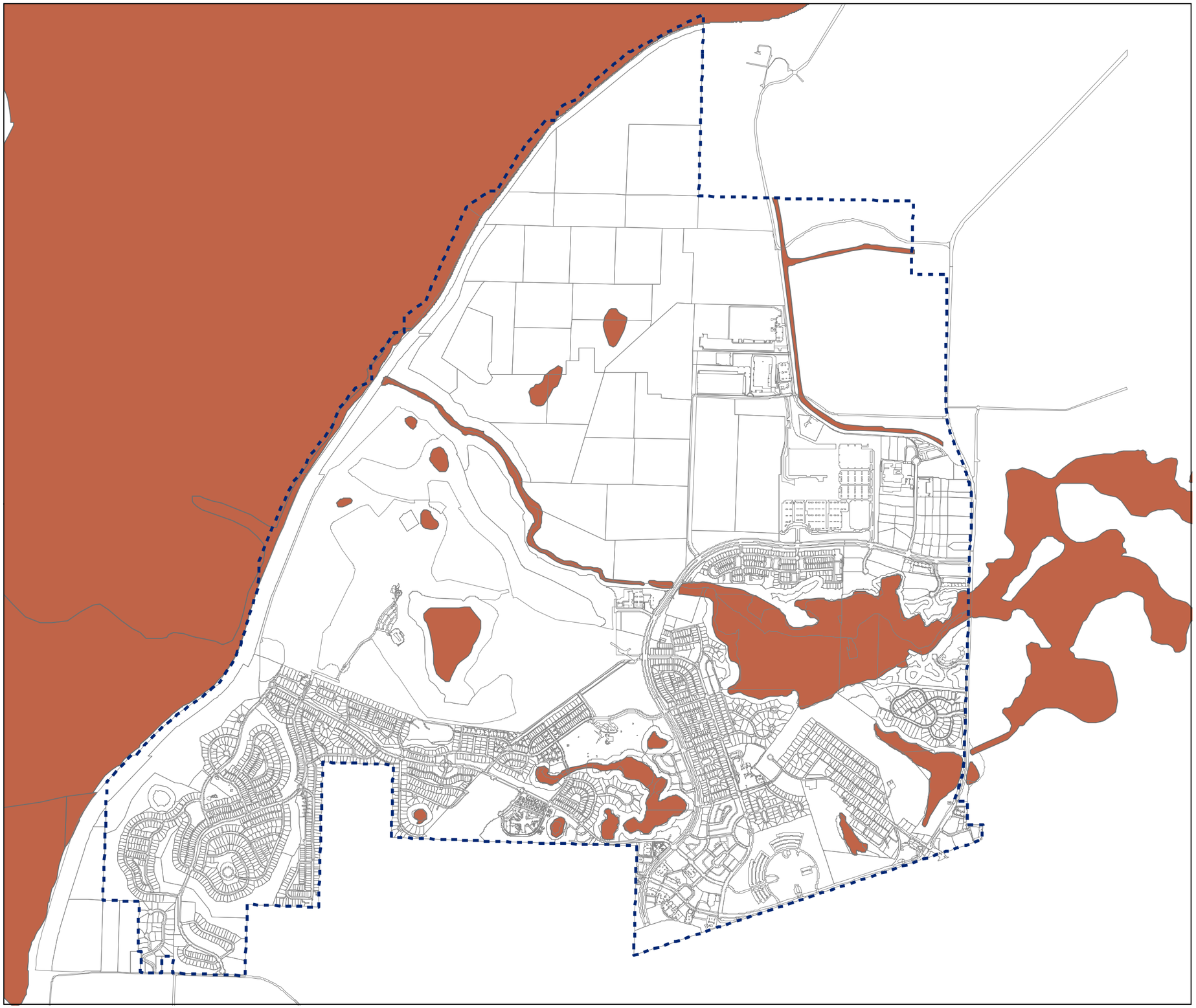
The City of DuPont currently utilizes only groundwater sources for its water supply. The City holds water rights for two wells in the Historic Village which are no longer in use, for three wells at Bell Hill, for two wells at Hoffman Hill, and for one well in El Rancho Madrona.

The Historic Village Wells, currently not in use, are completed in the shallow, unconfined Vashon aquifer. One of the wells is also located near a 30-inch Joint Base Lewis-McChord sewer line. The wells have historically experienced difficulties with bacteriological contamination, which may be attributable to the proximity of the sewer line. The capacity of these wells is 60 gpm and 150 gpm. They operate under a municipal water right and are not automatically subject to relinquishment for non-use. Due to water quality concerns, use of the Historic Village Wells has been suspended by the City. The potential future utilization of these sources for irrigation purposes is discussed later in this chapter.

The three Bell Hill wells and two Hoffman Hill wells supply the City water system from deeper aquifers with less susceptibility to contamination. Bell Hill Well Nos. 1 and 2 are equipped with an auxiliary power generator for continuous operation during power outages. Bell Hill Well Nos.1 and 2 are developed in different aquifers, with Well No. 2 experiencing a high concentration of manganese. In order to utilize Well No. 2, blending with Well No. 1 is required, however this does not allow for full utilization of the City's water right. Consequently, a third well, Bell Hill Well No. 3 was drilled in the same aquifer as Well No. 1 in order to maximize the blending potential of Well No. 2 and allow for more full utilization of the water right. Bell Hill Well No. 3 is located approximately 1,150 feet east of the previously installed Bell Hill Wells No. 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.

The El Rancho Madrona well, completed in the same aquifer as Bell Hill Well Nos. 1 and 3, provides service for that system alone. The City will begin the process to transfer the



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SCALE: 1"=1,800'

CITY LIMITS (UGA)

FLOODPLAIN

100 YEAR

CITY OF DUPONT

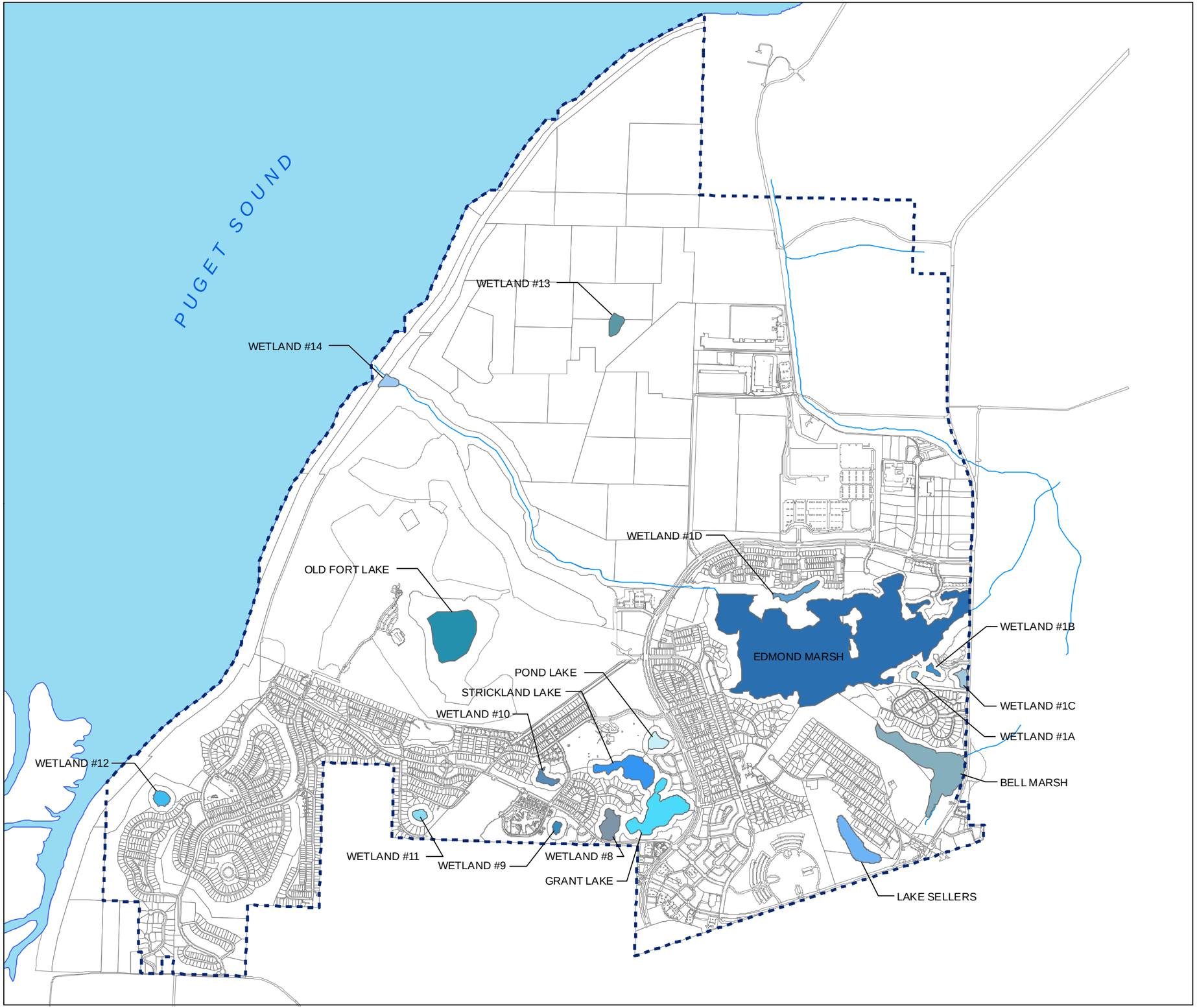
WATER SYSTEM COMPREHENSIVE PLAN

FIGURE 1-4

FEMA 100 YEARS FLOODPLAIN MAP

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SCALE: 1"=1,800'

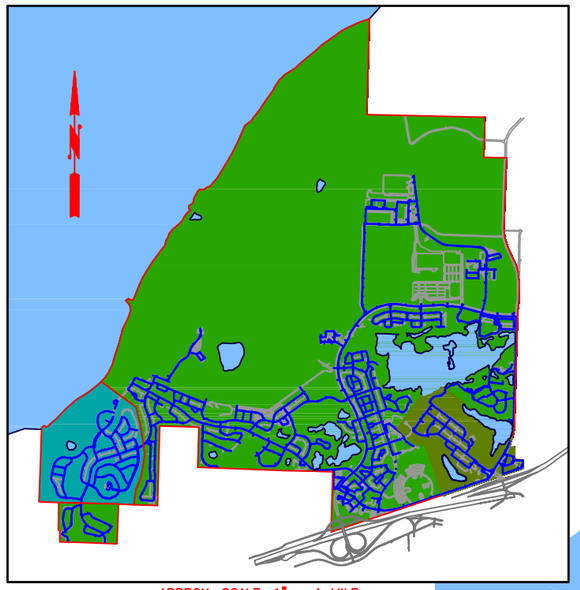
WETLANDS:

- 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 COMPREHENSIVE PLAN
FIGURE 1-5
WETLANDS MAP

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CONSULTING ENGINEERS



APPROX. SCALE: 1" = 1 MILE

HOFFMAN HILL WELL # 1 1100 GPM

3.0 MG RESERVOIR

HOFFMAN HILL BOOSTER STATION

HOFFMAN HILL WELL # 2 1100 GPM

BELL HILL 1.0 MG RESERVOIR

BELL HILL WELL # 2 1000 GPM

BELL HILL BOOSTER PUMP STATION

BELL HILL WELL #1 900 GPM

BELL HILL WELL # 3 1000 GPM

P U G E T S O U N D

530 ZONE

400 ZONE

400 ZONE

360 ZONE

HOFFMAN HILL

HISTORIC VILLAGE

LEGEND

- RESERVOIR
- WELL
- BOOSTER STATION
- PRV

APPROXIMATE SCALE: 1" = 2000'

CITY OF DUPONT

WATER COMPREHENSIVE PLAN

FIGURE 1-6

WATER SYSTEM SCHEMATIC

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CONSULTING ENGINEERS

El Rancho Madrona water right to the Hoffman Hill wells since the El Rancho Madrona water system was connected to the City of DuPont water system in November of 2010.

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 1-5.

TABLE 1-5

Existing Sources

Well	Depth (ft.)	Aquifer	Static Water Level (ft. below top of casing)	Well Pumping Capacity (gpm)
Bell Hill Well No. 1	300	Upper Salmon Springs	186	900
Bell Hill Well No. 2	516	Undifferentiated/ Outwash/Lakewood Glacial	187	1,000
Bell Hill Well No. 3	282.5	Upper Salmon Springs	186	1,000
Hoffman Hill Well No. 1	500	Upper Salmon Springs	221	1,100
Hoffman Hill Well No. 2	500	Upper Salmon Springs	221	1,100
El Rancho Madrona (offline)	293	Upper Salmon Springs	over 100	50

Bell Hill

Bell Hill Well No. 1, which is completed in the Upper Salmon Springs Aquifer, was originally drilled 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 No. 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 No. 1 provides approximately 62 feet of available drawdown to the top of the screen assembly.

The upper 362 feet of Bell Hill No. 2 was drilled 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 No. 1 during pump testing of Well No. 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 No. 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 No. 3 is completed in the same aquifer as Well No.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 No. 2.

Hoffman Hill

Hoffman Hill Well No. 1 and 2 both have 16-inch casings with 18-inch surface seals and are completed to a depth of approximately 500 feet below ground level. Both wells are completed in the Salmon Springs Aquifer with a screened interval depth of 295 to 375 feet below grade, which is 12 to 92 feet below mean sea-level (MSL). Well No. 2 is located approximately 1,900 feet northeast of Well No.1.

El Rancho Madrona

Like Bell Hill Well No. 1 and the Hoffman Hill wells, the El Rancho Madrona well is completed in the Salmon Springs Aquifer and is approximately 300 feet deep with a 50 gpm capacity. The 5-hp well pump delivered water to the adjacent El Rancho Madrona Reservoir. The El Rancho Madrona system was integrated with the City of DuPont water system in November 2010. The well will be decommissioned and the water right for El Rancho Madrona will be transferred to the Hoffman Hill water right through the Ecology application process.

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 1-6 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 B.

TABLE 1-6

City of DuPont Water Rights

Source	Current Well Pumping Capacity (gpm)	Water Right Number	Priority Date	Maximum Instantaneous Withdrawal (gpm)	Maximum Annual Withdrawal (acre ft.)	Supplementary Annual Withdrawal (acre ft.)
Historic Village Well No. 1[(1)]	--	G2-00800S (636)	November 11, 1925	60	44	0
Historic Village Well No. 2[(1)]	--	G2-00799S (635)	November 11, 1925	150	138	0
El Rancho Madrona	50	G2-20970C	April 27, 1973	80	18	0
Bell Hill Well No. 1	900	G2-27326C	April 22, 1988	900	1,149	0
Bell Hill Well No. 2[(2)]	1,000	G2-27450P	November 7, 1988	1,000	1,237	0
Bell Hill Well No. 3	1,000	G2-29489	April 25, 1997	1,000	0[(3)]	1,210[(3)]
Hoffman Hill Well Nos. 1 and 2	1,100 each well	G2-27663A	December 1, 1989	2,200	774[(4)]	1,922[(4)]
Total				**5,390**	**3,360**	**2,695**

(1) Due to poor water quality, the City is currently unable to use the Historic Village wells for municipal supply. Certificate 635 and 636 were issued as a municipal water right and are not automatically subject to relinquishment for non-use.

(2) Bell Hill Well No. 2 can produce 1,000 gpm, however, due to high manganese concentrations the well was routinely limited to a withdrawal rate of about 300 gpm. With the addition of Bell Hill Well No. 3 and its increased blending capability, the usable withdrawal rate has increased to approximately 600 gpm for Bell Hill Well No. 2.

(3) The annual quantity permitted from this well is based on an 18 hour-per-day pumping schedule at a rate of 1,000 gpm. The permitted annual quantity is supplemental to rights already held by the City of DuPont.

(4) Partially Supplemental. 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.

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 1-6, 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. Although the Historic Village wells are not currently in active use, they are available for emergency service or for other municipal purposes such as irrigation.

As shown in Table 1-6, the former El Rancho Madrona water system still has water rights associated with its well. The City of DuPont intends to pursue a transfer of those rights to another place of withdrawal within the DuPont water system.

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 1-7. Three Weyerhaeuser water rights were consolidated in April 2002 and are utilized for irrigation purposes on the golf course.

TABLE 1-7

Additional DuPont Area Water Rights

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

The Historic Village Wells and associated water rights have been considered for use in irrigation of parks and other public lands. However, given the limited capacity (240 gpm) of the Historic Village wells, their aging condition, and the extensive improvements and infrastructure necessary to implement a dedicated irrigation piping supply network, utilization of the wells for irrigation supply may not be a cost effective option.

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

A total of three wells have been constructed on the Bell Hill water facility site. Two of the wells are developed in vertically separated aquifers so there is no measurable interference if they run simultaneously. However, Well No. 2 exceeds the secondary maximum contaminant level (MCL) for manganese. This problem has been mitigated by blending this source with the other two well sources. Wells Nos.1 and 3 have excellent water quality. Blending is accomplished by adjusting pump run time cycles. The water is chlorinated prior to storage in the one million-gallon (MG) Bell Hill Reservoir. There is a noticeable hydrogeological interference between Well No. 1 and 3. To manage this interference, Well No. 3 has been equipped with Well Saver© software so that when the water level in Well No. 3 drops below a variable set point the pump control valve is throttled reducing flow. Well No. 1 is equipped with a low well shut off feature.

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.

The operation and maintenance of the treatment system will be discussed in 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, has been reconfigured for direct supply to the DuPont water system's 400-foot pressure zone. A meter was installed at the intertie located between the City of DuPont and JBLM. 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. The maximum design intertie flow rate for the intertie is 1,000 gpm. However, in emergency situations where the JBLM gradeline falls below that of the DuPont system, water from DuPont could also be used to supply JBLM. In order to activate the intertie, the City of DuPont must contact JBLM and JBLM personnel must physically open their secondary valve. Both the City of DuPont and JBLM must open separate valves to activate the intertie system. The City of DuPont and JBLM plan to develop a finalized Interlocal Agreement to formalize the conditions and requirements to access water. 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 C.

STORAGE

The City of DuPont currently owns and operates three storage facilities. Two reservoirs serve the main 400-foot HGL pressure zone; the 1.0 million gallon (MG) reservoir located at Bell Hill and the approximate 3.5 MG Hoffman Hill Reservoir serve the City water system. The El Rancho Madrona water system was served by a 38,000-gallon

ground level reservoir via booster pumps and a pressure tank until November 2010. It is now served primarily by the Hoffman Hill Reservoir.

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 approximate 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 1-8

Storage Facilities

Name	Type	Zone	Capacity (gallons)	Year Constructed	Height to Overflow (ft)	Diameter (ft)	Overflow Elevation (ft)
Bell Hill	Concrete	400	1,000,000	1991	23.8	85	273.8
Hoffman Hill	Steel	400	3,535,000	1999	24	160	401.5

PRESSURE ZONES

The City of DuPont water system operates on three 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, and Sequalitchew Village. The Hoffman Hill Booster Pump Station supplies water to the 530-foot HGL zone. Water from the Bell Hill Booster Pump Station and Hoffman Hill Reservoir serves the areas listed above at a nominal 400-foot HGL zone. The Historic Village at the 360-foot HGL is served from the upper 400-foot pressure zone through two pressure reducing valves (PRVs). 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 and the Hoffman Hill Booster Pump Station provide water for the City water system.

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. Pump Nos. 1, 2, and 3 each have a nominal capacity of 1,350 gpm and are driven by 50-hp motors. Pump Nos. 4 and 5 are 500 gpm in capacity with 20-hp motors. Pump No. 6 is driven by a 15-hp motor with a 350 gpm capacity. The pump station is fully operational via an auxiliary power generator.

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. 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 425 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. With one of the largest pumps out of service (500 gpm), the remaining three pumps are sized to provide peak day demand plus fire flow.

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 1-9

Booster Station Inventory

Booster Station	Date of Construction	Number of Pumps	Total Capacity	Motor (hp)
Bell Hill Booster Station	1992			
Bell Hill Pumps 1, 2, and 3		3	1,350 gpm	50 hp
Bell Hill Pumps 4 and 5		2	500 gpm	20 hp
Bell Hill Pump 6		1	350 gpm	15 hp
Total Rated Capacity		**5(1)**	**4,050 gpm(1)**	
Hoffman Hill Booster Station	2003			
Hoffman Hill Pump 1 and 2		2	425 gpm	25 hp
Hoffman Hill Pump 3 and 4		2	500 gpm	30 hp
Total Rated Capacity		**3(1)**	**1,350 gpm(1)**	

(1) The Number of Pumps and Total Capacity as shown are 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 1977 and included replacement of valves and hydrants, and installation of individual service meters. In 1997, construction of an emergency intertie with the adjacent Joint Base Lewis-McChord (formerly Fort Lewis) water system was completed. In 2000 and 2003, the original, 1920s Historic Village distribution system, composed primarily of 6-inch unlined cast iron pipe and a few hundred feet of 4-inch cast iron pipe was replaced. Piping improvements have also included the completion of a small number of loops to complete the piping grid in the Historic Village. Figure 1-7 depicts the City of DuPont water distribution system layout.

The El Rancho Madrona distribution system was constructed in the late 1960s and is primarily comprised of 6-inch-diameter AC pipe. The system was connected to the DuPont water system in 2010 and all the AC pipe is scheduled to be replaced in 2011 with PVC lines.

Table 1-10 provides an inventory of the pipes in the City of DuPont water system including pipe diameter and approximate length as of year 2010.

TABLE 1-10

Pipe Length and Size

Pipe Diameter (inches)	Approximate Length of Pipe in System (lineal ft.)[(1)]
3	710
4	1,530
6	22,830
8	137,350
10	120
12	56,690
16	30,480
Total	**249,710**

(1) The approximate length of pipe in the distribution system is an inventory including only the pipe owned by The City of DuPont.

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 1-7 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 2010 Water System Comprehensive Plan:

- **Village Water and Sewer Systems Reconstruction Project, Brown and Caldwell, (January 1986)**

  This document was prepared to evaluate the [Historic] Village water and sewer systems, and plan for reconstruction where necessary. Deficiencies in both systems were identified and discussed. The water system was found to be deficient in supply, storage, and distribution. Water and wastewater characteristics were also analyzed, and reconstruction options for both systems were evaluated and recommended.

- **Draft Initial Watershed Assessment Water Resources Inventory Area 12 Chambers-Clover Creek Watershed, (March 1995)**

  The objective of this report is to document the status of surface-water and ground-water resources in the Chambers-Clover Creek Watershed, which comprises Water Resources Inventory Area (WRIA) 12. Key water-management issues in the watershed which influence water-right permit decisions are identified and documented. According to the Department of Ecology 2009 Report to the Legislature (Publication No. 09-11-033, WRIA 12 has implemented Phase 1 (Organization and Formation), Phase 2 (Watershed Assessment); however, planning stopped in Phase 3 (Plan Approved by Planning Group and County Board)

- **Historic Village Water and Sewer System Facility Plan, Gray & Osborne, Inc., (March 1998)**

  This document analyzed both the water and sewer systems in the Historic Village. Deficiencies in both systems were identified and discussed and a capital improvement plan was developed.

- **The City of DuPont Water System Comprehensive Plan, Gray & Osborne, Inc., (DOH approved in March 1998 and January 2005)**

  These documents discuss 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

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

OLD FORT LAKE

REGIONAL STORMWATER FACILITIES

POND LAKE

STRICKLAND LAKE

GRANT LAKE

EDMOND MARSH

BELL MARSH

LAKE SELLERS

WETLAND #12

WETLAND #11

WETLAND #8

WETLAND #10

HOFFMAN HILL WELL #2

HOFFMAN HILL WELL #1 AND BOOSTER PUMP STATION

HOFFMAN HILL RESERVOIR

BELL HILL BOOSTER PUMP STATION

WELL #3

WELL #2

BELL HILL RSERVOIR

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.

HYLAND ST.

MEYER ST.

HAMMOND AVE.

TALISIDE BLVD.

DUPONT AVE.

LOUVERS AVE.

HASKELL ST.

THOMPSON ST.

PALISADE BLVD.

WILMINGTON DR.

BARKSDALE AVE.

BELL HILL PL.

AVIS PL.

RIDGE VENTOR

SINCLAIR DR.

BLACKENRIDGE AVE.

PARKWOOD AVE.

BURNSIDE PL.

LARSLEY DR.

McDONALD PL.

MOUNTS RD.

JBLM GOLF COURSE

JBLM

5

CITY OF DUPONT

WATER SYSTEM COMPREHENSIVE PLAN

FIGURE 1-7

WATER SYSTEM BASEMAP EXCERPT

Gray & Osborne, Inc.

CONSULTING ENGINEERS

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.

- **City of DuPont Comprehensive Plan, City of DuPont, (November 2001)**

  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.

- **Nisqually Watershed Management Plan, Nisqually Indian Tribe and WRIA 11 Planning Unit, (October 2003)**

  This plan is the product of four years of collaboration, through which the Planning Unit has reached a common ground in creating management strategies and recommending actions. The Watershed Management Plan is intended to serve as a locally-supported, long-term plan focusing on water availability, and also addressing water quality, habitat, and instream flows in the Nisqually Watershed (WRIA 11). According to the Department of Ecology 2009 Report to the Legislature (Publication No. 09-11-033, WRIA 11 has implemented Phase 1 (Organization and Formation), Phase 2 (Watershed Assessment), Phase 3 (Plan Approved by Planning Group and County Board), and Phase 4 (Implementation).

- **Fort Lewis Water System Comprehensive Management Plan, Fort Lewis, (November 2005)**

  The purpose of this plan is to evaluate the water system's water source, quality, transmission, distribution, and storage. The plan recommended system improvements and operational modifications to meet the demands or regulatory requirements and infrastructure repair and replacement. Water quality monitoring, water conservation, system maintenance, emergency operation, record keeping and reporting, and wellhead protection were also addressed in the plan.

- **City of DuPont Project Report for Hoffman Hill Well No. 2, City of DuPont, (February 2008)**

  This document describes construction of a new well and its connection to the existing system. The maximum capacity of the new well would be 1,500 gpm, however, the normal operating production will be limited to 1,100 gpm. The purpose is to increase reliability, decrease demand on existing wells, and allow continued growth in the City.

- **Nisqually River Basin Plan, Volume 1 – Basin Plan & DSEIS, Pierce County Public Works and Utilities Water Programs Division, (June 2008)**

  This Nisqually River Basin Plan is intended to serve as a comprehensive guide to storm drainage and surface management in the portions of the Nisqually River Basin that are under Pierce County's jurisdiction. Basin Plans address flooding, water quality and aquatic habitat aspects of surface water management in the major stream systems of the non-federal lands within unincorporated Pierce County.

RETAIL SERVICE AREA CHARACTERISTICS

RETAIL SERVICE AREA

The City's 2001 Comprehensive Plan 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 3,755 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 1-7. 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. Additional detail is included in DOH's Duty to Provide Service Requirement fact sheet (DOH 331-366) located in Appendix C.

- **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 LAND USE

Land use in the City of DuPont is a mix of developed and undeveloped land. Approximately 2,235 undeveloped acres within the City are still to be developed by the Weyerhaeuser Company and its subsidiary, Quadrant Homes. Approximately 200 acres in the northern region of the City is owned by CalPortland, a sand and gravel company. The northeastern boundary of the City abutts the Joint Base Lewis-McChord Landfill, which occupies 285 acres of land owned by the U.S. Army. Existing land use is summarized in Table 1-11 according to the 2001 City of DuPont Comprehensive Land Use Plan. Land use zoning is shown in Figure 1-2.

TABLE 1-11

Land Use Inventory from the 2001 City of DuPont Comprehensive Land Use Plan[(1)]

Land Use Designation	2001 Area (acres)	Buildout Area (acres)
Residential		
Single-Family	169	697
Multi-Family	34	141
Residential Reserve	0	210
Commercial	3	22
Mixed Use	0	53
Office	43	52
Manufacturing and Research	95	475
Business and Technology Park	0	299
Industrial	63	138
Open Space	130	241
Sensitive Areas/Buffers	581	597
Civic	1	10
Parks	24	102
Schools	0	70
Cultural and Recreation	10	204
Landfill (U.S. Army)	285	285

TABLE 1-11 – (continued)

Land Use Inventory from the 2001 City of DuPont Comprehensive Land Use Plan(1)

Land Use Designation	2001 Area (acres)	Buildout Area (acres)
Roads/Utilities	82	159
Not Yet in Use(2)	2,235	0
TOTAL	**3,755**	**3,755**

(1) The City of DuPont began a revision to the 2001 Comprehensive Land Use Plan in 2008 but it was not completed. Minor revisions occur intermittingly, but the 2001 Comprehensive Land Use Plan is still in effect.

(2) The Not Yet in Use category is comprised primarily of undeveloped land but it also includes portions of sensitive area buffer and open space which are not developable.

FUTURE LAND USE

The water system will continue to expand as development occurs within the City limits. The City of DuPont is expected to reach build out with a population of approximately 12,100 in the next 20 years according to the 2001 Comprehensive Plan. This is an increase from the 1995 Comprehensive Plan's build out population estimate of 10,994. Future land use is discussed in Chapter 2 of this document.

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 City policy documents. Copies of the referenced City policies are included in Appendix C. 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 C. In addition, Pierce County adopted Ordinance No. 2003-69, which adopted the Coordinated Water System Plan and Regional Supplement 2001and was codified as Chapter 19D.120 PCC in 2003. A copy of the Ordinance is included in Appendix C.

TABLE 1-12

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
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

CHAPTER 2

BASIC PLANNING DATA

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 growth and water demands, population projections as established by the City's 2001 Comprehensive Plan, 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.

CURRENT SYSTEM DEMANDS

In this section current system demands are examined in terms of production per capita 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.

RESIDENTIAL POPULATION

The analysis of local population and demographic trends is important for a broad understanding of the community and to anticipate future needs.

The total population within the city limits of DuPont was determined to be 2,464 by the 2000 Census. Intercensal population data from 1968 to 2000 is available in the Office of Financial Management (OFM), *Population Estimates for the State, Counties, Cities, and Towns: April 1, 1960 to April 1, 2010.* Postcensal population estimates are also provided by OFM for years 2001 and 2010. According to the OFM, population in DuPont included modest growth from 1968 to 1995 when the population went from 360 to 588 over the 27-year period. Growth has dramatically increased since 1995; the 1996 population was 690 and the census population in year 2000 was 2,452. The estimated population as of April 1, 2010 was 7,930, an increase of 5,478 over a 10-year period or an average of 548 people per year. Recent increases in City of DuPont population are primarily attributable to growth of Quadrant's Northwest Landing development. However, residential growth over the last 2 years has slowed primarily due to depressed economic conditions.

The City of DuPont adjusted the average number of people per household to be 2.92 people per single family residence, and 2.0 people per multifamily residence, based on data from the 2000 Federal Census. Previous to that, calculations were based on 2.6 people per household for single-family residences and 2.1 persons per multi-family residence. No adjustments in the average number of people per household has been made for this 2010 Water Plan update.

TOTAL SERVICE CONNECTIONS

Service connection and consumption data for this Plan is based on 5 years of data (2005-2009).

Production and consumption data in this chapter is analyzed for the system (City of DuPont) as a whole. The utility billing software, instituted in 2001 breaks down water service by meter size. Table 2-1A shows the City's meter sizes and the number of service connections for 2009. All City of DuPont services are metered.

TABLE 2-1A

Number of Service Connections by Meter Size (2009)

Water Service Description	No. of Connections (2009)
Single-Family	2,625
Life Line(1)	3
Multi-Family 1"	2
Multi-Family 1-1/2"	29
Multi-Family 2"	20
Multi-Family 4"	1
Commercial 5/8"	9
Commercial 1"	16
Commercial 1-1/2"	12
Commercial 2"	13
Commercial 3"	4
Commercial 6"	1
Irrigation 1"	45
Irrigation 1-1/2"	31
Irrigation 2"	38
Irrigation 3"	9
Irrigation 6"	1
Industrial 3"	2
Industrial 6"	1
Fireline 1"	36
Fireline 1-1/2"	1
Fireline 2"	38
Fireline 3"	1
Fireline 6"	4
Fireline 10"	2
Hydrant Permit (meters)	4(2)
Undev Land Chg.	19(2)
Miscellaneous	--
Totals	2,942

(1) Life Line is a designated reduced rate for a single-family residence.
(2) The Water Service Descriptions for Hydrant Permit and for Undeveloped Land Charge are not counted in the total number of connections.

Table 2-1B, consolidates the meter size data from Table 2-1A into six customer classes. The number of accounts is taken from the last billing cycle of that year.

TABLE 2-1B

Service Connections by Customer Class (2005-2009)

Customer Class[(1)]	No. of Accounts (2005)	No. of Accounts (2006)	No. of Accounts (2007)	No. of Accounts (2008)	No. of Accounts (2009)	Average No. of Accounts
Single-Family	1,941	2,154	2,379	2,515	2,625	2,323
Multi-Family	55	55	56	56	55	55
Commercial	50	52	83	62	58	61
Industrial	3	3	3	3	3	3
Irrigation	85	100	112	117	124	108
Fireline	53	47	74	78	82	67
Total	2,187	2,411	2,707	2,831	2,947	2,617

WATER USE

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. Individual service meter readings are collected every 2 months.

Production and Consumption History

From 2005 through 2009, average daily well production for all wells ranged from a low of 269,000 gallons per day (gpd) for the month of February 2005, to a high average of 2,990,000 gpd in the month of July 2009. Table 2-2 lists the City's production history for 2005 through 2009. The El Rancho Madrona Water System was connected to the main City of DuPont Water System in November 2010 and metered water production and consumption are based on all sources and customers.

TABLE 2-2

Metered Water Production

Year	Total Annual Production (MG per year)	Average Daily Production (gpd)
2005	318.07	871,416
2006	411.77	1,128,140
2007	380.75	1,043,155
2008	412.90	1,128,139
2009	441.89(1)	1,210,517

(1) Total annual production is a composite of telemetry meter readings and totalizer meter readings. For all other years, annual production is tabulated from the totalizer meters.

The City's water consumption history based on existing customer meter data is presented in Table 2-3. The total average daily consumption for the City water system ranged from 774,195 gallons per day in 2005 to 1,150,502 gallons per day in 2009. The recent 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. Due to the continued mandatory installation of low flow fixtures and conservation measures for all new construction, and other conservation measures detailed in Chapter 5, water use per capita is expected slightly decrease.

TABLE 2-3

Metered Water Consumption

Year	Total Annual Consumption (MG per year)	Average Daily Consumption (gpd) (1)
2005	282.58	774,195
2006	373.12	1,022,255
2007	349.49	957,519
2008	384.19	1,049,693
2009	419.88	1,150,348

(1) Consumption data was taken from City of DuPont annual reports. Consumption data was reported for every 2 month period for the 5 years.

Figure 2-1 shows the City of DuPont's total production and total consumption for the last 5 years (2005-2009).

FIGURE 2-1

Total Production and Consumption (2005-2009)

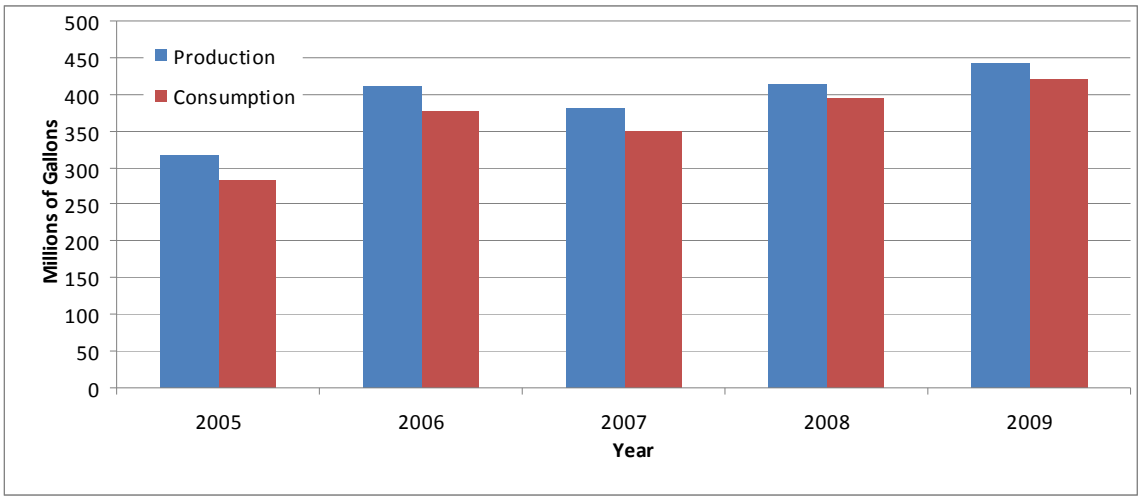


Table 2-4 presents a breakdown of consumption by customer class for the 5-year period (2005-2009) as a percentage. The City of DuPont's large commercial and industrial water users are discussed in Chapter 3.

TABLE 2-4

Average Percent Consumption by Customer Class (2005-2009)

Customer Class	Average Percent Consumption of Total
Residential	55%
Commercial	8%
Industrial	4%
Irrigation	33%
Total	100%

Figure 2-2 shows a graphical representation of water consumption by the four customer classes: Residential, Commercial, Industrial, and Irrigation.

FIGURE 2-2

Water Consumption by Customer Class (2005-2009)

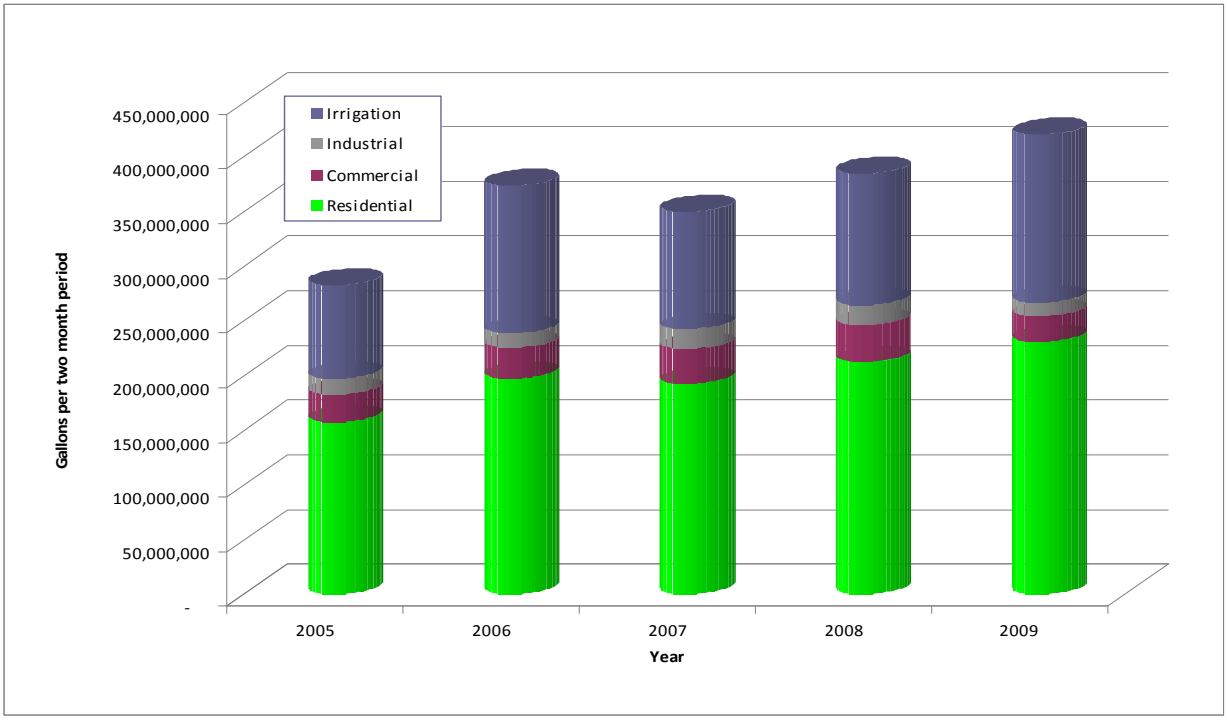


Table 2-5 summarizes the 2005-2009 average day consumption by the customer classes delineated above.

TABLE 2-5

Average Daily Consumption by Class for the Period (2005-2009)

Customer Class	Average Number of Connections	Water Consumption (MG)	Average Water Sales, (Gal/Conn)	Average Daily Water Sales, (Gal/Conn/Day)
Residential Single-Family	2,323	178.36	76,785	**210**
Residential Multi-Family	55	19.35	351,818	**964**
Commercial	61	28.94	474,426	**1,300**
Industrial	3	15.25	5,084,667	**13,931**
Irrigation	108	120.17	1,116,784	**3,060**
Total	2,550	362.07		

Maximum Day Production

Daily production records were reviewed for the most recent 5-year period, January 2005 through December 2009. The highest production days for each period are shown in Table 2-6. The highest production day was July 4, 2009.

The average for the 5-year period of maximum to average day ratios is 2.72. **For planning purposes the maximum day to average day ratio will be 2.72.**

TABLE 2-6

Highest Water Production Days for 2005-2009

Date	Production (MG)	Average Day for Year (MG)[(1)]	Maximum Day to Average Day Ratio
7/30/2005	2.439	0.871	2.80
7/23/2006	2.998	1.128	2.66
7/03/2007	2.731	1.043	2.62
7/14/2008	3.053	1.131	2.70
7/04/2009	3.449	1.211	2.85
Average	**2.934**	**1.077**	**2.72**

(1) Average Day is annual production divided by days in the year.

DISTRIBUTION SYSTEM LEAKAGE RATE

The Water Use Efficiency (WUE) Rule defines the difference between the total of all water production and the total of all known and credibly estimated water uses as Distribution System Leakage (DSL). Annual water production, water use, and DSL are summarized in Table 2-7 for the last 5 years using the annual water production and consumption totals from tables 2-2 and 2-3, respectively.

TABLE 2-7

Annual Water Production, Water Use and DSL

Year	Total Annual Production (MG/Y)	Total Annual Consumption (MG/Y)	Distribution System Leakage (MG/Y)	Annual Percent DSL	3-year Running Average Percent DSL
2005	318.07	282.58	35.49	11.2%	
2006	411.77	373.12	38.65	9.4%	
2007	380.75	349.49	31.26	8.2%	9.6%
2008	412.90	384.19	28.71	7.0%	8.2%
2009	441.89	419.88	21.96	5.0%	6.7%
Average				**8.2%**	**8.2%**

DSL ranged from a high of 11.2 percent in 2005 to a low of 5.0 percent in 2009. The WUE Rule requires municipal water systems to meet a 10 percent or less water loss standard. The City of DuPont has a 5-year average of 8.2 percent, a 3-year running average of 6.7 percent with a continuing trend towards decreasing distribution system leakage. Water Use Efficiency is discussed further in Chapter 4 of this plan.

EQUIVALENT RESIDENTIAL UNITS

An Equivalent Residential Unit (ERU) is the amount of water, in gallons, equivalent to water usage by one 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 by the total number of residential connections. This number defines the average residential water use. Initially, the 5-year period (2005-2009) water sales were used to determine water usage per ERU. However, during the 2010 Water Rate Analysis discrepancies were discovered with the number of overall residential accounts. In depth analysis of the year 2009 data revealed multiple account listings (in some cases) for individual addresses, due to a billing software anomaly that has been corrected. Therefore, it was determined the most accurate ERU value should be based on the single corrected year of data. In addition, production records were similarly scrutinized and corrected utilizing the two metering systems that are in place. Table 2-8 summarizes the year 2009 ERU data and calculation.

TABLE 2-8

Residential Connections and Water Use in 2009

Residential Connections (average for 2009)	Water Consumption (gallons per year)	Gallons per Residential Connection per day
2,576	209,372,243	223

As shown in Table 2-8, average water use in 2009 per single-family residence is 223 gpd per single-family residential connection. This figure does not include Distribution System Leakage (DSL). Using this ERU definition, the volume of water used by the other customer classes 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 2009, total ERUs served by DuPont are estimated in Table 2-9.

TABLE 2-9

ERUs for the Year 2009

Water Use Category	Annual Water Use (millions of gallons)	Number of Meters (Average in 2009)(1)	ERUs
Residential Single-Family	209.37	2,576	2,576
Residential Multi-Family	21.27	56	261
Commercial	23.29	62	286
Industrial	12.85	3	158
Irrigation	153.15	121	1,882
Distribution System Leakage (DSL)	21.96	--	270
Total	441.89	2,818	5,433

(1) Residential water use for 2009 averaged 223 gallons per connection per day.

MAXIMUM DAY DEMAND PER ERU

As discussed above under the heading, *Maximum Day Production*, the estimated maximum day to average day ratio is 2.72. With an average day demand per ERU of 223 gpd, the maximum day demand is estimated at 607 gpd per ERU (223 x 2.72). Table 2-10 summarizes water demand statistics on a residential equivalent basis.

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, MDD for DuPont is 607 gpd per ERU. Inserting these numbers into the above equation yields the following:

PHD = (607/1440)[(1.6)(N)+225]+18

This equation simplifies to the following:

PHD = 0.67*N+113

Using 5,433 current estimated ERUs from Table 2-9, the estimated peak hour demand for 2009 would be 3,753 gpm. The above formula will be used to estimate projected peak hour demands.

Table 2-8 includes a summary of water demand parameters for the City of DuPont.

TABLE 2-10

Summary of Water Demand Statistics

Demand Factor	Value
Average Day Demand per ERU, gpd	223
Maximum Day Demand per ERU, gpd	607
Maximum Day to Average Day Factor	2.72
Peak Hour Demand (system-wide), gpm	PHD = 0.67*N+113

PROJECTED LAND USE, FUTURE POPULATION, AND WATER DEMANDS

PROJECTED LAND USE

Projected land use for the City of DuPont is established in the City of DuPont Comprehensive Plan, adopted by Ordinance No. 01-698 on November 13, 2001. Table 2-11 presents projected land use as defined by the two most recent comprehensive plans. As previously stated, the 2001 Comprehensive Plan was adopted, while the 2006 Comprehensive Plan was never adopted but is available on the Municipal Services and Research Center (MRSC) website.

TABLE 2-11

Projected Land Use

Land Use Designation	Land Use Acres (2001)	Projected Land Use Acres (2012)[2]	Land Use Acres (Build Out)
Single-Family	169	388	678
Multi-Family	34	125	177
Residential Reserve	0	0	0
Office	43	43	52
Commercial	3	22	22
Mixed Use	0	57	57
Manufacturing and Research Park	95	95	440
Business and Technology Park	0	100	299
Industrial	63	87	138
Sensitive Areas	581	631	679
Open Space	130	277	277
Civic	1	10	10
School	0	65	65
Parks	24	72	106
Cultural and Recreation	10	200	204
Military (Landfill)	285	285	285
Major Roads	82	227	265
Not Yet in Use[1]	2,235	1,156	0
TOTAL	**3,755**	**3,755**	**3,755**

Source: City of DuPont Comprehensive Plan, Adopted by Ordinance No. 01-698, November 13, 2001.

(1) The Not Yet in Use category is comprised primarily of undeveloped land but it also includes portions of sensitive area buffer and open space which are not developable.

(2) Taken from the non-adopted 2006 Comprehensive Plan. From that document, 2012 is shown to reflect the end of the City's first 20 year growth period.

PROJECTED POPULATION

The City's 2001 Comprehensive Plan update forecasted population growth through buildout. Beginning in 2001 with a population of 2,900, the projections indicate growth to 6,000 by 2006, nearly 10,000 in 2012 and 12,100 at buildout. The Plan does not indicate what year buildout is likely to occur. Although the 2006 Comprehensive Plan update has not been approved, population projections have been updated based on information that was not available in 2001 such as the gravel mine expansion timeline in the Sequalitchew Creek area. The mine expansion effectively halts construction for both single-family and multi-family units that are expected to house approximately 2,600 people. The forecasted buildout population in the City of DuPont is 12,100 has not

changed since the 2001 Comprehensive Plan. Table 2-12 presents the most recent population projection based on the best available data.

TABLE 2-12

Projected Population

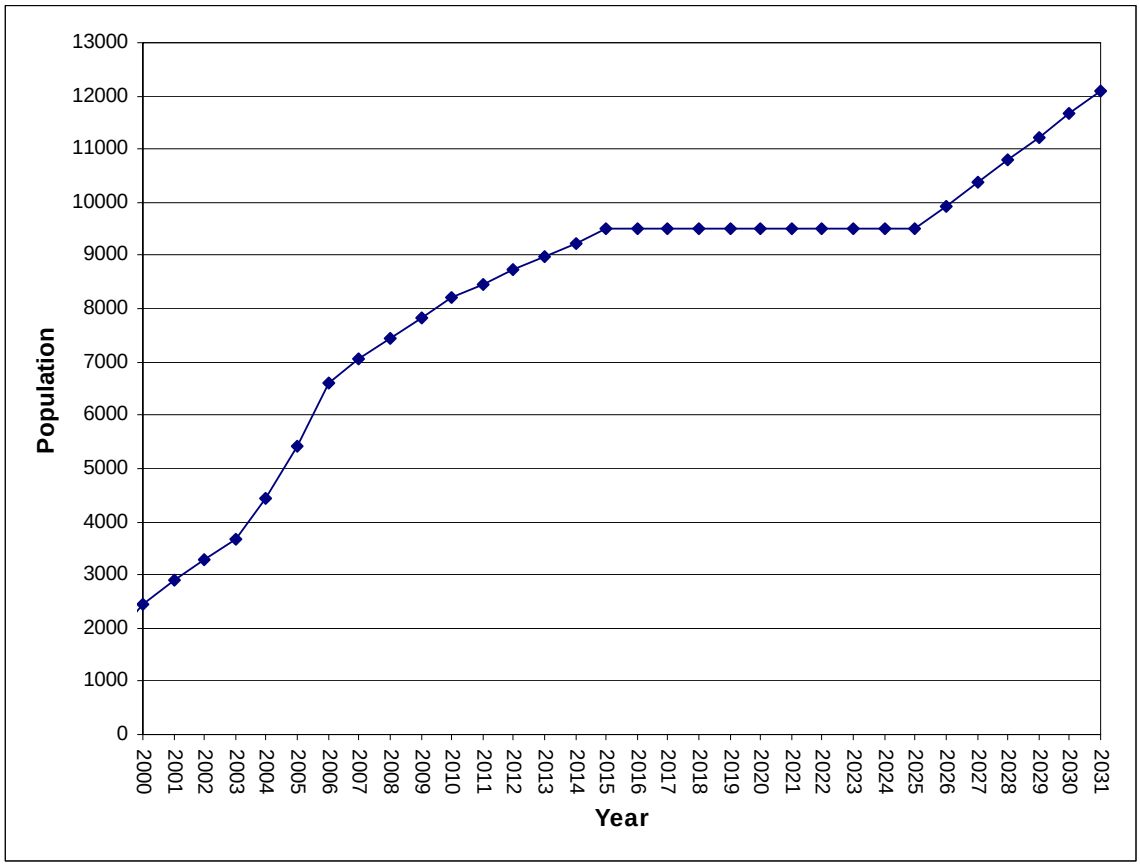
Year	Current Projection
2012	8,720
2013	8,980
2014	9,240
2015	9,500
2016	9,500
2017	9,500
2018	9,500
2019	9,500
2020	9,500
2021	9,500
2022	9,500
2023	9,500
2024	9,500
2025	9,500
2026	9,933
2027	10,367
2028	10,800
2029	11,233
2030	11,667
2031	12,100

The projected population is based on the 2010 population of 8,200, which is an estimate from the Washington State Office of Financial Management (OFM). This population was then projected forward based on the number of available single and multi-family housing unit plats remaining in Hoffman Hill Division 5, Creekside, Patriot's Landing, and DuPont Station Trax. The number of single-family housing units was multiplied by 2.92 persons and multi-family units by 2.0 persons per unit. Approximately 1,300 people are added by completing development in these subdivisions. Adding the 2010 population of 8,200 to the infill population of 1,300, equates to a total of 9,500 persons. This 9,500 population then plateaus while gravel mining in Sequalitchew is underway, which is estimated to be completed in year 2025. The population then is estimated to grow steadily as Sequalitchew Village is developed until buildout occurs, which is estimated to be in year 2031.

The projected population is graphically shown in Figure 2-3.

FIGURE 2-3

Projected Population



FUTURE SYSTEM DEMANDS

To project future water demands, ERUs for each identified water use are projected forward at a growth rate that reflects past trends, current conditions, and future buildout. Each customer class was reviewed: Residential (single-family and multi-family), Commercial, Industrial, Irrigation, Distribution System Leakage (DSL).

TABLE 2-13

Projected ERUs

Year	Residential ERUs (SF)[(1)]	Residential ERUs (MF)[(2)]	Commercial ERUs[(3)]	Industrial ERUs[(4)]	Irrigation ERUs[(5)]	DSL ERUs[(6)]	Total ERUs[(7)]
2012	2,777	305	574	164	1,882	456	6,158
2013	2,860	314	658	180	1,977	479	6,468
2014	2,943	323	742	196	2,071	502	6,777
2015	3,026	333	825	212	2,165	525	7,085
2016	3,026	333	908	228	2,214	537	7,245
2017	3,026	333	992	244	2,263	549	7,406
2018	3,026	333	1,075	260	2,312	560	7,565
2019	3,026	333	1,158	276	2,361	572	7,725
2020	3,026	333	1,242	292	2,410	584	7,886
2021	3,026	333	1,325	308	2,459	596	8,046
2022	3,026	333	1,408	324	2,507	608	8,205
2023	3,026	333	1,492	340	2,557	620	8,367
2024	3,026	333	1,575	355	2,605	631	8,524
2025	3,026	333	1,575	379	2,617	634	8,563
2026	3,164	348	1,575	403	2,704	655	8,848
2027	3,302	363	1,575	427	2,791	677	9,135
2028	3,440	378	1,575	451	2,878	698	9,420
2029	3,578	393	1,575	475	2,965	719	9,705
2030	3,716	408	1,575	499	3,053	740	9,991
2031	3,854	424	1,575	522	3,140	761	10,275

(1) Single-Family Residential ERUs were derived from population estimate in Table 2-12. The ERU value was calculated by dividing the population into historic proportions of single-family (93%) and multi-family (7%), then dividing by the average number of persons per single-family household (2.92).

(2) Multi-Family Residential ERUs were derived from the population estimate in Table 2-12. The ERU value was calculated by dividing the population into historic proportions of single-family (93%) and multi-family (7%), then dividing by the average number of persons per multi-family household (2.0).

(3) Commercial ERUs were derived by calculating the per acre water consumption for current land uses and projecting the same per acre consumption for future water use based on projected development of future commercial-type land uses. Land uses include Office, Commercial, Mixed Use, and School. The Business and Technology Park projected water consumption is included under commercial ERUs based on the requested domestic water of 251,400 gpd ADD (1,127 ERUs), projected to be phased in linearly from 2011 to 2024.

(4) Industrial ERUs were derived by calculating the per acre water consumption for current land uses and projecting the same per acre consumption for future water use based on projected development of future industrial-type land uses. Land uses include MRP and Industrial.

(5) Irrigation ERUs were derived by calculating the subtotal of Residential (SF&MF), Commercial, and Industrial ERUs as 67 percent of total production minus DSL (8%) and multiplying by the historical average (2005-2009) for Irrigation usage (33%) from Table 2-4.

(6) Distribution System Leakage (DSL) ERUs were calculated as 8 percent of total production as shown in Table 2-7.

(7) Total ERUs is the sum of all customer classes and Distribution System Leakage. Buildout is predicted to occur in 2031. In order to project water demands at buildout, water consumption criteria were used to estimate water use. As shown in Table 2-12, growth and development in DuPont are anticipated to continue to grow until buildout in approximately 2031. The two previous water system plans calculated water demands based on anticipated land uses, acreages, dwelling units, population densities, and employment. The current water system plan utilizes previous consumption patterns and population projections to predict future water use.

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 2-14. Projected annual demand in millions of gallons (MG) is projected average day demand times 365 days per year divided by one million.

TABLE 2-14

Projected Water Demands

Year	ERUs	Average Day Demand, gpd	Maximum Day Demand, gpd	Peak Hour Demand, gpm	Annual Demand, MG
2012	6,158	1,373,270	3,735,294	4,239	501
2013	6,468	1,442,391	3,923,303	4,447	526
2014	6,777	1,511,271	4,110,657	4,654	552
2015	7,085	1,579,910	4,297,356	4,860	577
2016	7,245	1,615,555	4,394,309	4,967	590
2017	7,406	1,651,440	4,491,916	5,075	603
2018	7,565	1,687,084	4,588,869	5,182	616
2019	7,725	1,722,729	4,685,822	5,289	629
2020	7,886	1,758,614	4,783,429	5,397	642
2021	8,046	1,794,258	4,880,382	5,504	655
2022	8,205	1,829,661	4,976,679	5,610	668
2023	8,367	1,865,787	5,074,942	5,719	681
2024	8,524	1,900,950	5,170,584	5,824	694
2025	8,563	1,909,620	5,194,167	5,850	697
2026	8,848	1,973,202	5,367,110	6,041	720
2027	9,135	2,037,025	5,540,707	6,233	744
2028	9,420	2,100,606	5,713,650	6,424	767
2029	9,705	2,164,188	5,886,592	6,615	790
2030	9,991	2,228,011	6,060,189	6,807	813
2031	10,275	2,291,352	6,232,477	6,997	836

EFFECTS OF WATER CONSERVATION

It is anticipated that the value of an ERU will change as the system grows to buildout. With promotion of water conservation, the water usage represented by an ERU may go down. However, for projection of water system needs it is more conservative to assume that water usage per ERU will not decrease.

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 (October 2009).**

  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 Use Efficiency Rule, Washington State Department of Health (July 2007).**

  The Water Use Efficiency Rule is a collection of revisions to WAC 246-290. The revisions add and amend certain definitions, add Water Use Efficiency requirements to water system planning requirements and small water system management plans, add a new section requiring installation of water service meters, and add new sections on Water Use Efficiency Planning, including Purpose and Applicability, Water Use Efficiency Program, Distribution System Leakage Standard, Water Use Efficiency Goal Setting, and Water Use Efficiency Performance Reports.

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

  These standards serve as guidance for the preparation of plans and specifications 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 and 2003. 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 (2010).**

  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 **223 gpd**. The maximum day to average day factor is 2.72, and the maximum day consumption per ERU is **607 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=607, C=1.6, and F=225, which simplifies to the equation: **PHD=0.67*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

TABLE 3-1 – (continued)

General Facility Requirements

Standard	DOH Water System Design Manual (December 2009)	Suggested City of DuPont Standard
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.
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)	Suggested City of DuPont 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 2009 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 nominal volume of a water reservoir is generally the name given to a reservoir based on an approximation of the gross volume the reservoir, which is the amount of water the reservoir could hold if filled all the way to the top of the reservoir wall. However, practically speaking, a reservoir cannot be filled to the top of the wall and a reservoir also cannot, under normal operational conditions, be drained completely while meeting system demand. Therefore, there is a need to determine how much of a reservoir volume is effective storage and how much effective storage a water system needs.

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

A reservoir's effective storage volume is the gross volume less operational storage and dead storage. This volume must be large enough to accommodate the requirements for equalizing storage, standby storage and fire suppression storage.

Operational Storage

Operational storage is the amount of water that flows in and out of a reservoir during normal system control cycling. Reservoirs typically operate with a maximum water level at which all source pumps are turned off, and a minimum level at which all source pumps are turned on. The amount of water that flows into and out of the reservoir between these two levels depends upon the operational control levels and the dimensions of the system's reservoirs.

Equalizing Storage

Equalizing storage is the amount of water needed to meet peak system demand for a period of time that the system demand exceeds the system source capacity. The DOH Water System Design Manual recommends that this volume be estimated as PHD minus source capacity for 150 minutes, but not less than zero.

Standby Storage

Standby Storage is water held in reserve for emergency situations, such as temporary loss of a water source. The DOH Water System Design Manual recommends that this volume be estimated as 2 days of average day demand for the water system, less the amount of water that can be produced by the water system in 1 day with the largest source of supply out of service, but not less than 200 gallons per ERU.

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 fire fighting 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).

Dead Storage

Dead storage is the volume of the reservoir that either cannot be utilized for storage because it is above the maximum operational water level of the reservoir, or cannot be withdrawn from the reservoir at the required rates while maintaining the minimum required system pressure or other required operating parameter, such as chlorine contact time. The amount of dead storage existing in a system depends on storage system dimensions, elevations, pumping systems, outlet design, and possibly other requirements such as disinfectant contact time.

Effective Storage

The amount of effective storage a water system needs will be referred to as the Effective Storage Requirement. The Effective Storage Requirement is based on equalizing and standby storage.

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 October 2009, as well as sections of Code of Federal Regulation (CFR) Title 40, Parts 141 and 143, adopted by reference in WAC 246-290. A summary of the water quality regulations is included in Appendix D. Since DuPont is supplied by only groundwater sources, only the groundwater regulations apply.

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 ANALYSIS

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 distribution system, including coliform, lead and copper, disinfectant byproducts, and asbestos are discussed under the heading of Delivered Water Quality in this section. 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. Appendix D includes a summary of the Water Quality Standards and a summary of the City's water quality sampling exceedance results on record.

SOURCE WATER QUALITY

As described in Chapter 1, the City of DuPont has six well sources. All sources are chlorinated prior to distribution.

Inorganic Chemical and Physical Water Quality

General IOC Tests

Inorganic chemical and physical (IOC) water quality monitoring results for the most recent DuPont and El Rancho Madrona 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. There is a single recording of an exceedance of a Primary Contaminant since sample data was first collected in DuPont in 1995. The MCL was exceeded for Cyanide in Hoffman Hill Well No. 2 on 11/12/2008 with a result of 0.500 mg/L. This sample was taken prior to connecting this well to the system. It is unknown what caused this sample exceedance. Subsequent sampling showed no detection of Cyanide. The last exceedance above the MCL for a Secondary Contaminant was recorded in 2004 for Manganese (0.100 mg/L) at Bell Hill Well No. 2.

TABLE 3-3

Inorganic Chemical Sampling Results

Source Number	S-03	S-04	S-05	S-06	S-09	S0-1	
Source Name	Bell Hill No. 1	Bell Hill No. 2	Hoffman Hill No. 1	Bell Hill No. 3	Hoffman Hill No. 2	El Rancho Madrona	
Sample Date	8/16/10	10/25/04	8/17/09	10/25/04	8/13/10	10/26/04	MCL
Primary Contaminants – All results mg/L[(1)] unless otherwise noted							
Antimony	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006
Arsenic	<0.010	0.005	<0.002	<0.002	<0.002	<0.002	0.010
Barium	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	2.000
Beryllium	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.004
Cadmium	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.005
Chromium	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.100
Copper	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	1.3[(2)]
Cyanide	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.200
Fluoride	<0.200	0.300	<0.200	0.200	<0.200	<0.200	4.00[(3)]
Lead	<0.001	<0.002	<0.002	<0.002	<0.001	<0.002	0.015[(2)]
Mercury	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.002
Nickel	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.100
Nitrate-N	0.400	<0.200	0.900	0.400	0.800	0.900	10.00
Nitrite-N	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	1.00
Selenium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.050
Sodium	5.00	8.00	9.00	6.00	6.00	7.00	20[(5)]
Thallium	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002
Total Nitrite/Nitrate	<0.500	<0.400	0.900	<0.500	0.800	0.900	10.00
Turbidity (NTU)	<0.10	0.200	2.00	0.100	<0.100	0.100	--[(6)]

TABLE 3-3 – (continued)

Inorganic Chemical Sampling Results

Source Number	S-03	S-04	S-05	S-06	S-09	S0-1	
Source Name	Bell Hill No. 1	Bell Hill No. 2	Hoffman Hill No. 1	Bell Hill No. 3	Hoffman Hill No. 2	El Rancho Madrona	
Sample Date	8/16/10	10/25/04	8/17/09	10/25/04	8/13/10	10/26/04	MCL
Secondary Contaminants – All results mg/L(1) unless otherwise noted							
Chloride	3.00	2.00	6.00	3.00	3.00	4.00	250.0
Fluoride	<0.200	0.300	<0.200	0.200	<0.200	<0.200	4.00(3)
Iron	<0.100	0.130	0.110	<0.100	<0.100	<0.100	0.300
Manganese	<0.010	**0.100**	<0.010	<0.010	<0.010	<0.010	0.050
Silver	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.100
Sulfate	8.00	2.00	9.00	8.00	9.00	10.00	250.0
Zinc	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	5.00
Color (color units)	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	15.00
Conductivity (µmho/cm)(7)	112.00	96.00	120.00	140.00	124.00	150.00	700.0
Hardness (as $CaCO_3$)	84.00	38.00	85.00	60.00	72.00	67.00	None

(1) Mg/L indicates milligrams per liter. A milligram is one thousandth of a gram and one liter of water weighs approximately one thousand grams, so 1 mg/L is equivalent to 1 part per million (ppm).

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

(3) Fluoride has both a primary and a secondary MCL. Concentrations above the secondary MCL cause aesthetic problems, while concentrations above the primary MCL are a public health concern.

(4) Nitrite-N sample was collected 7/8/2009.

(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) The turbidity MCL applies only to untreated surface water sources. Since DuPont and El Rancho Madrona are groundwater, turbidity requirements do no apply.

(7) A µmho is a micro-mho, or 1 millionth of a mho (pronounced "mō"). A mho is a unit of electrical conductance, the inverse of an ohm, a unit of electrical resistance. (Note: mho is ohm spelled backward.) One mho of electrical conductance is capable of transmitting 1 amp of electrical current across a potential of 1 volt. One µmho of conductance will transmit 1 millionth of an amp (1 micro-amp) at 1 volt, or 1 amp at 1-million volts (one megavolt).

Annual Nitrate Tests

IOC samples include annual nitrate samples at the entry point to the distribution system. NO_3 is always monitored annually and is not dependent on any other rule or sampling schedule. Table 3-4 summarizes the results from the last individual nitrate sampling conducted for each active source. **All nitrate test results are well below the MCL of 10 mg/L, so the DuPont and El Rancho Madrona systems are in compliance with the standard for nitrate.**

TABLE 3-4

Nitrate Monitoring Results(1)

Source	8/17/2009	8/18/2009	12/8/2009	8/16/2010	10/15/2010
S-03	0.400				
S-04	0.200			<0.200	
S-05	1.000				0.700
S-06	0.300			0.400	
S-09			0.700		<0.200
S-01		0.900		0.900	

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

Radionuclides

Results of all radionuclide testing since 1997 are shown in Table 3-5. **All radionuclide samples are well below their respective standards, so DuPont and El Rancho Madrona are in compliance with the radionuclide standards.** As of the writing of this Plan, no radionuclide sampling has been conducted at S-09 (Hoffman Hill No. 2).

TABLE 3-5

Test Results for Radionuclides(1)

Date	Analyte	S-03	S-04	S-05	S-06	S-01	MCL
12/09/1998	Gross Beta	2.0	2.0			<4.0	50.0
11/05/1999	Gross Beta			<4.0			50.0
01/25/2001	Gross Beta				<4.0		50.0
03/26/2003	Gross Alpha (Minus Uranium)				ND(2)	ND(2)	15.0
10/15/2007	Radium 228				<1.0		5.0
12/14/2007	Radium 228					<1.0	5.0
12/08/2009	Radium 228	<1.0	<1.0	<1.0			5.0
12/08/2009	Gross Alpha (Minus Uranium)	<3.0	<3.0	<3.0			15.0

(1) All radionuclide test results are picocuries per liter (pCi/L).
(2) ND signifies the parameter was Not Detected.

Volatile Organic Chemicals

Source Volatile Organic Chemicals (VOC) samples were collected on the dates indicated in Table 3-6 and included all sampling since 1999. No VOCs were detected either above the MCL or State Reporting Limit in any of the source VOC samples.

TABLE 3-6

VOC Sampling History

Date	S-03	S-04	S-05	S-06	S-09	S-01
02/06/2001				NE(1)		
03/15/2001	NE(1)	NE(1)	NE(1)			NE(1)
06/26/2002				NE(1)		
03/25/2003			NE(1)			
10/26/2004	NE(1)	NE(1)				NE(1)
12/13/2004		NE(1)				
07/26/2006				NE(1)		
11/19/2007			NE(1)			NE(1) (2)
07/24/2009	NE(1)	NE(1)				NE(1) (2)
08/20/2010						NE(1)
10/15/2010					NE(1)	

(1) NE signifies the parameter did Not Exceed either the MCL or State Reporting Limit.
(2) Date of sample collection was 8/18/2009.
(3) Date of sample collection was 12/13/2007.

Synthetic Organic Chemicals

Synthetic Organic Chemicals (SOC) samples taken by the City of DuPont are summarized in Table 3-7. The dates that are shown are the most recent samples taken for that particular panel. No SOCs were detected either above the MCL or State Reporting Limit in any of the source SOC samples.

TABLE 3-7

SOC Sampling History

Panel	S-03	S-04	S-05	S-06	S-09	S-01
Insecticide	12/21/2001	12/13/2004	12/21/2001	12/21/2001	10/14/2010	07/25/2001
Herbicide	12/21/2001	12/13/2004	12/21/2001	12/21/2001	10/14/2010	07/25/2001
Pesticide	12/21/2001	12/13/2004	12/21/2001	12/21/2001	10/14/2010	07/25/2001

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

WAC 246-290-300(3) sets distribution system coliform monitoring requirements, and WAC 246-290-310(2) sets coliform bacteria maximum contaminant levels. In general, a coliform MCL violation occurs when two or more coliform samples in one sampling period have detectable coliform bacteria. An Acute MCL occurs if any of the coliform positive samples are positive for Fecal Coliform or E. Coli. A Non-Acute MCL occurs when none of the coliform positive samples are positive for Fecal Coliform or E. Coli.

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 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 Coliform Monitoring Plan (CMP) is included in Appendix E.

The distribution coliform monitoring record since 2000 was reviewed for this Plan. In the record that was reviewed, there were four positive coliform samples for the period, occurring in October 2001, August 2002, November 2008, and September 2009. In each case, follow-up coliform samples indicated no presence of coliform.

Groundwater Rule

The Department of Health adopted the federal Groundwater Rule (GWR) on October 1, 2010. The rule builds upon the Total Coliform Rule (TCR) by addressing the health risks of fecal contamination in groundwater sources used by public water systems. The basic requirements of the Groundwater Rule include source water monitoring (triggered and assessment), compliance monitoring, sanitary surveys, corrective actions, and public notification.

Source Water Monitoring

Triggered Source Water Monitoring is required when the system's routine distribution samples collected under the TCR is total coliform positive. Within 24 hours of notification of the total coliform positive result, the system must collect a triggered source sample (prior to treatment) and have it tested for *E. coli*. If the triggered source sample is positive for *E. coli*, the DOH will direct the water system to either take

corrective action or take five additional source samples within 24 hours. If any of the five additional source samples is *E. coli* positive, the water system must take corrective actions including:

- Correct all significant deficiencies.
- Provide an alternative source of water.
- Eliminate the source of contamination.
- Provide 4-log treatment.

Since DuPont has multiple groundwater sources, it is possible to reduce the number of source samples the system collects by submitting a triggered source water monitoring plan, which includes a system map identifying each source, routine coliform monitoring locations, and any distribution system features that help identify the source associated with each sample location (such as pressure zones and isolation valves).

Assessment Source Water Monitoring may be required on a case-by-case basis to evaluate sources that may be at risk for fecal contamination. This usually requires the system to collect one source sample per month and have it tested for E. coli.

Other Source Monitoring Details. **Sample Location and Size:** The system must collect all source water samples at the source prior to treatment. If the system is unable to meet these conditions, the system may request an alternative sample location by contacting DOH. All *E. coli* samples must be at least 100 milliliters (mL) and analyzed by an accredited laboratory using EPA-approved methods.

Compliance Monitoring

Compliance monitoring confirms the effectiveness and reliability of the system's treatment. If you provide 4-log treatment for viruses and perform compliance monitoring, then the triggered source water monitoring requirements do not have to be met.

For chemical disinfection, the system must monitor the residual concentration daily before the first customer during peak flow, and continuously monitor if the system serves more than 3,300 people. The tests must confirm that the system is providing a chlorine residual high enough to maintain 4-log treatment. Systems providing 4-log treatment that is not the result of a corrective action or state mandate may choose to do trigger source water monitoring instead of compliance monitoring.

Sanitary Surveys

GWR increases the required frequency of sanitary surveys for community water systems from once every 5 years to once every 3 years. However, a community water system may be allowed to stay on a 5-year schedule if it provides 4-log treatment for viruses or

has no total coliform MCL violations, has no more than one total coliform monitoring violation since the last survey, and has no unresolved significant deficiencies in the current survey.

Public Notification

Systems that receive an E. coli positive result in a source water sample must notify their customers within 24 hours of getting their results.

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. A copy of DuPont's Disinfectant Byproduct (DBP) Monitoring Plan is located in Appendix E.

The Stage 2 DBP Rule will revise residual disinfectant concentrations and maximum contaminant levels for disinfection byproducts. The Stage 2 rule will require that each individual sample location meet the running annual average MCL. Under the Stage 1 rule, systems were able to average all sample locations in order to meet the MCL. The final rule for Stage 2 compliance states the system must meet 80 ug/L and 60 ug/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. Once the sample locations are determined, DuPont will be required to collect one sample per year for TTHMs and HAA5s, based on the City's population and the source water type (groundwater). Compliance with the Stage 2 DBPR monitoring for systems serving less than 10,000 people is October 1, 2013.

Table 3-8 shows all the sampling results from the City of DuPont and El Rancho Madrona. No samples were above the Maximum Contaminant Level (MCL).

TABLE 3-8

TTHM and HAA5 Sampling History

Date	Sample Location	TTHM Result (ug/L)	HAA5 Result (ug/L)
07/22/2004	Lone Star	2.700	<1.00
07/22/2004	118th and Center	0.800	<1.00
07/22/2004	2 Lapsley Drive Stand Pipe(1)	3.100	<1.00
08/31/2007	118th and Center tp2	0.600	<15.00
08/31/2007	4301 Pioneer Way tp1	ND(2)	<15.00
08/31/2007	2 Lapsley Drive Stand Pipe(1)	ND(2)	<15.00
08/20/2010	2 Lapsley Drive Stand Pipe(1)	1.7	<15.00
08/19/2010	Sinclair Drive Sample Station	ND(2)	<15.00
08/19/2010	118th and Center Drive	ND(2)	<15.00
08/19/2010	Glacier NW Sample Station	0.5	<15.00
MCL (ug/L)		**80.00**	**60.00**

(1) Two Lapsley Drive Stand Pipe is located in El Rancho Madrona.
(2) ND signifies the parameter was Not Detected.

Asbestos

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, which consists exclusively of asbestos cement pipe, was required to sample their distribution system for asbestos. The last sampling was conducted September 22, 2010 with a result of less than 0.128 MFL, which is well below the MCL of 7.0 MFL. This entire section of the City of DuPont water system is scheduled to have all its water mains replaced 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 last lead and copper samples were collected in May 2011 from service connection taps within the water distribution system from both the DuPont and El Rancho Madrona water systems. At that time 26 samples were collected for DuPont and six samples were collected for El Rancho Madrona.

Table 3-9 summarizes DuPont's and El Rancho Madrona's lead and copper monitoring results. The data shows that DuPont and El Rancho Madrona are in compliance with the lead and copper standards.

TABLE 3-9

Lead and Copper Monitoring Results

Water System	Date	Lead, mg/L		Copper, mg/L	
		Highest Level	90th Percentile	Highest Level	90th Percentile
DuPont	8/25/2010	0.002	0.001	0.430	0.160
El Rancho	8/25/2010	0.005	0.004	0.170	0.140
Action Level			0.015		1.3

WATER QUALITY MONITORING SCHEDULE

Water quality monitoring is required for regulatory compliance and to monitor water system conditions. The DOH is preparing to distribute an "Inorganic and Organic Monitoring Plan" summary to each water purveyor that will define monitoring schedules and sample locations. Table 3-10 provides a 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. Refer to Water Facility Inventory form in Appendix A.	See Coliform Monitoring Plan in Appendix E for addresses.	Follow-up and Repeat Sampling
Inorganic Chemicals	Source (S03)	One complete sample between 01/02 and 12/10	Sampled May 2011	Possible Treatment Modifications
	Source (S04)	One complete sample between 01/02 and 12/10	Sampled October 2004	Possible Treatment Modifications
	Source (S05)	One complete sample between 01/02 and 12/10	Sampled August 2009	Possible Treatment Modifications
	Source (S06)	One complete sample between 01/02 and 12/10	Sampled October 2004	Possible Treatment Modifications
	Source (S09)	One sample between 01/08 and 12/10	Sampled November 2008	Possible Treatment Modifications
Nitrates	Source (S03)	One sample every year	Sampled August 2009 (1)	Possible Treatment Modifications
	Source (S04)	One sample every year	Sampled August 2009 (1)	Possible Treatment Modifications
	Source (S05)	One sample every year	Sampled August 2009 (1)	Possible Treatment Modifications
	Source (S06)	One sample every year	Sampled August 2009 (1)	Possible Treatment Modifications
	Source (S09)	One sample every year	Sampled December 2009 (1)	Possible Treatment Modifications
VOCs	Source (S03)	One sample between 01/08 and 12/10	Sampled July 2009	Possible Treatment Modifications
	Source (S04)	One sample between 01/08 and 12/10	Sampled July 2009	Possible Treatment Modifications
	Source (S05)	State Waiver through 12/2010	--	Possible Treatment Modifications
	Source (S06)	State Waiver through 12/2010	Sampled July 2006	Possible Treatment Modifications
	Source (S09)	Two samples every 3 months	Sampled October 2010	Possible Treatment Modifications

TABLE 3-10 – (continued)

City of DuPont Water System Water Quality Monitoring

Parameter	Sample Location	Frequency	Notes	Consequence of Exceeding Standard
SOC Herbicides	Source (S03)	State Waiver through 12/2010	Sampled December 2001	Possible Treatment Modifications
	Source (S04)	State Waiver through 12/2010	Sampled December 2004	Possible Treatment Modifications
	Source (S05)	State Waiver through 12/2010	Sampled December 2001	Possible Treatment Modifications
	Source (S06)	State Waiver through 12/2010	Sampled December 2001	Possible Treatment Modifications
	Source (S09)	State Waiver through 12/2010	Sampled May 2011	Possible Treatment Modifications
SOC General Pesticides	Source (S03)	State Waiver through 12/2010	Sampled December 2001	Possible Treatment Modifications
	Source (S04)	State Waiver through 12/2010	Sampled December 2004	Possible Treatment Modifications
	Source (S05)	State Waiver through 12/2010	Sampled December 2001	Possible Treatment Modifications
	Source (S06)	State Waiver through 12/2010	Sampled December 2001	Possible Treatment Modifications
	Source (S09)	State Waiver through 12/2010	Sampled May 2011	Possible Treatment Modifications
SOC Insecticides	Source (S03)	State Waiver through 12/2010	Sampled December 2001	Possible Treatment Modifications
	Source (S04)	State Waiver through 12/2010	Sampled December 2004	Possible Treatment Modifications
	Source (S05)	State Waiver through 12/2010	Sampled December 2001	Possible Treatment Modifications
	Source (S06)	State Waiver through 12/2010	Sampled December 2001	Possible Treatment Modifications
	Source (S09)	State Waiver through 12/2010	Sampled May 2011	Possible Treatment Modifications
SOCs – EDB and other soil fumigants	Source (S03)	State Waiver through 12/2010	--	Possible Treatment Modifications
	Source (S04)	State Waiver through 12/2010	--	Possible Treatment Modifications
	Source (S05)	State Waiver through 12/2010	--	Possible Treatment Modifications
	Source (S06)	State Waiver through 12/2010	--	Possible Treatment Modifications
	Source (S09)	State Waiver through 12/2010	--	Possible Treatment Modifications

TABLE 3-10 – (continued)

City of DuPont Water System Water Quality Monitoring

Parameter	Sample Location	Frequency	Notes	Consequence of Exceeding Standard
SOCs – Dioxin, Endothall, Diquat, Glyphosphate	All Sources	State Waiver through 12/2010	--	Possible Treatment Modifications
Lead and Copper	Distribution System	One set of 30 samples between 01/09 and 12/11	Sampled 05/2011	Additional Treatment Modifications
Trihalomethanes D/DBPs Stage 1	Distribution System	Sample in 2010	Sampled 08/10	Possible Treatment Modifications
Asbestos	Distribution System	State Waiver through 12/2010	--	Possible Treatment Modifications
Radionuclides (Gross Alpha, Radium 228)	Source (S03)	One sample between 01/08 and 12/10	Sampled 12/08	Possible Treatment Modifications
	Source (S04)	One sample between 01/08 and 12/10	Sampled 12/08	Possible Treatment Modifications
	Source (S05)	One sample between 01/08 and 12/10	Sampled 12/08	Possible Treatment Modifications
	Source (S06)	One sample between 01/08 and 12/10	Sampled 09/10	Possible Treatment Modifications

(1) Nitrate analysis is included as a part of inorganic chemical analysis. This test should 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. The former El Rancho Madrona water system regularly received complaints regarding water system pressure, however since the systems have been connected there have been no 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

A summary of the City's existing water rights is provided in Table 1-5 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. Since the Historic Village wells are not physically connected to the system, the available water right has not been included in Table 3-11. An analysis of the City's instantaneous water rights versus projected source pumping capacity is presented in Table 3-12. This analysis is based on existing accessible water rights. The City's Water Rights Self-Assessment form is included in Appendix B.

TABLE 3-11

Instantaneous Production Capacity versus Water Right Analysis

Source	Current Pumping Capacity (gpm)	Maximum Instantaneous Withdrawal Permitted by Existing Water Rights (gpm)	Water Right Surplus/ (Deficit), (gpm)
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		
TOTAL	**5,100**	**5,100**(2)	**0**

(1) 2,200 gpm requires both Hoffman Hill wells 1 and 2 to be operating.

(2) The total Existing Water Rights include an additional 60 gpm from the Historic Village Well No. 1, 150 gpm from the Historic Village Well No.2, and 80 gpm from the former El Rancho Madrona water system (not shown in this table) for a overall total of 5,390 gpm. The wells that are potable and connected to the system total 5,100 gpm.

Table 3-12 shows projected peak day production versus the existing instantaneous water right.

TABLE 3-12

Projected Instantaneous Water Right Analysis

Year	Projected Peak Day Instantaneous Production (gpm)[(1)]	Existing Instantaneous Water Rights (gpm)	Instantaneous Water Rights Surplus/ (Deficit), gpm
2012	3,461	5,100	1,639
2013	3,635	5,100	1,465
2014	3,809	5,100	1,291
2015	3,982	5,100	1,118
2016	4,072	5,100	1,028
2017	4,162	5,100	938
2018	4,252	5,100	848
2019	4,342	5,100	758
2020	4,432	5,100	668
2021	4,522	5,100	578
2022	4,611	5,100	489
2023	4,702	5,100	398
2024	4,791	5,100	309
2025	4,813	5,100	287
2026	4,973	5,100	127
2027	5,134	5,100	(34)
2028	5,294	5,100	(194)
2029	5,455	5,100	(355)
2030	5,615	5,100	(515)
2031	5,775	5,100	(675)

(1) Projected Peak Day Production is total ERUs (including DSL) times Maximum Day Demand (607 gpm) divided by 1,080 (minutes in 18 hours of pumping).

Table 3-12 shows the City of DuPont will require additional instantaneous water rights beginning in year 2027. It should be noted that the instantaneous water right depicted above does not account for the blending of the Bell Hill Wells. The 5,100 gpm is the amount totaled of the permitted water rights minus the Historic Village Wells and the El Rancho Madrona Well.

Table 3-13 compares the projected average annual withdrawal requirement (projected average day demand) with existing water rights.

TABLE 3-13

Projected Average Annual Withdrawal Water Right Analysis

Year	Projected Annual Production[(1)] (MG)	Projected Annual Production[(1)] (acre-ft)	Permitted Annual Withdrawal (acre-ft)[(2)]	Projected Surplus/ (Deficit) (acre-ft)
2012	501	1,538	3,160	1,622
2013	526	1,616	3,160	1,544
2014	552	1,693	3,160	1,467
2015	577	1,770	3,160	1,390
2016	590	1,810	3,160	1,350
2017	603	1,850	3,160	1,310
2018	616	1,890	3,160	1,270
2019	629	1,930	3,160	1,230
2020	642	1,970	3,160	1,190
2021	655	2,010	3,160	1,150
2022	668	2,049	3,160	1,111
2023	681	2,090	3,160	1,070
2024	694	2,129	3,160	1,031
2025	697	2,139	3,160	1,021
2026	720	2,210	3,160	950
2027	744	2,282	3,160	878
2028	767	2,353	3,160	807
2029	790	2,424	3,160	736
2030	813	2,496	3,160	664
2031	836	2,567	3,160	593

(1) Projected Annual Production is total ERUs (including DSL) times Average Day Demand (223 gpm) times 365 (number of days in a year).

(2) The Permitted Annual Withdrawal (acre-ft) includes water rights for Hoffman Hill and Bell Hill Wells but not Historic Village and El Rancho Madrona Wells.

As shown in Table 3-13, the City of DuPont will not require additional annual withdrawal water rights in this planning period.

Source Capacity

The 2001 *Water Supply Design Manual* published by DOH, requires that source production capacity meet or exceed Maximum Day Demand (MDD) of the water system. The Department of Health recommends that source(s) capacity is capable of supplying MDD within an 18-hour period. In this case, the source capacity of 5.08 mgd (in 18 hours of pumping) is exceeded in year 2024 when MDD is projected at 5.18 mgd. Table 3-14 summarizes the projected MDD in million gallons per day (mgd) versus available source capacity. Also shown for comparison is the existing source capacity

when pumping for 24 hours, which maintains a surplus through the 20-year planning period.

TABLE 3-14

Projected Demand versus Source Capacity Analysis

Year	Projected Maximum Day Demand (mgd)	Existing Source Capacity with 24 hours of Pumping (mgd)[(1)(3)]	Existing Source Capacity with 18 hours of Pumping (mgd)[(2)(3)]	Source Capacity Surplus/(Deficit) (mgd)
2012	3.74	6.77	5.08	1.34
2013	3.93	6.77	5.08	1.15
2014	4.11	6.77	5.08	0.96
2015	4.30	6.77	5.08	0.78
2016	4.40	6.77	5.08	0.68
2017	4.50	6.77	5.08	0.58
2018	4.59	6.77	5.08	0.48
2019	4.69	6.77	5.08	0.39
2020	4.79	6.77	5.08	0.29
2021	4.88	6.77	5.08	0.19
2022	4.98	6.77	5.08	0.10
2023	5.08	6.77	5.08	0.00
2024	5.17	6.77	5.08	(0.10)
2025	5.20	6.77	5.08	(0.12)
2026	5.37	6.77	5.08	(0.30)
2027	5.54	6.77	5.08	(0.47)
2028	5.72	6.77	5.08	(0.64)
2029	5.89	6.77	5.08	(0.81)
2030	6.06	6.77	5.08	(0.99)
2031	6.24	6.77	5.08	(1.16)

(1) Based on peak well pump run times of 24 hours per day.
(2) Based on peak well pump run times of 18 hours per day in accordance with DOH Guidelines.
(3) Source capacity based on existing wells and pumps in production, which include Bell Hill 1, 2, 3, and Hoffman Hill No. 1 and 2. Blending of the Bell Hill Wells has been taken into account for this source capacity analysis. Bell Hill Well No. 3 pumping capacity is approximately 1,000 gpm, which allows Bell Hill Well No. 2 to blend approximately 600 gpm of its total 1,000 gpm permit.

STORAGE ANALYSIS

Storage requirements for the City of DuPont were determined by applying the Department of Health Group A Water System Design Manual, August 2001, Chapter 9. The storage recommended according to this guidance document is based on the sum of the following and is shown in Figure 3-1:

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

Effective storage is discussed on pages 3-6 to 3-8.

Operational Storage

Operational storage is the volume of the reservoir devoted to supplying the water system while, under normal operating conditions, the source(s) of supply are in "off" status. This volume is dependent upon the sensitivity of the reservoir water level sensors and the tank configuration necessary to prevent excessive cycling of source pump motors. Operational storage is in addition to other storage components, thus providing a factor of safety for equalizing, standby, and fire suppression components.

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.

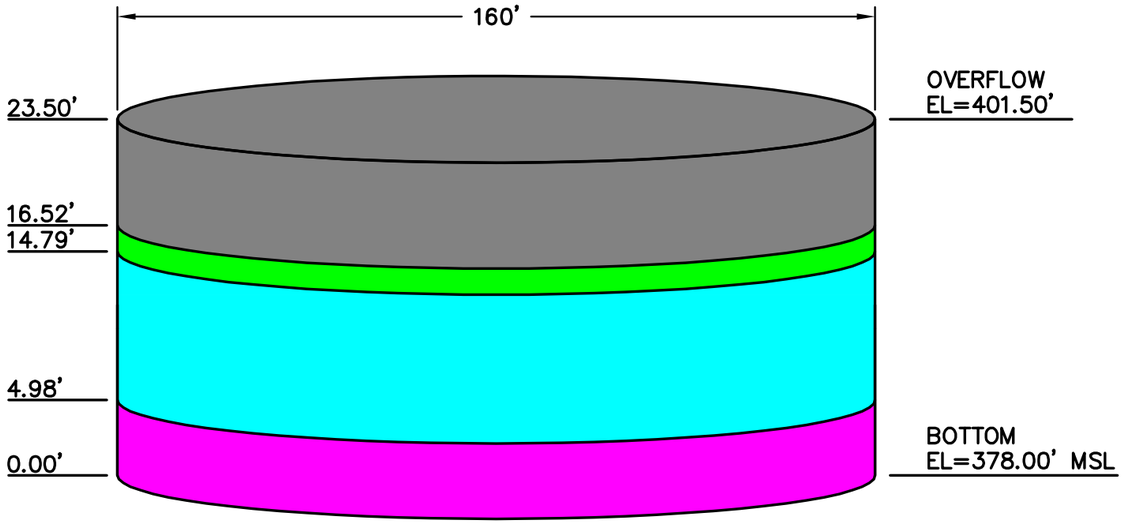
Equalizing storage is calculated using the following equation:

$V_{ES} = (Q_{PH} - Q_S)150$ minutes
V_{ES} = Equalizing storage component (gallons)
Q_{PH} = Peak hourly demand (gpm)
Q_s = Total source of supply capacity, excluding emergency sources (gpm)

Peak hour demands are determined by applying an hourly peaking factor to the maximum day demand. This peaking factor was determined by using the DOH formula for peak hour demand found on page 5-8 of the *Water System Design Manual*.

Standby Storage

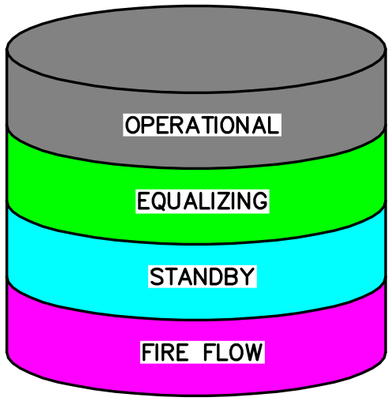
Standby storage is provided in order to meet demands in the event of a system failure such as a power outage, an interruption of supply, or break in a major transmission line. The amount of emergency storage should be based on the reliability of supply and pumping equipment, standby power sources, and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

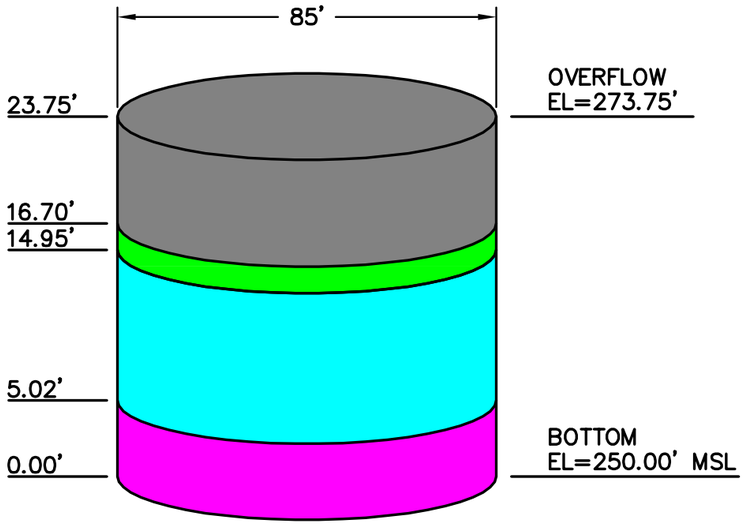


HOFFMAN HILL RESERVOIR
150,414 GALLONS/FOOT

RESERVOIR DATA (GALLONS)			
STORAGE TYPE	TOTAL	HOFFMAN HILL	BELL HILL
OPERATIONAL	1,349,000	1,049,600	299,400
EQUALIZING	334,000	259,900	74,100
STANDBY	1,900,000	1,478,300	421,700
FIRE FLOW	960,000	747,000	213,000
TOTAL	4,543,000	3,534,800	1,008,200
		78%	22%

STORAGE LEGEND





BELL HILL RESERVOIR
42,451 GALLONS/FOOT

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

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12/9/10

Standby storage is calculated using the following equation:

SB_{TMS}= (2 days)(ADD)(N) – $t_m(Q_S – Q_L)$

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)

DOH Note: Although standby storage volumes are intended to satisfy the requirements imposed by system customers for unusual situations and are addressed by WAC 246-290-420, it is recommended that a standby storage volume be not less than 200 gallons/ERU.

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 = $(FF)(t_m)$

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

Note: The standby storage component or the Fire Suppression Storage component, whichever volume is smaller, can be excluded from a water system's total storage requirement provided that such practice is not prohibited by: (1) a locally developed and adopted Coordinated Water System Plan, (2) local ordinance, or (3) the local fire protection authority or County Fire Marshal (reference WAC 246-290-235(4)).

Per the 2001 DOH *Water System Design Manual*, Fire Suppression and Standby Storage components may be "nested," whereby the smaller storage component is deleted from calculations. Since the City of DuPont has adequate storage capacity, nesting has not been used in this analysis.

Dead Storage

Dead storage is considered to be any portion of the storage volume that is below the hydraulic gradeline required to provide a minimum domestic service pressure of 30 psi to any service meter or service line at the property boundary. This provision is intended to prevent the construction of homes in areas of the distribution system with substandard operating pressure. Typically, a standpipe has a component of its capacity that is intentionally designed as dead storage. This means that below a certain water level within the tank, the pressure delivered to some customers falls below the 30 psi requirement for domestic water service. A second system pressure requirement is that fire flow pressure during maximum day flow must meet a minimum of 20 psi based on the hydraulic grade line established by the bottom of Standby and Fire Suppression Storage volumes. Any storage volume below this level is also considered dead storage. The City of DuPont reservoirs do not have any Dead Storage.

Table 3-15 summarizes the City of DuPont storage capacity analysis.

TABLE 3-15

Storage Capacity Analysis

Year	Storage Requirement (MG)					Available Storage (MG)	Storage Surplus, (MG)
	Equalizing	Operational Storage	Minimum Standby	Fire Flow[(1)]	Total[(2)]		
2011	0.00	1.38	1.08	0.96	2.04	4.50	2.46
2012	0.00	1.38	1.12	0.96	2.08	4.50	2.42
2013	0.00	1.38	1.23	0.96	2.19	4.50	2.31
2014	0.00	1.38	1.29	0.96	2.25	4.50	2.25
2015	0.00	1.38	1.36	0.96	2.32	4.50	2.18
2016	0.00	1.38	1.42	0.96	2.38	4.50	2.12
2017	0.00	1.38	1.45	0.96	2.41	4.50	2.09
2018	0.00	1.38	1.48	0.96	2.44	4.50	2.06
2019	0.00	1.38	1.51	0.96	2.47	4.50	2.03
2020	0.00	1.38	1.55	0.96	2.51	4.50	1.99
2021	0.00	1.38	1.58	0.96	2.54	4.50	1.96
2022	0.02	1.38	1.61	0.96	2.57	4.50	1.93
2023	0.03	1.38	1.64	0.96	2.60	4.50	1.90
2024	0.05	1.38	1.67	0.96	2.63	4.50	1.87
2025	0.07	1.38	1.70	0.96	2.66	4.50	1.84
2026	0.07	1.38	1.71	0.96	2.67	4.50	1.83
2027	0.10	1.38	1.77	0.96	2.73	4.50	1.77
2028	0.13	1.38	1.83	0.96	2.79	4.50	1.71

TABLE 3-15 – (continued)

Storage Capacity Analysis

Year	Storage Requirement (MG)					Available Storage (MG)	Storage Surplus, (MG)
	Equalizing	Operational Storage	Minimum Standby	Fire Flow[(1)]	Total[(2)]		
2029	0.16	1.38	1.88	0.96	2.84	4.50	1.66
2030	0.18	1.38	1.94	0.96	2.90	4.50	1.60
2031	0.21	1.38	2.00	0.96	2.96	4.50	1.54

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

(2) WAC 246-290-235 (4) states, "Standby and fire suppression storage volumes may be nested with the larger of the two volumes being the minimum available, provided the local fire protection authority does not require them to be additive." However, since City of DuPont has adequate storage capacity, nesting has not been used in this analysis.

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 Chlorination

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 No. 1 is excellent, with no primary or secondary contaminants or organics detected beyond allowable limits. The water quality of Well No. 2 is good except for high manganese; 0.16 mg/L versus the 0.05 mg/L standard. Manganese is a secondary contaminant, meaning potential aesthetic (stains laundry, etc.) problems, rather than potential health hazards. The recommended method of controlling the manganese is through blending with the low manganese water from Well No. 1. This has been accomplished by City operators by varying the length of pumping cycles. A third well, Well No. 3 was drilled to maximize the water right with the necessity of blending.

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.

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.

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 system booster pump station must be designed to meet the maximum day demand (MDD) for the system or a specific pressure zone. At a minimum, the design is expected to ensure that MDD can be met with all pumps, in service, and that average day demand (ADD) can be met with the largest pump out of service. For open systems, any needed fire-flow capability needs to be analyzed in conjunction with the fire suppression storage provided in the relevant pressure zone.

Requirement 1: MDD with all pumps operating

- Buildout MDD for the zone supplied by the Bell Hill Booster Pump Station is 5.01 mgd. The total capacity of the station with all pumps operating is 5,400 gpm (7.78 mgd).

Requirement 2: ADD with the largest capacity pump off line

- Buildout ADD for the zone supplied by the Bell Hill Booster Pump Station is 1.87 mgd. The capacity of the station with the largest pump off line is 4,050 gpm (5.83 mgd).

Control of Bell Hill 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 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, the auto dialer calls a series of phone numbers until acknowledged when a remote facility has a problem, headquarters is down, or there is a extended power outage (2 minutes or more). Headquarters is accessible off site via "PC Anywhere"; there is a dedicated laptop that is carried by the staff person that 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 this 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 No. 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 1.0 MG 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 provided as Figure 3-2.

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 425 gpm at 150 feet of TDH. The other two variable speed pumps provide fire flow and are each capable of delivering a capacity of 500 gpm at 150 feet of TDH. With one of the largest pumps out of service (500 gpm), the remaining three pumps are sized to provide peak day demand plus fire flow.

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. Since the regulations require that the system provide peak hour demand (PHD) at no less than 30 psi at all service connections

throughout the distribution system, a closed system booster pump station is expected to be designed to meet this requirement [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

- Buildout PHD for the zone supplied by the Hoffman Hill Booster Pump Station is calculated at 581 gpm [MDD (342 gpm) x peaking factor (1.7)]. The capacity of the station with the largest pump off line is 1,350 gpm.

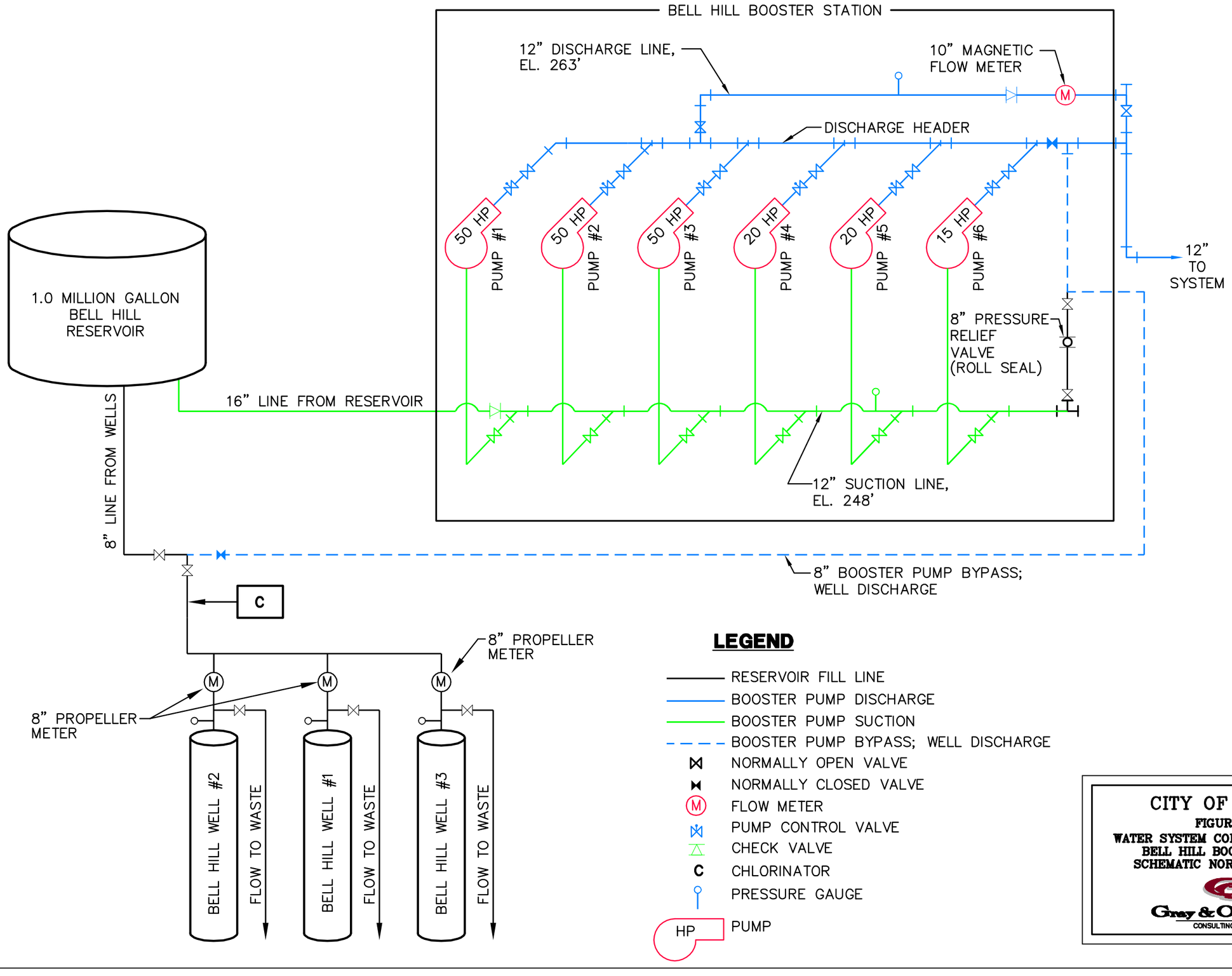
Requirement 2: MDD while supplying fire flow with the largest capacity pump off line

- Buildout MDD for the zone supplied by the Hoffman Hill Booster Pump Station is 342 gpm (0.49 mgd) plus the 1,000 gpm for fire flow equals 1,342 gpm. The capacity of the station with the largest pump offline is 1,350 gpm.

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 Hills Well No. 1 and Well No. 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 provided as Figure 3-3.

DISTRIBUTION SYSTEM

The City of DuPont water distribution system includes over 47 miles of water mains. The system is comprised of three main areas; Historic Village, El Rancho Madrona, and Northwest Landing. The Historic Village is the contains the oldest distribution system within the City, the last significant upgrades in Historic Village were made in 1977 and included replacement of valves, hydrants, and the installation of individual service



LEGEND

- RESERVOIR FILL LINE
- BOOSTER PUMP DISCHARGE
- BOOSTER PUMP SUCTION
- BOOSTER PUMP BYPASS; WELL DISCHARGE
- NORMALLY OPEN VALVE
- NORMALLY CLOSED VALVE
- (M) FLOW METER
- PUMP CONTROL VALVE
- CHECK VALVE
- C CHLORINATOR
- PRESSURE GAUGE
- HP PUMP

CITY OF DUPONT

FIGURE 3-2

WATER SYSTEM COMPREHENSIVE PLAN
BELL HILL BOOSTER STATION
SCHEMATIC NORMAL OPERATION

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meters. Water main replacement projects are regularly planned for and constructed beginning with the most vulnerable mains in that area.

The former El Rancho Madrona Water System serves 33 single-family residences and is now connected with the DuPont Water System. The original water distribution system, constructed in the late 1960s and early 1970s is still in use and comprised of asbestos cement (AC) water mains. Replacement of the entire distribution system is currently in the planning phase and will be replaced in 2012.

The existing water distribution system in the Northwest Landing portion of the City, makes up by far the largest segment of the overall water system and was installed after 1992. It is in excellent condition.

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 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 MWHSoft's H_2ONet hydraulic modeling software, which operates in an AutoCAD computer-aided design and drafting environment. The H_2ONet model was created from an existing CYBERNET hydraulic model developed during the completion of the City's Water System Comprehensive Plan (1998). The current model has been modified to include transmission, distribution, source, storage, and pumping facilities added since 1998. The model was subsequently

updated in 2004 and 2011 and has been utilized to model developer projects to determine flow and pressure availability in the water system for various developer scenarios.

The H_2ONet 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 H_2ONet 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, system demands, and the settings of PRVs are included in the following sections.

Source

The City's sources of supply include Bell Hill Well Nos. 1, 2 and 3, and Hoffman Hill Well Nos. 1 and No. 2.

Booster stations

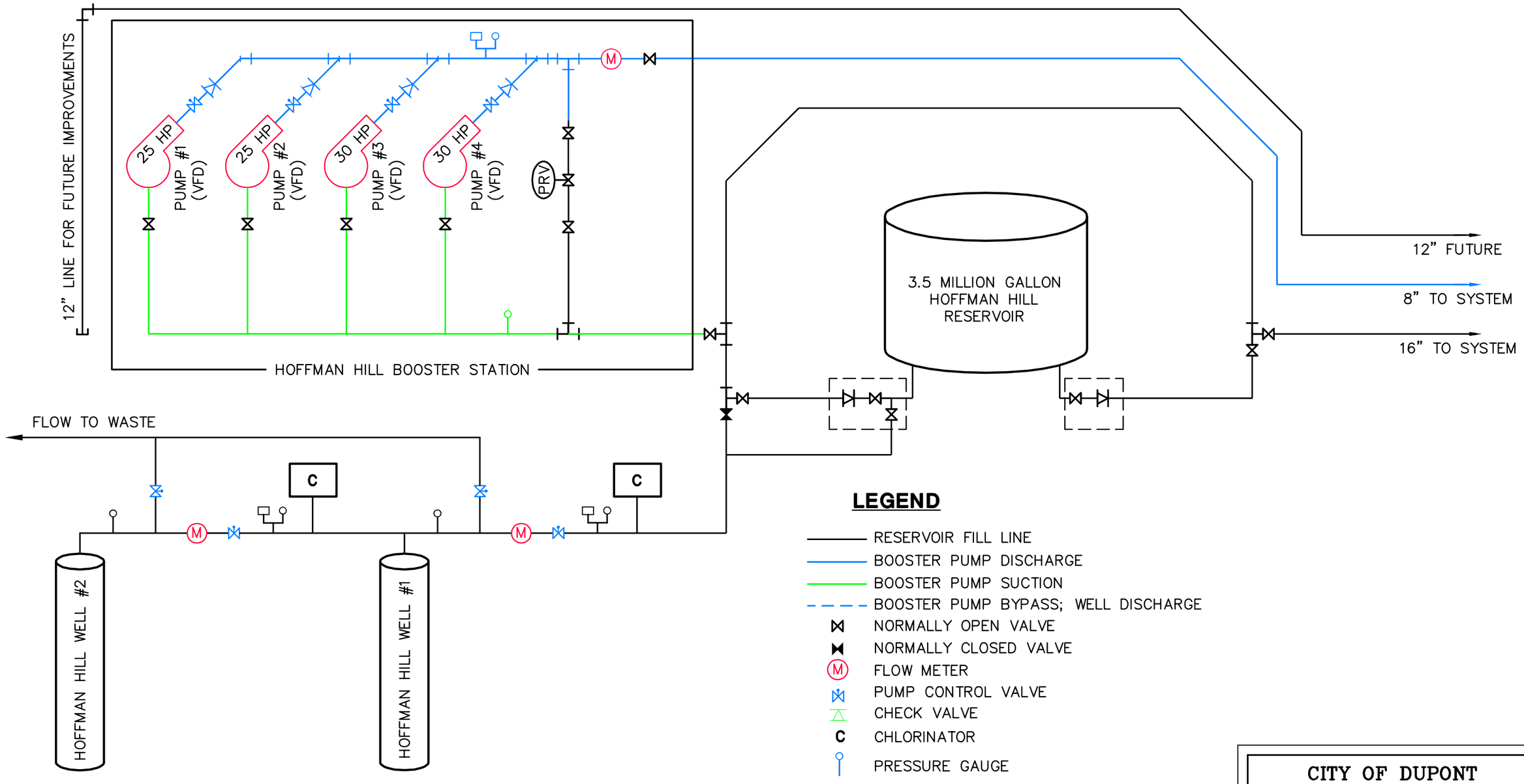
The City's Bell Hill and Hoffman Hill booster stations are included in the hydraulic model. Pump curves have been assigned to each pump based on data obtained from the City. The pressure sustaining valve at the booster station has also been included in the model.

Pressure Reducing Valves (PRVs)

The City's Historic Village area is served by two PRVs. Each PRV has been modeled to match actual pressure measurements in Historic Village.

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.



LEGEND

- RESERVOIR FILL LINE
- BOOSTER PUMP DISCHARGE
- BOOSTER PUMP SUCTION
- BOOSTER PUMP BYPASS; WELL DISCHARGE
- NORMALLY OPEN VALVE
- NORMALLY CLOSED VALVE
- (M) FLOW METER
- PUMP CONTROL VALVE
- CHECK VALVE
- C CHLORINATOR
- PRESSURE GAUGE
- PRESSURE GAUGE WITH TRANSDUCER
- HP PUMP

CITY OF DUPONT

FIGURE 3-3

WATER SYSTEM COMPREHENSIVE PLAN
HOFFMAN HILL BOOSTER STATION
SCHEMATIC NORMAL OPERATION

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CONSULTING ENGINEERS

Five 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 800 gpm. These demands were used for the calibration of the model.

- 2011 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.

- 2011 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.

- 2017 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 6-year planning period.

- 2017 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 6-year planning period.

- 2031 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.

- 2031 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 March 17, 2011 are used for the calibration process.

FIRE HYDRANT TESTS

The H_2ONet 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 March 17, 2011. During these tests, static and residual pressures were recorded as City staff opened hydrants 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 3-16.

TABLE 3-16

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 3-17. The system conditions at the time of testing were replicated in the hydraulic model during the calibration process.

TABLE 3-17

System Conditions during Hydrant Testing

Facility	Conditions During Testing
Bell Hill Reservoir	N/A(1)
Hoffman Hill Reservoir	Level at 18.5 feet
Bell Hill Well No. 1	Off
Bell Hill Well No. 2	Off
Bell Hill Well No. 3	Off
Hoffman Hill Well No. 1	Off
Hoffman Hill Well No. 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 800 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 800 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. Hazen-Williams C-factors between 100 and 130 are used throughout the system. These friction factors are typical values for most pipe and are 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 3-18.

TABLE 3-18

Calibration Results

Test No. (1)	Flow (gpm)	Static Pressure (psi)			Residual Pressure (psi)			ΔS – ΔR (2)
		Field	Model	Difference	Field	Model	Difference	
1	1,342	80	79	-1	74	69	-5	4
2	1,353	80	80	0	72	68	-4	4
3	1,373	85	85	0	75	75	0	0
4	1,186	56	56	0	50	48	-2	2
5	1,186	71	69	-2	55	55	0	-2
6	1,300	69	68	-1	64	62	-2	1
7	1,321	71	71	0	68	63	-5	5
8	1,424	77	76	-1	74	72	-2	1
9	1,472	90	89	-1	81	81	0	-1
10	1,414	72	70	-2	69	64	-5	3

(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 5 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 3-19 shows the reservoir levels, Hoffman Hill Well No. 2 status, and the pumps that were operating at the Bell Hill booster station under different scenarios. 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.

TABLE 3-19

Model Conditions

Modeling Scenario	Hoffman Hill Reservoir Level (ft)	Bell Hill Reservoir Level (ft)	Bell Hill Booster Station
2011 Peak Hour Demand	13.57	18.32	On (2)
2011 Fire Flows	7.89	11.61	On (2)
2017 Peak Hour Demand	13.55	18.30	On (2)
2017 Fire Flows	6.05	9.44	On (2)
2031 Peak Hour Demand	13.00	17.64	On (2)
2031 Fire Flows	4.01	7.03	On (2)

(1) All other wells pump into storage facilities and therefore do not impact the hydraulics of the system.

(2) Under all scenarios, the largest pump is not in service.

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. The City's existing distribution system was modeled under 2011, 2017 and 2031 peak hour demand conditions. Model output results are located in Appendix F. Table 3-20 summarizes the minimum system pressure and location for the peak hour demand analysis. As shown in Table 3-20, no system deficiencies were identified.

TABLE 3-20

Summary of Peak Hour Demand Analysis Results

Scenario	Total System Demand (gpm)	Minimum System Pressure (psi)	Location of Minimum System Pressure	Deficiencies
2011 Peak Hour	3,931	39.43	El Rancho Madrona	None
2017 Peak Hour	5,411	39.02	El Rancho Madrona	None
2021 Peak Hour	6,153	38.53	El Rancho Madrona	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 peak day demand conditions, while maintaining a minimum system pressure of 20 psi. A system wide available fire flow

map, located in the back sleeve of the Plan, illustrates the City's available fire flow under buildout maximum day demand conditions. The results of fire flow modeling for 2011, 2017 and 2031 peak day demand are included in Appendix F. Table 3-21 summarizes the results of the fire flow analysis.

TABLE 3-21

Summary of Fire Flow Analysis Results

Scenario	Total System Demand (gpd)	Deficiencies	Available Fire Flow/Required Fire Flow (gpm)	Reason for Deficiency
2011 Maximum Day + Fire Flow	3,459,000	J-72 Center Plaza – Building 2	3,852/4,000	8-inch Bottleneck
2017 Maximum Day + Fire Flow	4,800,000	J-72 Center Plaza – Building 2	3,740/4,000	8-inch Bottleneck
2031 Maximum Day + Fire Flow	5,473,000	J-72 Center Plaza – Building 2	3,627/4,000	8-inch Bottleneck

RECOMMENDED IMPROVEMENTS

A portion of the Center Plaza – Building 2 site was identified as deficient in fire flow. To remedy this deficiency, it is recommended that an 8-inch line be extended from the 16-inch water main under DuPont-Steilacoom Road to the water line located on the east side of the Center Plaza – Building 2 plat.

WATER SYSTEM DEFICIENCIES AND CAPACITY LIMITS

WATER QUALITY

The City of DuPont meets all applicable DOH regulations required for water quality. The City has consistently provided a high quality of drinking water to its service area. No system deficiencies are noted with the exception of the high manganese concentrations in Bell Hill Well No. 2, which is blended to reduce levels below the MCL.

WATER RIGHTS

As shown in Tables 3-12 and 3-13, the City of DuPont has adequate water rights to meet projected 6-year growth demands of the system. However, in planning for buildout, the City of DuPont will pursue transferring existing water rights (Weyerhaeuser golf course wells) from one point of withdrawal to another. Additionally, this should be pursued with the wells that are no longer used at Historic Village and El Rancho Madrona.

Instantaneous Water Right Capacity Limit

From Table 1-5, the City of DuPont has 5,390 gpm of instantaneous water rights. Assuming that use of these rights would be limited to 18 hours per day, the instantaneous water rights limit can be calculated as follows:

$$\text{Instantaneous Water Rights Connections Limit} = \frac{5{,}390 \text{ gpm} \times 1{,}080 \text{ min/day}}{607 \text{ gpd per ERU}} = 9{,}590 \text{ ERUs}$$

However, assuming that use of these rights would not be limited to 18 hours per day and pumped for 24 hours per day, the instantaneous water rights limit would increase to:

$$\text{Instantaneous Water Rights Connections Limit} = \frac{5{,}390 \text{ gpm} \times 1{,}440 \text{ min/day}}{607 \text{ gpd per ERU}} = 12{,}787 \text{ ERUs}$$

Annual Water Right Capacity Limit

From Table 1-5, the City of DuPont has 3,360 acre feet (AF/Y) of annual water rights and the Average Day Demand per ERU from Table 3-1 is 223 gpd. The limit on ERUs due to the annual water right can be calculated as follows:

$$\text{Annual Water Rights Connections Limit} = \frac{3{,}360 \text{ AF/Y} \times 325{,}829 \text{ gal/AF}}{365 \text{ days/year} \times 223 \text{ gpd per ERU}} = 13{,}450 \text{ ERUs}$$

SOURCE CAPACITY

The minimum required design criteria for a water system is that it should be capable of meeting a maximum day of water demand in 1 day (24 hours) of water production. From Table 3-14 it can be seen that the City of DuPont has adequate source capacity to meet this criteria. However, to provide additional system reliability, the recommended source capacity is to meet maximum day demands in 18 hours of pumping. Table 3-14 shows that DuPont meets this recommended capacity criteria until year 2024. To determine the number of ERUs supportable by the existing source capacity, we take the total amount of water that can be produced by in 24 hours of operation and divide that by the maximum day demand per ERU as follows:

$$\text{Source Production Capacity Connections Limit} = \frac{4{,}701 \text{ gpm} \times 1{,}440 \text{ min/day}}{607 \text{ gpd per ERU}} = 11{,}152 \text{ ERUs}$$

Source capacity is based on existing wells and pumps in production, which include Bell Hill Wells No. 1, 2, 3, and Hoffman Hill Wells No. 1 and 2. The blending of the Bell Hill Wells has been accounted for in this capacity analysis. Bell Hill Well No. 3

pumping capacity is approximately 1,000 gpm, which allows Bell Hill Well No. 2 to blend approximately 600 gpm of its total 1,000 gpm permit.

TREATMENT

No known treatment deficiencies exist with the present blending or the chlorination system at the Bell Hill wells.

STORAGE

No known storage deficiencies exist within the City based on the storage analysis presented in this chapter and summarized in Table 3-15. Following the 20-year planning period ending in year 2031, the population will have reached buildout and the City of DuPont will still have a storage surplus predicted to be 1.54 million gallons.

BOOSTER STATIONS

The booster station at Bell Hill was designed and constructed to serve a buildout population. However, there are improvements proposed at the Bell Hill Booster Station to improve system operation, control, and reliability. These upgrades to the Bell Hill Booster Station include:

- Replace all six control valves with "Cla-valves".
- Replace existing pumps with Variable Frequency Drives (VFDs). The existing pump configuration allows the booster station to operate inefficiently due to the wide range of pressure variations within the distribution system. VFDs would eliminate current pumping inefficiencies.
- Upgrade the telemetry system at the Bell Hill Booster Pump Station to improve communication and operational response.

In addition, the Hoffman Hill Booster Pump Station was also designed and constructed to serve a buildout population. However, the booster pumps are not operating exactly as designed. The booster station was designed to function with the largest pump out of service (500 gpm) and the remaining three pumps providing peak day demand plus fire flow. The booster station currently operates at times with all four pumps on while the system is neither supplying a peak day demand or fire flow.

DISTRIBUTION SYSTEM

Distribution system deficiencies include:

- Replacing the remaining AC water distribution lines in Historic Village.
- Replacing the entire AC water distribution system in El Rancho Madrona.
- Installing approximately 100 lineal feet of 8-inch water main from the waterline located on the east side of the Center Plaza – Building 2 plat to connect with 16-inch water main on the DuPont Steilacoom Road as discussed under the Hydraulic Analysis Recommended Improvements.

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. This legislation amended RCW 90.03 to require additional conservation measures. The Municipal Water Law applies to all Municipal Water Suppliers[1]. Among other things, the Municipal Water law directed DOH to develop the Water Use Efficiency Rule (WUE Rule), which was adopted January 22, 2007. In addition, DOH has developed a WUE Rule guidance document titled "Water Use Efficiency Guidebook" (WUE Guidebook) dated July 2007 (DOH Publication #331-375). 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

[1] The Municipal Water Law defines all community water systems serving 15 or more services as Municipal Water Suppliers. However, King County Superior Court on June 22, 2008, in a decision known as the "Lummi Decision" overturned portions of the Municipal Water Law, including the definition of Municipal Water Supplier. The State Departments of Ecology and Health have appealed the Lummi Decision to the State Supreme Court.

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 water use efficiency measures to show that they are not cost effective.

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

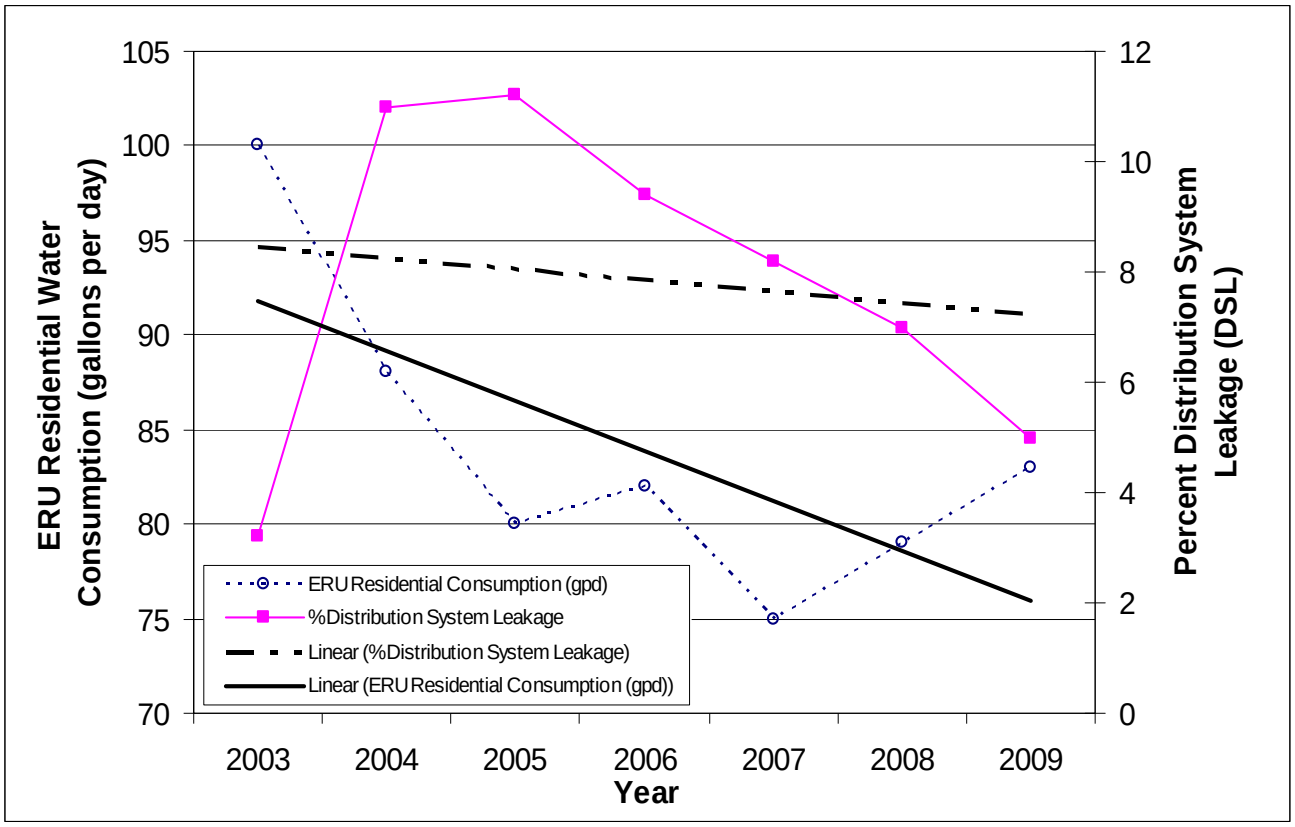
ESTIMATION OF WATER SAVED

Figure 4-1 shows a plot of the residential water use in gallons per capita per day (gcpd) since year 2003. Also plotted is the percentage of Distribution System Leakage (DSL) over the same period. Trendlines for both variables show varying degrees of decline for the period. For residential water consumption, the year to year net savings is equivalent to approximately 17 gallons per capita per day. For the City of DuPont population in 2010, estimated at 8,200 persons, the savings in residential consumption is 139,400 gallons per day or approximately 50 million gallons per year.

In addition, DSL shows a steady decline from a high of 11 percent to approximately 5 percent. A single percentage point drop in year 2009 was equivalent to approximately 4.0 million gallons.

FIGURE 4-1

Annual Water Use Trend



WATER USE EFFICIENCY 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." The WUE Goals will be adopted by the City of DuPont are as follows:

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

- Reduce per residential ERU consumption by one percent per year over the 6-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:

- Improve the water distribution system (including replacing water system mains in El Rancho Madrona and portions of Historic Village)
- Improvements in water system control
- Improvements in water accounting
- Further measures to promote conservation

In addition, future new home construction practices will result in a decline in the average ERU value, because current building codes require the installation of higher efficiency plumbing fixtures that result in lower water consumption.

SELECTED 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 water use efficiency measures. The WUE Guidebook further states that water use efficiency 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 water use efficiency 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.

The City of DuPont hereby adopts the following WUE Measures:

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 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, fire fighting, water main flushing, and estimated leakage from leaks that have been repaired.

As shown in Chapter 2, Table 2-7, the 3-year running average Distribution System Leakage (DSL) for the City of DuPont was 8.2 percent and ranged from a low of five percent to a maximum of 11.2 percent for 2005-2009 period. This leakage rate is less than the 10-percent standard threshold and demonstrates the City's progress in meeting our WUE goals.

GOAL SETTING AND PERFORMANCE REPORTING

Pursuant to the WUE Rule, the City of DuPont must set water use efficiency goals and report progress annually. The City's water use efficiency 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 water conservation 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. The first water use efficiency goals must be set by July 1, 2009 for municipal water suppliers with 1,000 or more service connections.

Annual water use efficiency 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 2010. Table 4-1 summarizes the water use data collection requirements.

TABLE 4-1

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.

TABLE 4-1 – (continued)

Summary of Water Use Data Collection

Data Type	Unit of Measure	Collection Frequency	Comments
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 water use efficiency goals, a description of the conservation 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

Table 4-2 provides the projected average day demand with the goal of reducing water demands by one percent per year over the 6-year planning period. The number of ERUs is the same as projected in Chapter 2; however, pursuant to the City's water use efficiency goals outlined in preceding sections of this chapter, the ERU value is projected to decrease by one percent per year over the coming 6-year planning period. DSL is projected to be below 10 percent throughout the planning period.

TABLE 4-2

Projected Production with Water Use Efficiency Measures

Year	No. of ERUs[(1)]	Average Consumption per ERU, gpd/ERU[(2)]	Average Day Demand with Water Use Efficiency, gpd[(3)(4)]
2010	5,424	223	1,209,500
2011	5,608	221	1,239,500
2012	6,158	219	1,348,600
2013	6,468	217	1,403,600
2014	6,777	215	1,457,100
2015	7,085	213	1,509,100
2016	7,245	210	1,521,400
2017	7,406	210	1,555,200
2018	7,565	210	1,588,700
2019	7,725	210	1,622,300
2020	7,886	210	1,656,100
2021	8,046	210	1,689,700
2022	8,205	210	1,723,000
2023	8,367	210	1,757,000
2024	8,524	210	1,790,100
2025	8,563	210	1,798,300
2026	8,848	210	1,858,200
2027	9,135	210	1,918,300
2028	9,420	210	1,978,100
2029	9,705	210	2,038,000
2030	9,991	210	2,098,100
2031	10,275	210	2,157,800

(1) ERUs are from Table 2-13, including historic distribution system leakage rates.
(2) Average consumption per ERU is 223 gpd per ERU.
(3) Average day demand is rounded to the nearest 100 gallons per day.
(4) Assumes DSL is equivalent to 5 percent throughout the planning period.

Table 4-3 compares the average day demand with and without estimated water use efficiency savings from Table 4-2. At the end of the 6-year planning period (2016), meeting the water use efficiency goals could account for an average savings of 94,200 gpd, or 105 ac-ft/yr. At the end of the 20-year planning period (2031), meeting efficiency goals could account for an average savings of 133,600 gpd, or 150 ac-ft/yr. If this water use efficiency goal were achieved, the net water savings over the 20-year planning period would be 2,068 acre-feet, or an average of approximately 103.4 ac-ft/yr.

TABLE 4-3

Projected Water Use Efficiency Savings

Year	Average Day Demand without Water Use Efficiency		Average Day Demand with Water Use Efficiency		Potential Water Use Efficiency Savings	
	gpd	ac-ft/yr	gpd	ac-ft/yr	gpd	ac-ft/yr
2010	1,209,500	1,355	1,209,500	1,355	0	0
2011	1,250,700	1,401	1,239,500	1,388	11,200	13
2012	1,373,300	1,538	1,348,600	1,511	24,600	28
2013	1,442,400	1,616	1,403,600	1,572	38,800	43
2014	1,511,300	1,693	1,457,100	1,632	54,200	61
2015	1,579,900	1,770	1,509,100	1,690	70,800	79
2016	1,615,600	1,810	1,521,400	1,704	94,200	105
2017	1,651,400	1,850	1,555,200	1,742	96,300	108
2018	1,687,100	1,890	1,588,700	1,780	98,400	110
2019	1,722,700	1,930	1,622,300	1,817	100,400	112
2020	1,758,600	1,970	1,656,100	1,855	102,500	115
2021	1,794,300	2,010	1,689,700	1,893	104,600	117
2022	1,829,700	2,049	1,723,000	1,930	106,700	119
2023	1,865,800	2,090	1,757,000	1,968	108,800	122
2024	1,901,000	2,129	1,790,100	2,005	110,800	124
2025	1,909,600	2,139	1,798,300	2,014	111,300	125
2026	1,973,200	2,210	1,858,200	2,081	115,000	129
2027	2,037,000	2,282	1,918,300	2,149	118,800	133
2028	2,100,600	2,353	1,978,100	2,216	122,500	137
2029	2,164,200	2,424	2,038,000	2,283	126,200	141
2030	2,228,000	2,496	2,098,100	2,350	129,900	145
2031	2,291,400	2,567	2,157,800	2,417	133,600	150
Total Savings						**2,068**

SOURCE OF SUPPLY ANALYSIS

OPTIMIZING USE OF CURRENT SUPPLIES

The City of DuPont has increased the efficiency of its water system in the past 10 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 implementing 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 3-11, the City of DuPont's instantaneous water rights of 5,180 gpm are adequate through year 2026 at current use rates and projected growth.

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 twelve 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 one 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. Peter Zahn, 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 Water Use Efficiency 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 which 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 No. 1 and made recommendations regarding pumping rates. A well log and pumping draw down data were included in the Appendix.

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

  Similar to the Bell Hill No. 1 report, this report discussed the results of a pumping test and presented backup data in the Appendix.

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

  Similar to the Bell Hill No. 1 report, this report discussed the results of a pumping test and presented backup data in the 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 the 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 the 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 the City is relieved from much of the required groundwater 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 No. 1, No. 2, and No. 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 No. 1, No. 2, and No. 3 from the Department of Health as shown in the Water Quality Monitoring Report for the Year 2009 in Appendix E.

The supply aquifer for the Hoffman Hill Wells No. 1 and No. 2 are completed in the Salmon Springs Aquifer. The assessment rated the Well No. 1 as having a low susceptibility rating due to the confining layers. Hoffman Hill Well No. 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.

WELLHEAD PROTECTION AREA DELINEATION

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

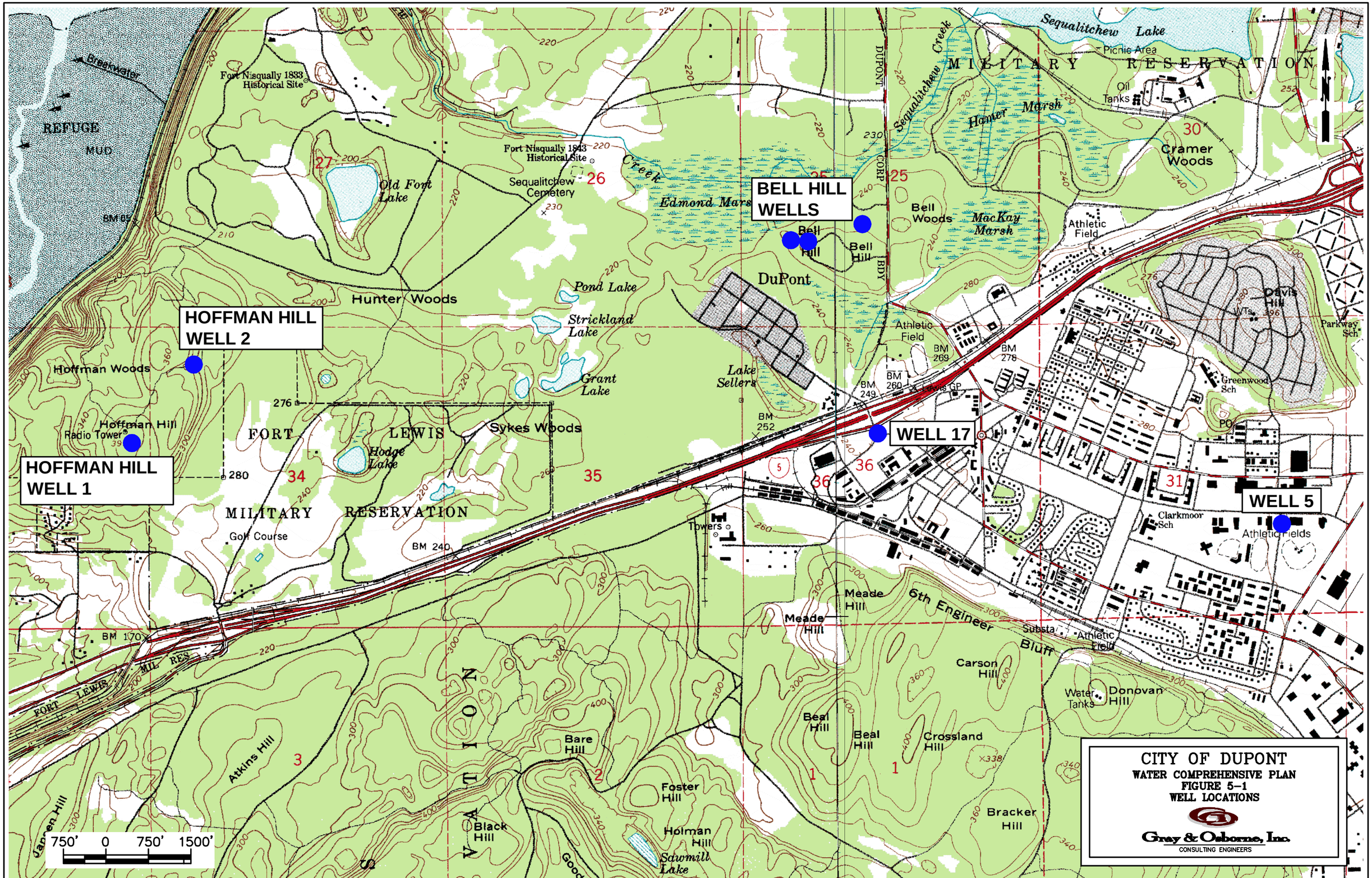
PURPOSE

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

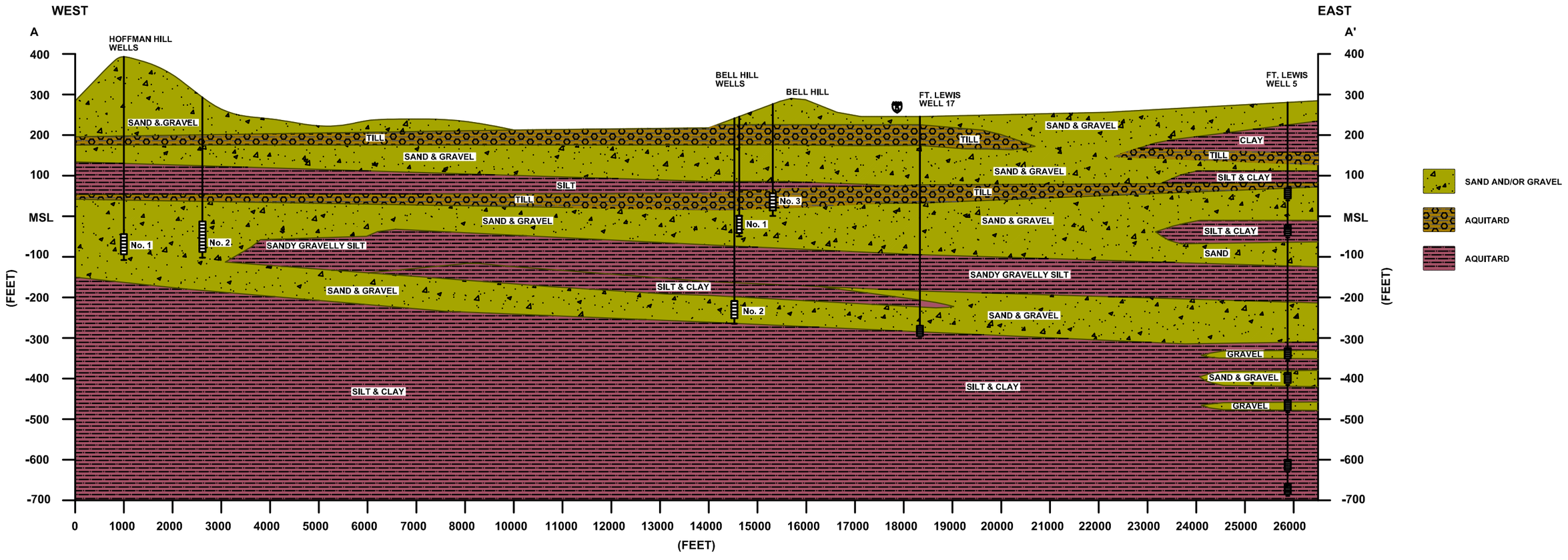
Figure 5-1 presents the location of the hydrogeologic cross-section shown in Figure 5-2, of the underlying water bearing formations associated with the DuPont Bell Hill wells. In the DuPont area, the uppermost aquifer is unconfined and comprised mostly of Steilacoom gravels. This aquifer was formed from 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.



CITY OF DUPONT
WATER COMPREHENSIVE PLAN
FIGURE 5-1
WELL LOCATIONS

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*HYDROGEOLOGIC CROSS SECTION BETWEEN BELL HILL WELL No. 2 AND HOFFMAN HILL WELL No. 2 IS INFERRED.

CITY OF DUPONT

WATER SYSTEM COMPREHENSIVE PLAN
FIGURE 5-2
SCHEMATIC HYDROGEOLOGIC CROSS SECTION

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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.

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 typically about 90 feet thick (depth of 70 to 160 feet) near DuPont. The Kitsap formation, formed during a nonglacial period, underlies the Pre-Vashon sediments. The unit is observed in the boring logs for Bell Hill Wells No. 1 and No. 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 than the upper portion of the aquifer it is not included the hydrogeologic analysis. Bell Hill Wells No. 1 and No. 3 and Hoffman Hill Wells Nos. 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 No. 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 Well No.1, No. 3 and Hoffman Hill No. 1 and No. 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 No. 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 which 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 which 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 generates 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, which 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 one, five, and ten 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 Nos. 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 No. 1 and No. 3	Bell Hill No. 2	Hoffman Hill Wells No. 1 and No. 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 No. 2 is wider (NE-SW) than that for Bell Hill Wells No. 1 and No. 3. Bell Hill Wells No. 1 and No. 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 No. 1 and No. 3. Bell Hill Well No. 2 is screened in a deeper aquifer than Bell Hill Wells No. 1 and No. 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 which 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 one-year time of travel; Zones 2 and 3 represent the five- and ten-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 No. 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 which 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

BELL HILL WELLS

1 YEAR

5 YEAR

10 YEAR

LEGEND:

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

500 0 1000 2000 4000 Feet

SCALE: 1" = 2000'

CITY OF DuPONT

WATER SYSTEM COMPREHENSIVE PLAN

FIGURE 5-3

COMBINED WELL HEAD PROTECTION AREAS

BELL HILL WELLS

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HOFFMAN HILL WELL 2

HOFFMAN HILL WELL 1

BELL HILL WELLS

1 YEAR

5 YEAR

10 YEAR

LEGEND:

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

500 0 1000 2000 4000 Feet

SCALE: 1" = 2000'

CITY OF DuPONT

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

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regulated by the Washington State Department of Ecology under WAC 173-304. These 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 which 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 which 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 then 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 are 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 and 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 (perchloroethelyene, 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 estimates 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 must 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 3 dozen catch basins were 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 10 catch basins located along the Interstate-5 right-of-way. These appear 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 which 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 subbasin. 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, is 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 3 with both soil and groundwater being impacted. Landfill No. 5 has received a ranking of 5 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 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 which 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:

- **Facility/Site Database Interactive Website, (May 2011)**

  http://apps.ecy.wa.gov/website/facsite/viewer.htm. This website 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.

- **Title III Facilities**

  Title III facilities are identified as those which 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. 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

Potential Source	1-Year Zone of Contribution	5-Year Zone of Contribution	10-Year Zone of Contribution
Underground Tanks	None	4 - No. 2 Fuel Oil Volume = 3,550 gal	41 - No. 2 Fuel Oil 1 - Gasoline 1 - Diesel Volume = 136,025 gal
Dangerous Waste Generators	None	None	None
Landfills	None	None	None
Traffic Corridors	None	Interstate 5, Burlington Northern Railroad	Interstate 5, Burlington Northern Railroad
Dry Cleaners	None	None	None
Metal Plating	None	None	None
Automobile Service	None	None	1
Scrap, Salvage and Junkyards	None	None	None
Dry Wells	None	1	3

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 created with the assistance of the Joint Base Lewis-McChord Department of Public Works.

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,

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

1 YEAR TRAVEL TIME

5 YEAR TRAVEL TIME

R1E

R2E

GAS & DIESEL

T19N

25 30
36 31

CITY OF DUPONT

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

Gray & Osborne, Inc.
CONSULTING ENGINEERS

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.

- **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 which 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 G. Spills which 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 which 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 which 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 Well Nos. 1, 2, and 3, and Hoffman Hill Well Nos. 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 which 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 must be provided a copy of the WHPA map, with instructions to notify the City in the event of a spill within a zone of contribution. A sample letter that was sent in 1997 has been included in Appendix G. This letter will be revised and updated and sent to these agencies.

CHAPTER 6

OPERATION AND MAINTENANCE PROGRAM

WATER SYSTEM MANAGEMENT AND PERSONNEL

Waterworks Operator Certification, specified in WAC 246-292, requires all Class 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 is the minimum level of operator certification allowed for the City of DuPont. The City complies with WAC 246-292 by employing the personnel listed below:

Mr. Scott Hein	Water Distribution Manager 2 Cross-Connection Control Specialist
Mr. Fred Foreman	Water Distribution Manager 2 Cross-Connection Control Specialist
Mr. Larry Clark	Water Distribution Manager 2 Cross-Connection Control Specialist Basic Treatment Operator
Mr. Dave Carlington	Water Distribution Manager 2 Cross-Connection Control Specialist
Mr. Justin Moore	Water Distribution Manager 2 Cross-Connection Control Specialist
Mr. Paul Jacoby	Water Distribution Manager 2 Cross-Connection Control Specialist Basic Treatment Operator

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 source of CEUs for certified operators in Washington State.

http://www.doh.wa.gov/ehp/dw/Our_Main_Pages/training.htm

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 primary municipal water system serves the Historic Village and Northwest Landing areas 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.

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. The largest three booster pumps turn on at low system pressure. 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 cannot meet minimum demand and usually runs 24 hours per day, 7 days per week, providing approximately 300 gpm. When a Hoffman Hill Well pump runs at 1,000 gpm, both pumps fill the upper reservoir and the Bell Hill booster pump turns off.

The Bell Hill booster pumps are called by 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. With the headquarters unit in control of operation, Pump No. 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 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 Well Nos. 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.

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 Elevation
- Intrusion
- Fire
- Telemetry Failure

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

During a system-wide power failure, Bell Hill Well Nos. 1 and No. 2 will provide the only source of water, since it can be powered by a backup generator located at the Bell Hill site. During a power outage, control for the booster pumps will be automatically switched from the water level at the Hoffman Hill Reservoir to the discharge pressure at the Bell Hill Booster Pump Station. As during normal operation, Bell Hill Well No. 1 will be called by the water level in the Bell Hill Reservoir. Table 6-1 summarizes the Bell Hill Booster Pump Station.

TABLE 6-1

Bell Hill Booster Pumps

Installation	Pump Model	Pump Configuration	Rated Capacity	Meter
Booster Pump Nos. 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 No. 4 and No. 5	Byron Jackson Type 10 GH vertical turbine pump w/US motor	3 stage 20 hp	500 gpm each	10" Sparling Series FM655 magnetic flow meter (Tigermag) w/transmitter
Booster Pump No. 6	Byron Jackson Type 8 GH vertical turbine pump w/US motor	4 stage 15 hp	350 gpm	10" Sparling Series FM655 magnetic flow meter (Tigermag) w/transmitter

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 station is equipped with a standby generator to keep the system operational until power service is restored.

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 capable of delivering a capacity of 425 gpm at 150 feet of TDH. The other two variable speed pumps provide fire flow and are each capable of delivering a capacity of 500 gpm at 150 feet of TDH. With one of the largest pumps out of service (500 gpm), the remaining three pumps are sized to provide peak day demand plus fire flow. Table 6-2 summarizes the Hoffman Hill Booster Pump Station.

TABLE 6-2

Hoffman Hill Booster Pumps

Installation	Pump Model	Pump Configuration	Rated Capacity	Meter
Booster Pumps No. 1 and No. 2	Peerless C825A	25 hp	425 gpm	6" Sparling Series FM657 magnetic flow meter (Tigermag) w/transmitter
Booster Pumps No. 3 and No. 4	Peerless C830A	30 hp	500 gpm	10" Sparling Series FM657 magnetic flow meter (Tigermag) w/transmitter

SOURCE OF SUPPLY

Bell Hill Wells

Bell Hill has three operational wells (Bell Hill Well Nos. 1, 2, and 3). As stated in Chapter three, Well No. 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 Well No. 1. This was accomplished by varying the length of pumping cycles. The third well, Well No. 3 was drilled to maximize the water right with the necessity of blending. Although not a DOH requirement, the Bell Hill system 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.

During normal operation, the water level in the Bell Hill Reservoir controls the operation of the Bell Hill wells. Well Nos. 1 and 3 are used preferentially over Well No. 2 due to the high iron and manganese concentrations. When Well No. 2 is utilized, the flow is restricted to 400 gpm, so that the total iron and manganese concentrations are less than the secondary MCLs when mixed with Well Nos. 1 and 3. Table 6-3 describes the configuration of the pumps and capacities of the Bell Hill Wells.

TABLE 6-3

Bell Hill Well Pump Description

Installation	Pump Model	Pump Configuration	Rated Capacity	Meter
Bell Hill Well No. 1	Byron Jackson Type MQ submersible pump w/Type H motor	5 stage 75 hp	900 gpm	8" Sparling Series 100 propeller meter w/FT 193 transmitter
Bell Hill Well No. 2	Byron Jackson Type MQ submersible pump w/Type H motor	7 stage 150 hp	1,000 gpm	8" Sparling Series 100 propeller meter w/FT 193 transmitter
Bell Hill Well No. 3	Byron Jackson Type MQ submersible pump w/Type H motor	7 stage 150 hp	1,000 gpm	8" Sparling Series 100 propeller meter w/FT 193 transmitter

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 and injected into the water main prior to entry to the Hoffman Hill Reservoir.

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 6-4 describes the configuration of the pumps and capacities of the Hoffman Hill Wells.

TABLE 6-4

Hoffman Hill Well Pump Description

Installation	Pump Model	Pump Configuration	Rated Capacity	Meter
Hoffman Hill Well No.1	Byron Jackson Type MQ submersible pump w/Type H motor	5 stage 75 hp	1,100 gpm	8" Sparling Series 100 propeller meter w/FT 193 transmitter
Hoffman Hill Well No.2	Byron Jackson Type MQ submersible pump w/Type H motor	7 stage 150 hp	1,100 gpm	8" Sparling Series 100 propeller meter w/FT 193 transmitter

Storage

The operation strategies discussed above were developed for when demand is high. When demand is low, the Bell Hill Reservoir may not have adequate turnover. When this is the case, the Hoffman Hill Well will have to be manually turned off in order to circulate more water through the Bell Hill Reservoir.

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 H.

RESERVOIRS

Improperly maintained reservoirs can cause contamination in public water systems. This is 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 must be completed with each inspection and repair, and a copy of the report retained on file.

Periodic Maintenance

The Bell Hill Reservoir was constructed in 1992 and the Hoffman Hill Reservoir in 1999. Both reservoirs were inspected and cleaned in 2009.

It is important that each reservoir is cleaned and inspected for leaks at least once every 5 years. This involves taking one of the reservoirs out of service and draining it completely. 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 will include the following. Vent screens and the integrity of the access hatch and other openings into the reservoir will be 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 thirty 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 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 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 H. 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 H. The following recommended procedure for testing fire hydrants has been adapted from the American Water Works Association (AWWA), 1989:

Maintenance Procedure

- 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 8,800 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. 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.

- 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.

- 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

The City has a minimal number of dead-end mains in the system and currently flushes them on an as-needed basis. 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.

BOOSTER PUMP STATIONS

The City's booster pump stations were constructed in years 1992 (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 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 H.

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, chemical dosage, and chlorine residual following treatment.

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. It is highly recommended that City 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.

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.

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 6-5 is a listing and schedule of normal maintenance and operations activities. The frequency listed is a minimum and the actual frequency will be adjusted as necessary to meet system requirements.

TABLE 6-5

Preventive Maintenance Schedule

Frequency	Maintenance Task
Daily	Monitor distribution system and note any suspected leaks
3 Days per Week	Inspect wells and record meter readings
3 Days per Week	Inspect booster stations and record meter reading
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 6-6 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 6-6

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	Dave Carlington	(253) 377-4977 (C)
Operator	Larry Clark	(253) 377-4970 (C)
Operator	Justin Moore Paul Jacoby	(253) 377-4978 (C)
Public Works Department		(253) 912-5381
24 Hour Emergency Line (message)		(253) 912-5389
On-Call Phone		(253) 377-5060
On-Call Pager		(253) 396-2152
DuPont 20500P auto dialer		(253) 964-1798

TABLE 6-6 – (continued)

Emergency Phone List

Agency/Group	Contact	Phone Number(1)
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
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
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 I 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, the persistent detection of

coliforms in the water supply, particularly E. coli or fecal bacteria, may require 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 I. WAC 246-290-320 requires water utilities to follow specific procedures in the event coliform bacteria are detected in the water system. The most up-to-date procedures are outlined on the DOH website at http://www.doh.wa.gov/ehp/dw/default.htm.

VOC/SOC and Inorganic Chemical/Physical Characteristics Detection Procedures

The procedures to comply with DOH requirements in the event of a volatile organic chemical or synthetic organic chemical contamination are available on the DOH website at http://www.doh.wa.gov/ehp/dw/default.htm. In addition, a procedure for an inorganic chemical/physical characteristic detection is also available by accessing the provided DOH website.

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 in case of power failure. However, 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 if no other sources are available.

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.

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.

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.

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. This guidance is found at the following website and is summarized below:

https://fortress.wa.gov/doh/eh/dw/publications/publications.cfm?action=pubdetail&PubId=54

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.

The City 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 Cross-Connection Control Specialist is in charge of record management, investigates backflow incidents, and conducts 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 6-7 lists common facilities in each category.

TABLE 6-7

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 reporting period January 2010 through November 2010.

Program Scheduling and Personnel Requirements

The City currently maintains a fully implemented cross-connection control program. Table 6-8 lists the required program items that the City oversees.

TABLE 6-8

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

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 C.

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 C. 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 source of supply, storage, distribution, and others identified capital and non-capital improvements.

IDENTIFICATION OF SYSTEM IMPROVEMENTS

SOURCE CAPACITY

The previous Plan identified the need for additional source capacity in 2010 and would require additional Instantaneous Water Rights in 2019 and Annual Water Rights in year 2016. The previous Plan recommended the addition of three wells, each with a capacity of 1,050 gpm in years 2010, 2015, and 2019. This recommended additional source capacity has been amended since commercial water use has not developed to levels predicted in previous comprehensive planning documents.

As described in Chapters 1, 2, and 3, the City of DuPont currently has sufficient instantaneous water rights to meet projected water system demands through year 2026 and sufficient annual water rights for the entire 20-year planning period.

Source pumping capacity analysis does indicate a deficit beginning in year 2024 when well pumps are running for 18 hours daily to supply Maximum Day Demand as recommended by DOH. Pumping 24 hours a day eliminates the deficit in the 20-year planning period.

In order for the City to maximize the water right for Bell Hill Well No. 2, which currently requires blending, three alternatives are available to maximize the full allocation of water available through the water right. The first option is to screen the well at a depth that eliminates the drawing of water from the level with high concentrations of iron and manganese, if possible. The second option is to drill a replacement well into an aquifer where iron and manganese do not impact raw water quality. The third option is to

provide treatment for iron and manganese at Bell Hill Well No. 2. In 2004, a cost estimate was completed to treat iron and manganese at the well site. Treatment at that time was determined to not be cost effective since blending of sources resolved the issue. In addition, the City of DuPont would also be operating another treatment system.

In order for the City of DuPont to maintain maximum operational flexibility with its existing water rights, the City will pursue transfer of existing water rights from wells that are not currently in use. These transfers are discussed as capital improvement projects below. Additionally, the City of DuPont has already submitted an application (June 2009) to transfer/change place of use for water rights from Weyerhaeuser wells in the vicinity of the golf course. The application is included in Appendix B.

Another method that will be pursued to extend existing source capacity and maximize the City's existing water rights is to decrease dependency on potable water for non-potable uses such as irrigation and fire flow. Large contiguous irrigated areas may utilize Class A reclaimed water or potentially, wells once owned and operated by the Weyerhaeuser Company for irrigation and fire flow purposes. Reduction of the dependence on potable water for non-potable uses would reduce the amount of the water rights required for the City of DuPont.

The following are source capacity projects that are identified either herein or in Chapters 2 and 3 of this Plan.

Project SO-1

Feasibility study investigating alternatives to maximize the water right at Bell Hill Well No. 2. Alternatives that will be investigated include well modification, well relocation, and iron (Fe) and manganese (Mn) treatment; however, additional options will be explored. This feasibility study is scheduled to begin in year 2014. [$12,500]

Project SO-2

Transfer existing water rights from one point of withdrawal to another for the Historic Village wells. The application process is scheduled to begin in year 2013. [$2,500]

Project SO-3

Transfer existing water rights from one point of withdrawal to another for the El Rancho Madrona well. The application process is scheduled to begin in year 2013. [$2,500]

Project SO-4

Update and formalize the existing intertie agreement with the adjacent water purveyor; Joint Base Lewis-McChord to utilize the intertie when needed. The Joint Base Lewis-McChord Water System Plan should be reviewed to determine if that source is

adequate to supply Joint Base Lewis-McChord and supplement the City of DuPont in times of critical need. Costs include an in-depth review of the Joint Base Lewis-McChord Water System Plan, possible hydraulic analysis, and the generation of legal documentation of a binding agreement. After an analysis of the intertie connection and valving, upgrades may be warranted. This is scheduled to occur in year 2013. [$5,000]

TREATMENT

Possible water treatment projects proposed for the 20-year planning period may include outfitting Bell Hill Well No. 2 for iron and manganese. However, a feasibility study will be completed first to determine the most cost effective solution to maximizing the City's water right at Bell Hill Well No. 2. In addition, routine maintenance activities associated with the alternative source projects described above, which may require minor modifications to piping and valving.

Project T-1

Install on-site generation sodium hypochlorite disinfection at the Hoffman Hill wells. This project was completed in year 2012. [$50,000]

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.

Project ST-1

The Bell Hill Reservoir was last inspected and cleaned in 2009. It is planned for inspection and cleaning in 2015, 2021, and 2027. [$7,000 each time]

Project ST-2

The Hoffman Hill Reservoir was last inspected and cleaned in 2009. It is planned for inspection and cleaning in year 2015, 2021, and 2027. [$7,000 each time]

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. The exception is the Historic District, which has been substantially replaced following leak detection surveys and area wide upgrades. The only additional area that will require major distribution system improvements is the El Rancho Madrona area. Formerly, this was operated by the City as a separate water system; however, in 2010 it was connected into the City of DuPont Water System.

Project D-1

Replace the entire approximately 1,970 feet of 6-inch asbestos-cement (AC) water pipe El Rancho Madrona with 8-inch ductile iron (DI) water pipe. This project will complete the replacement of the remainder of AC pipe in the entire City of DuPont water system with the exception of the Historic Village. This project was completed in year 2012. [$443,200]

Project D-2

Irrigation Control/Modifications, which include a City-owned weather station and system reprogramming to maximize watering and facility efficiency. The completion of the project may significantly reduce water consumption at these connections. This is scheduled to occur in year 2014. [$27,500]

Project D-3

Install approximately 100 lf of 8-inch water main from the waterline located on the east side of the Center Plaza – Building 2 plat to connect with 16-inch water main on the DuPont Steilacoom Road to correct a hydraulic deficiency. This is scheduled to occur in year 2013. [$20,500]

Project D-4

The City will change the method of service meter readings from direct read to remote read technology. This program is expected to take a total of 3 years to fully implement. The full cost of the program will be spread evenly over three years. This is scheduled to occur in year 2013-2015. [$587,000]

Project D-5

Replace approximately 2,600 feet of 6-inch asbestos-cement (AC) water pipe in the Historic Village in the vicinity of Haskell Street and Barksdale Avenue with 8-inch ductile iron (DI) water pipe. This project will complete the replacement of the remainder of AC pipe in the Historic Village. This is scheduled to occur in years 2015 and 2016. [$543,100]

Project D-6

The City will continue to identify and replace older or defective water mains and service lines within the system through ongoing leak detection - repair/replacement program. [$12,600 annually]

Project D-7

The City will continue to test, repair, or replace older or defective water meters within the system through ongoing water meter repair/replacement program. [$32,100 annually]

BOOSTER PUMP STATIONS

The booster stations at Bell Hill and Hoffman Hill were designed and constructed to serve a buildout population. However, there are improvements proposed at the Bell Hill Booster Station to improve system operation, control, and reliability.

Project B-1

Replace all six control valves with "Cla-valves" at the Bell Hill Booster Pump Station. This is scheduled to occur in year 2013. [$23,100]

Project B-2

Install Variable Frequency Drives (VFDs) at the Bell Hill Booster Pump Station. The existing booster station operates inefficiently at times due to pressure variations within the distribution system. This is scheduled to occur in year 2013. [$126,400]

Project B-3

Upgrade telemetry system at the Bell Hill Booster Pump Station. This is scheduled to occur in year 2013. [$27,500]

Project B-4

Troubleshoot the Hoffman Hill Booster Pump Station to ensure it is operating as designed with the largest pump out of service (500 gpm) and the remaining three pumps providing peak day demand plus fire flow. The booster station currently operates at times with all four pumps on while the system is neither supplying a peak day demand or fire flow. This is scheduled to occur in year 2013. [$3,500]

GENERAL BUDGETARY ITEMS

Project G-1

The City will upgrade their water billing software, which will allow accurate interpretation of water use within customer classes and water meter sizes. The current billing software is limited and has created difficulties in assessing data. This is scheduled to occur in year 2013. [$8,000]

Project G-2

The City will upgrade their current GIS system components (computer, plotter, and software) to meet the City's increasing demands with more current and adaptable hardware and software components. This is scheduled to occur in year 2013. [$15,000]

Project G-3

The City will install various security features to various water system components to avoid vandalism and tampering. Features that will be installed include fencing and increased lighting as well as other security measures. Projects will occur over the next 3-year period and will be a result of the Vulnerability Analysis and Update of the Emergency Response Plan that was completed in 2004. This is scheduled to occur in year 2013. [$22,000]

Project G-4

Update Water System Comprehensive Plan in year 2018 per Department of Health requirements. [$75,000]

Project G-5

Implementation of a Water Use Efficiency Program. This would include public outreach including possible mailers or bill inserts as well as other forms of informing the public and departments of water conservation measures. [$1,500 annually]

Project G-6

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. [$1,500 annually]

SUMMARY OF RECOMMENDED IMPROVEMENTS

A prioritization schedule and cost summary for the recommended 6 - and 20-year improvements are shown in Table 8-1. All costs shown are in 2012 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"

WATER WELLS

DuPONT CITY LIMITS

PROPERTY LINES

0 600 1,200 2,400

SCALE: 1"=1,200'

Capital Improvements Legend

T-1	Hoffman Hill Well on-site generation sodium hypochlorite disinfection system
ST-1	Bell Hill Reservoir inspection and cleaning
ST-2	Hoffman Hill Reservoir inspection and cleaning
D-1	Replace approx. 2,000 feet 6-inch AC water pipe in El Rancho Madrona
D-2	Irrigation control / Modification
D-3	Install 100 feet of 8-inch water line between Center Plaza Building 2 and DuPont-Steilacoom Road
D-5	Replace approx. 2,600 feet 6-inch AC water pipe in Historic Village
B-1	Replace six control valves with Cla-Val valves at the Bell Hill Booster Pump Station
B-2	Install Variable Frequency Drives at the Bell Hill Booster Pump Station
B-3	Upgrade telemetry system at the Bell Hill Booster Pump Station

Note: Other projects included in the CIP (Table 8-1) are not site specific and therefore are not shown on this map.

PUGET SOUND

N

WHARF ROAD

WATERLINE ACCESS ROAD

DUPONT-STEILACOOM RD

POWERLINE RD.

INTERNATIONAL AVE. N

CENTER DR.

D-3

WETLAND #10

D-2

OLD FORT LAKE

EDMOND MARSH

B-1
B-2
B-3

ST-1

BELL HILL BOOSTER PUMP STATION

WELL #3

WELL #2

BELL HILL RSERVOIR

WELL #1

DAVIS PL.

BELL HILL PL.

DUPONT-STEILACOOM RD.

MARTIN ST

McNEIL ST.

REGIONAL STORMWATER FACILITIES

WALLACE ST.

HYLAND ST.

CHARLES ST.

BOB'S HOLLOW LN.

HAMMOND AVE

FALCHER BLVD.

POND LAKE

DUPONT AVE.

LOWMER AVE.

HASKELL ST.

BELL MARSH

STRICKLAND LAKE

GRANT LAKE

WETLAND #8

CENTER DR.

THOMPSON ST.

PALISADE BLVD.

LAKE SELLERS

BARKSDALE AVE.

STEILACOOM RD.

WILMINGTON DR.

WETLAND #12

RIDGE VIEW DR.

HOFFMAN HILL BLVD.

SINCLAIR DR.

BRACKENRIDGE AVE.

WETLAND #11

HOFFMAN HILL WELL #2

HOFFMAN HILL WELL #1 AND BOOSTER PUMP STATION

T-1

HOFFMAN HILL RESERVOIR

ST-2

D-1

LARSEN DR.

MADRONA PL.

MOUNTS RD.

D-5

CITY OF DUPONT

WATER SYSTEM COMPREHENSIVE PLAN

FIGURE 8-1

LOCATIONS OF CIP PROJECTS

Gray & Osborne, Inc.

CONSULTING ENGINEERS

TABLE 8-1

Capital Improvement Projects

Priority	Project No.	Project	Estimated Project Cost and Schedule						
			2012	2013	2014	2015	2016	2017	2018-2031
1	T-1	Install on-site generation sodium hypochlorite disinfection at Hoffman Hills	$50,000						
2	D-1	Replace El Rancho Madrona water mains	$443,200						
3	B-1	Replace all six control valves (Cla-valves) at the Bell Hill Booster Station		$23,100					
4	B-2	Install Variable Frequency Drives (VFDs) at the Bell Hill Booster Station		$126,400					
5	B-3	Upgrade telemetry system at the Bell Hill Booster Station		$27,500					
6	SO-1	Feasibility Study investigating operational alternatives for Bell Hill Well No. 2			$12,500				
7	SO-2	Transfer existing water rights from Historic Village Wells to another point of withdrawal		$2,500					
8	SO-3	Transfer existing water rights from El Rancho Madrona Well to another point of withdrawal		$2,500					
9	SO-4	Formalize Intertie agreement with Joint Base Lewis-McChord		$5,000					
10	D-2	Irrigation control / modifications to weather station and system reprogramming			$27,500				
11	G-1	Billing Software Upgrades		$8,000					
12	G-2	Upgrades to current GIS system components		$15,000					
13	G-3	Increased security measures to water system components		$22,000					
14	D-3	Install 100 lf of 8-inch waterline between Center Plaza – Building 2 and DuPont Steilacoom Road		$20,500					
15	D-4	Change from direct read meters to remote read meter technology		$189,900	$195,600	$201,500			
16	B-4	Hoffman Hill Booster Pump Station Modifications Analysis		$3,500					

TABLE 8-1 – (continued)

Capital Improvement Projects

Priority	Project No.	Project	Estimated Project Cost and Schedule						
			2012	2013	2014	2015	2016	2017	2018-2031
17	ST-1	Internal inspection and routine cleaning of Bell Hill Reservoir				$7,000			$14,000
18	ST-2	Internal inspection and routine cleaning of Hoffman Hill Reservoir				$7,000			$14,000
19	D-5	Replace approximately 2,600 lf of AC water pipe in the Historic Village				$108,620	$434,480		
20	G-4	Update Water System Comprehensive Plan in year 2017							$75,000
21	D-6	Leak Detection Survey	$12,600	$12,600	$12,600	$12,600	$12,600	$12,600	$163,800
22	D-7	Repair/replace defective water meters	$32,100	$32,100	$32,100	$32,100	$32,100	$32,100	$417,300
23	G-5	Conservation Program	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$19,500
24	G-6	Annual Consumer Confidence Report	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$19,500
Total			**$540,900**	**$493,600**	**$283,300**	**$371,820**	**$482,180**	**$47,700**	**$723,100**

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 8-2 lists these recommendations.

TABLE 8-2

System Operation and Administrative Action Plan

Action Item/Improvement	Purpose	Reference Page No. (1)
Water Use Efficiency Program	Reduce water consumption through educational program, leak detection/repair, audit of large consumers, distribution of conservation kits	Chapter 4
Water quality monitoring	Continue routine sampling per the monitoring plan in Table 3-10	3-16 -- 3-19
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	6-12, 6-13
Inventory of service meter age	Maintain accurate records to assist in a service meter replacement program	6-13
Cross-connection control program	Fully implement this program to protect the drinking water system from contamination	6-19
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	6-7

(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 that describes 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, are presented in Resolution No. 10-395, passed on November 9, 2010 located in Appendix L. The City charges water customers a monthly flat charge based on meter size and a volume charge of $1.14/ccf on all usage over 500 cubic feet per month. Water rates are summarized in Table 9-1.

TABLE 9-1

Monthly Water Service Rates[(1)]

Base Charge Classes	2010	2011	2012	2013	2014	2015
Single-Family	$16.32	$19.10	$21.60	$24.40	$27.55	$31.15
Single-Family – Lifeline	$11.32	$13.35	$15.10	$17.10	$19.30	$21.80
Non-Single-Family[(2)]						
3/4 Inch	$16.32	$19.10	$21.60	$24.40	$27.55	$31.15
1 Inch	$27.23	$31.90	$36.05	$40.75	$46.00	$52.00
1-1/2 Inch	$54.47	$63.60	$71.95	$81.25	$91.75	$103.75
2 Inch	$87.11	$101.80	$115.15	$130.05	$146.85	$166.05
3 Inch	$163.30	$203.80	$230.45	$260.35	$293.95	$332.35
4 Inch	$272.14	$318.40	$360.05	$406.75	$459.25	$519.25
6 Inch	$544.27	$636.60	$719.95	$813.25	$918.25	$1,038.25
8 Inch	$870.88	$1,018.60	$1,151.95	$1,301.25	$1,469.25	$1,661.25
10 Inch	$1,577.65	$1,846.40	$2,088.05	$2,358.75	$2,663.25	$3,011.25
Fire Protection Service (all sizes)	$15.30	$17.95	$20.30	$22.95	$25.90	$29.30
Temporary Water Use	$15.30	$19.10	$21.60	$24.40	$27.55	$31.15
Water Hydrant Use	$15.30	$19.10	$21.60	$24.40	$27.55	$31.15
ccf of water use over 500 cf/month	$1.14	$1.35	$1.50	$1.70	$1.95	$2.20

(1) Source: City of DuPont Resolution No. 10-395.
(2) Non-Single Family customers include commercial, industrial, and irrigation.

SYSTEM DEVELOPMENT CHARGES

System Development Charges (SDC) are presented in Resolution No. 10-395, passed on November 9, 2010 and summarized in Table 9-2. The SDC covers the cost for meter installation.

TABLE 9-2

System Development Charge

Meter Size	System Development Charge[(1)]
Single-Family	$2,888.00
Non-Single-Family	
3/4 Inch	$2,888.00
1 Inch	$4,822.96
1-1/2 Inch	$9,617.04
2 Inch	$15,393.04
3 Inch	$30,814.96
4 Inch	$48,142.96
6 Inch	$96,257.04
8 Inch	$154,017.04
10 Inch	$279,182.96

(1) SDC does not include B&O Tax.

HISTORICAL FINANCIAL OPERATIONS

Historic water revenues and expenses for the years 2006 through 2009 are summarized in Table 9-3. Expenses 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 Operation and Maintenance Expenses

Revenues	2006	2007	2008	2009
Water Service	1,130,125	1,059,249	1,114,627	1,164,744
Water Turn-On Fees	25,385	28,090	24,915	23,325
Permits/Inspection Fees	38,161	25,316	21,639	13,228
Hydrant Use	144	(449)	871	784
Other Misc. Revenues/Penalties	15,183	13,276	13,829	12,624
Other Misc. Revenues	885	5,695	70,309	1,115
General Investment	111,283	100,784	53,152	13,471
Total Revenues	1,321,166	1,231,961	1,299,342	1,229,291
Expenses	**2006**	**2007**	**2008**	**2009**
Salaries & Wages	183,656	307,192	341,956	383,890
Overtime	5,375	7,330	7,749	8,300
Personnel Benefits	56,417	104,660	122,052	145,000
Uniform Cleaning	1,376	1,548	1,771	1,000
Uniforms	156	338	381	700
Office Supplies	287	241	308	250
Gas, Oil, Fuel	5,966	9,479	9,326	8,000
Operating Supplies	16,235	12,447	11,699	15,000
Small Tools and Equipment	2,716	1,673	3,382	2,500
Building Materials and Supplies	86	641	1,542	2,000
Professional Services	46,202	17,403	23,761	50,000
Professional Services - RI	588	436	3,946	1,500
Communication	4,599	5,201	7,188	6,000
Communications – Other	4,921	5,543	3,047	4,000
Communication – Postage	388	320	14	4,800
Travel and Subsistence	881	509	291	750
Advertising		356	307	100
Operating Rental and Leases		250	1,125	300
AWC-RMSA Insurance	15,738	19,361	20,260	23,327
Utilities	108,057	119,201	123,365	120,000
Repairs and Maintenance	8,991	11,990	17,688	8,000
Repairs Software	2,290	3,449	3,244	4,732
Repairs – Vehicles	2,854	794	4,228	6,000
Miscellaneous	24	23	88	75
Conference/School/Training	2,197	745	1,090	1,500
Printing/Binding		0	76	999
Prof Dues and Subscriptions	6,988	6,976	9,074	9,000
Intergovernmental Services		88	570	
Utility Tax	122,523	108,807	126,038	137,800

TABLE 9-3 – (continued)

Historic Operation and Maintenance Expenses

Expenses – Cont.	2006	2007	2008	2009
Capital Improvements				
Other Improvements	63,918	236,992	28,609	115,000
Machinery and Equipment	35,847	52,819	45,434	50,000
Debt Service	**2006**	**2007**	**2008**	**2009**
Civic Center – Principal				48,150
PWTF – Principal		31,445	31,445	31,445
PWTF – Interest		4,087	3,773	3,459
Civic Center – Interest				66,378
Equipment Replacement	15,440	10,926	11,077	12,656
Total Operating Costs	**714,716**	**1,083,270**	**965,904**	**1,272,611**
Cash Balance	**1,783,667**	**1,932,675**	**2,266,113**	**2,272,700**
Total Operating Revenue	**1,321,166**	**1,231,961**	**1,299,342**	**1,229,291**

PROJECTED GROWTH

In 2010, the City of DuPont updated its water service utility rates based on a Utility Rate Analysis. The current rates are a result of that Analysis and shown in Table 9-1. Projected future revenues are based on the growth in the number of projected water system customers. Water service area population is projected to grow at an annual constant rate until the buildout population of 12,100 is attained based on data presented in Chapter 2. For purposes of conservatively projecting future revenues and expenses, the financial analysis assumes that water use within the system will grow annually by a projected 1.5 percent Equivalent Residential Units (ERUs) through year 2015.

PROJECTED EXPENSES, REVENUES, AND CAPITAL RESERVES

FUTURE OPERATION AND MAINTENANCE EXPENSES

Future operation and maintenance expenses were projected for the 2010 Utility Rate Analysis based on a review of the historical costs shown in Table 9-3. Table 9-4 summarizes projected operation and maintenance expenses. Costs are escalated by the following factors: interest earnings rate, cost of living adjustment (COLA), benefits, inflation, electricity, and insurance increases. In addition, three capital improvement projects have been included under operating expenses since they are maintenance projects that should be performed annually. These projects are leak detection of $12,600 annually, conservation program of $1,500 annually, and consumer confidence reporting of $1,500 annually. Lastly, future excise taxes are based on the State water utility excise tax rate of 4.7 percent plus the 11.0 percent local City water utility tax applied to

estimated water utility revenues. Additionally, project D-5 is planned to be funded with City issued bonds.

There is also an annual transfer from operations to a capital reserve fund that accounts for a 25 percent level of funding depreciation. This capital (depreciation) reserve fund, calculated annually at 3 percent, is intended to provide funds for eventual replacement of aging infrastructure. Maintaining a capital reserve fund and providing it with consistent annual funding will assist in minimizing debt funding leveling rates (without large increases from year to year) and will assist in the financial health of the system.

TABLE 9-4

Projected Operation and Maintenance Expenses

Operation and Maintenance Expenses	2011	2012	2013	2014	2015	2016
Salaries and Wages	412,100	441,000	471,900	504,900	540,200	556,400
Overtime	12,100	13,000	13,900	14,800	15,900	16,400
Personnel Benefits	164,000	183,600	205,700	230,400	258,000	268,300
New Personnel	0	34,500	36,900	79,000	84,600	87,100
Uniform Cleaning	1,500	1,600	1,600	1,700	1,700	1,800
Uniforms	700	700	800	800	800	800
Office Supplies	500	500	500	600	600	600
Gas, Oil, Fuel	11,600	12,100	12,700	13,400	14,000	14,700
Operating Supplies	15,500	15,900	16,400	16,900	17,400	17,900
Small Tools and Equipment	2,600	2,700	2,700	2,800	2,900	3,000
Building Materials and Supplies	1,500	1,600	1,600	1,700	1,700	1,800
Professional Services	25,800	26,500	27,300	28,100	29,000	29,900
Professional Services - RI	500	500	500	600	600	600
Communication	6,200	6,400	6,600	6,800	7,000	7,200
Communications - Other	4,100	4,200	4,400	4,500	4,600	4,800
Communication - Postage	4,600	4,800	4,900	5,100	5,200	5,400
Travel and Subsistence	1,200	1,300	1,300	1,400	1,400	1,400
Advertising	300	300	300	300	300	400
Operating Rental and Leases	500	500	500	600	600	600
AWC-RMSA Insurance	31,600	35,100	39,000	43,300	48,000	53,300
Utilities	140,600	149,900	159,700	170,200	181,400	190,500
Repairs and Maintenance	13,400	13,800	14,200	14,600	15,100	15,500
Repairs Software	4,600	4,800	4,900	5,100	5,200	5,400
Repairs - Vehicles	4,100	4,200	4,400	4,500	4,600	4,800
Miscellaneous	100	100	100	100	100	100
Conference/School/Training	3,100	3,200	3,300	3,400	3,500	3,600
Printing/Binding	1,900	1,900	2,000	2,000	2,100	2,100

TABLE 9-4 – (continued)

Projected Operation and Maintenance Expenses

Operation and Maintenance Expenses	2011	2012	2013	2014	2015	2016
Prof Dues and Subscriptions	9,300	9,500	9,800	10,100	10,400	10,700
Fire Protection	(10,100)	(10,400)	(10,700)	(11,000)	(11,400)	(11,700)
Utility Tax	210,300	240,600	275,400	315,400	361,200	360,500
Total Expenses	**1,074,200**	**1,204,400**	**1,312,600**	**1,472,100**	**1,606,700**	**1,653,900**

FUTURE DEBT PAYMENTS

Future debt payments were projected for the 2010 Utility Rate Analysis and are shown in Table 9-5. The Civic Center line item is a continuing debt payment throughout the planning period. The Public Works Trust Fund (PWTF) line item is debt from a water construction project that took place in the Historic Village and ended in year 2015. The line item listed as 'New Debt' represents the funding of Capital Improvement Project (CIP) D-3 discussed in Chapter 8 and will be funded through a City issued Bond.

TABLE 9-5

Future Debt Payments

Debt Payment Expenses	2011	2012	2013	2014	2015	2016
Civic Center	(114,400)	(114,300)	(114,600)	(114,300)	(114,900)	(114,900)
Public Works Trust Fund	(34,300)	(34,000)	(33,700)	(33,400)	(33,100)	(32,800)
Total Debt Payments	**(148,700)**	**(148,300)**	**(147,900)**	**(147,300)**	**(148,000)**	**(147,700)**

FUTURE REVENUES

Operating revenues and capital revenues are projected in Table 9-6 below. Revenues forecasted in Table 9-6 are based on projected rates in Resolution No. 10-395 and projected City of DuPont water ERU growth rate of 1.5 percent through year 2015. Water Turn-On Fees, Permit/Inspection Fees, Hydrant Use, and Miscellaneous Revenues and Penalties are held constant.

TABLE 9-6

Projected Operating Revenues 2011-2016

Operating Revenues	2011	2012	2013	2014	2015	2016
Water Service	1,345,900	1,543,700	1,770,500	2,030,700	2,329,100	2,329,100
Revenue Loss[(1)]	(35,100)	(39,700)	(44,800)	(50,600)	(57,200)	(57,200)
Water Turn-On Fees	23,300	23,300	23,300	23,300	23,300	23,300
Permits/Inspection Fees	13,200	13,200	13,200	13,200	13,200	13,200
Hydrant Use	800	800	800	800	800	800
Other Misc. Revenues -Penalties	12,400	12,400	12,400	12,400	12,400	12,400
Other Misc. Revenues	1,000	1,000	1,000	1,000	1,000	1,000
Interest Earnings from Cash	4,900	5,700	3,700	2,200	2,100	4,400
Total Operating Revenues	**1,361,500**	**1,554,700**	**1,776,400**	**2,030,800**	**2,322,600**	**2,322,600**

(1) Revenue loss attributed to reduced irrigation as a result of improved irrigation control, irrigation system modifications, and landscaping maturation.

FUTURE CAPITAL RESERVES

Future capital reserves were projected for the 2010 Utility Rate Analysis and are shown in Table 9-7.

TABLE 9-7

Capital Reserves

Capital Revenues	2011	2012	2013	2014	2015	2016
Connection Charges	47,500	47,500	47,500	47,500	48,000	0
Bond – Historic Village Water Improvements (D-5)	0	0	0	543,100	0	0
Total Capital Revenues	47,500	47,500	47,500	590,600	48,000	0

FUTURE REVENUE AND EXPENSE SUMMARY

The City of DuPont projected revenues and expenses are summarized in Table 9-8.

TABLE 9-8

Future Revenue and Expense Summary

Future Revenues / Expenses	2011	2012	2013	2014	2015	2016
Total Operating Revenues	1,361,500	1,554,700	1,776,400	2,030,800	2,322,600	2,322,600
Total Operating Expenses	1,074,200	1,204,400	1,312,600	1,472,100	1,606,700	1,653,900
Net Revenues	**287,300**	**350,300**	**463,800**	**558,700**	**715,900**	**668,700**

CAPITAL EXPENDITURES AND CASH FLOWS

This section details how capital improvements identified in Chapter 8 will be funded. Table 9-9 lists the capital projects identified in earlier chapters.

TABLE 9-9

Future Water Utility Capital Expenses[1]

Capital Expenses	2012	2013	2014	2015	2016	2017
Miscellaneous CIP Planning/Services	8,500	0	0	0	0	0
Machinery and Equipment	47,500	47,500	47,500	48,000	0	0
Equipment Replacement	13,400	13,800	14,200	14,600	15,000	15,400
Install on-site generation sodium hypchlorite at Hoffman Hill	50,000					
Replace El Rancho Madrona water mains	443,200					
Replace all six control valves (Cla-valves) at Bell Hill Booster Station		23,100				
Install Variable Frequency Drives (VFDs) at Bell Hill Booster Station		126,400				
Upgrade telemetry system at Bell Hill Booster Station		27,500				
Feasibility Study investigating operation at Bell Hill Well No. 2			12,500			
Transfer existing water rights from Historic Village Wells		2,500				
Transfer existing water rights from El Rancho Madrona Well		2,500				
Formalize Intertie agreement with Joint Base Lewis-McChord[2]		5,000				
Irrigation control/modifications to weather station and program			27,500			
Billing software upgrades		8,000				
Upgrades to current GIS system components[2]		15,000				
Increased security measures to water system components		22,000				
Install 100 lf of 8-inch between Center Plaza/DuPont Steilacoom Road[2]		20,500				
Change from direct read meters to remote read meter technology		189,900	195,600	201,500		
Hoffman Hill Booster Pump Station Modification Analysis		3,500				
Internal inspection and routine cleaning of Bell Hill Reservoir[2]				7,000		
Internal inspection and routine cleaning of Hoffman Hill Reservoir[2]				7,000		

TABLE 9-9 – (continued)

Future Water Utility Capital Expenses[1]

Capital Expenses	2012	2013	2014	2015	2016	2017
Replace 2,600 lf of AC water pipe in Historic Village				108,620	434,480	
Leak Detection Survey[2][3]	12,600	12,600	12,600	12,600	12,600	12,600
Repair/replace defective water meters[2]	32,100	32,100	32,100	32,100	32,100	32,100
Conservation Program[3]	1,500	1,500	1,500	1,500	1,500	1,500
Annual Consumer Confidence Report[3]	1,500	1,500	1,500	1,500	1,500	1,500
Total Capital Expenses	594,700	539,300	329,400	418,820	481,580	47,500

(1) Costs are inflated from the year of the cost estimate to the year planned using 2.5 percent annual inflation.
(2) Capital Expenses not included in rate analysis.
(3) Costs included in Operation and Maintenance costs.

Table 9-10 shows the resulting cash flows assuming revenues from Table 9-6 minus annual operating and maintenance expenses as listed in Table 9-4, projected debt payments in Table 9-5, and projected capital reserves in Table 9-7 minus capital expenditures scheduled to occur between 2011 and 2016, plus the net cash flow from capital. As shown in Table 9-6, the City does have capital revenues from a combination of Water Turn-On Fees, Permits/Inspection Fees, Hydrant Use, Penalties, and Other Miscellaneous Revenues. Capital expenses are the costs associated with capital improvements identified in Table 9-9 that are non-developer funded and scheduled to occur on or before 2017. Therefore, the cash flows shown in Table 9-10 result from paying annual O&M costs, annual transfers to the capital (depreciation) fund, and funding construction of capital projects identified in Table 9-9.

As can be seen from Table 9-10, by the year 2017 capital reserve level is slightly less than $2,000,000.

TABLE 9-10

Projected Capital Cash Flows and Capital Funding Sources

Capital Summary	2012	2013	2014	2015	2016	2017
Start of Year Cash	2,317,800	1,511,700	1,083,200	795,400	1,168,680	735,100
Operational Summary						
(+) Operating Revenues[1]	1,361,500	1,554,700	1,776,400	2,030,800	2,322,600	2,322,600
(-) O&M Expenses[2]	(1,074,200)	(1,204,400)	(1,312,600)	(1,472,100)	(1,606,700)	(1,653,900)
(-) Debt Payment[3]	(148,700)	(148,300)	(147,900)	(147,300)	(148,000)	(147,700)
Net Revenue[4]	**138,600**	**202,000**	**315,900**	**411,400**	**567,900**	**521,000**
(+) Capital Reserves[5]	47,500	47,500	47,500	590,600	48,000	0
(-) Capital Expenses[6]	(594,700)	(539,300)	(329,400)	(418,820)	(481,580)	(47,500)
Net Capital Revenue[7]	(547,200)	(491,800)	(281,900)	171,780	(433,580)	(47,500)
End of Year Cash[8]	**1,770,600**	**1,278,800**	**996,900**	**1,168,680**	**735,100**	**687,600**
Reserve Fund						
Start of Year Reserve Balance	**865,300**	**867,500**	**1,072,800**	**1,284,200**	**1,503,700**	**1,730,400**
CIP Reserve Contribution[9]	0	200,000	205,000	212,000	218,100	201,800
Interest Earned	2,200	5,300	6,400	7,500	8,600	9,700
End of Year Reserve Balance	**867,500**	**1,072,800**	**1,284,200**	**1,503,700**	**1,730,400**	**1,941,900**

(1) Operating Revenues are from Table 9-6.
(2) Operation and Maintenance Expenses are from Table 9-4.
(3) Debt Payment is from Table 9-5.
(4) Net Revenue is the Operating Revenue minus O&M Expenses and minus the Debt Payment.
(5) Capital Reserves are from Table 9-7.
(6) Capital Expenses are from Table 9-9.
(7) Net Capital Revenue is Capital Expenses minus Capital Reserves.
(8) End of Year Cash equals the Start of Year Cash minus Net Capital Revenue.
(9) CIP Reserve Contribution is from Water Rate Study.

FINANCIAL VIABILITY TEST

According to the Department of Health, the financial health of a utility may be judged by employing the following four financial viability tests:

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 revenues than expenses (including debt and depreciation costs) in each year from 2011 through 2016 as seen by comparing annual operating expenses (including debt and depreciation) in Table 9-4 with annual revenues listed in Table 9-6.

According to DOH, operating expenses do not include debt or capital costs. From Table 9-4, the utility's maximum projected operating expense is projected to be $1,653,900 (not including debt payments or depreciation) in the year 2016. Therefore, 1/8 of operating expenses is $206,738. Table 9-10 projects the water utility to have at least $865,000 in reserves (not counting depreciation 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. The utility currently has $865,000 in reserves and Table 9-10 projects that the utility will have about $1.94 million in reserves by the year 2017. Therefore, the utility has the resources available to respond to both a major water main and well repair.

The current MHI for City customers is $80,435 per year and 1-1/2 percent of MHI is $120.65 per month. The average residential customer's monthly bill of $42.00 (with 10 ccf) projected with adopted rate increases in year 2015 represents 0.05 percent of MHI and therefore the City's rates meet the fourth financial viability test.

RATE STRUCTURE ANALYSIS

The City of DuPont recently adopted new rates for water service and consumption (Resolution No. 10-395 included as Appendix L). This current rate structure includes a meter charge (or base charge) that is based on meter size and a single commodity charge. The utility currently generates about 70 percent of revenues from base charges and 30 percent from commodity charges. However, this is somewhat misleading because the City's base charge includes 500 cubic feet per month. Therefore, actual volume revenues are higher than 30 percent of total rate revenues.

According to the 2008 Association of Washington Cities (AWC) Tax and User Fee Survey, of the 213 water agencies reporting water utility rates, the average single family monthly water rate is $27.83 serving within the agencies jurisdiction, based on the use of 1,000 cubic feet (cf) of water. The highest monthly water rate was $89.00/month and the lowest was $7.25/month. For the same water use quantity, DuPont customers in year 2011 are charged $86.60/month. It is important to note that the average number of connections per water system for the AWC survey was 4,068, whereas the DuPont has approximately 2,617 connections.

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.

The next section describes alternative funding sources the City may pursue for building capital projects.

ALTERNATIVE CAPITAL IMPROVEMENT FUNDING SOUCES

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)

US ECONOMIC DEVELOPMENT ADMINISTRATION (US EDA)

US EDA offers competitive grants up to $1 million for projects within Region 10. Projects are selected locally by an economic development district and submitted to

Congress for competitive selection among other regions in the United States. Similar to CERB, applicants must have an industrial partner ready to proceed or a feasibility study that establishes realistic job creation.

US EPA STATE AND TRIBAL ASSISTANCE GRANT (STAG)

Local jurisdictions within the state of Washington can apply to the State and Tribal Assistance Grant (STAG) program through the office of their local Congressional representative. The Congressional representative will work to add the project as a line item to the VA/HUD Appropriations Bill. Applicants can obtain grant funds up to approximately $2 million.

USDA RURAL DEVELOPMENT, RURAL UTILITY SERVICES (RUS)

The RD Rural Utility Service administers water loan and grant programs to improve the quality of life and promote economic development in rural areas.

Rural Development has a loan program that, under certain conditions, includes a limited grant program. Grants may be awarded when the annual debt service portion of the utility rate exceeds 1.0 percent to 1.5 percent of the municipality's median household income.

In addition, RD has a loan program for needy communities that cannot obtain funding by commercial means through the sale of revenue bonds. The loan program provides 30- to 40-year loans at an interest rate that is based on federal rates and varies with the commercial market. RD loans are revenue bonds with a 1.1 debt coverage factor.

Eligible projects include the construction, expansion, extension or improvement of rural water, sanitary sewers, solid waste disposal, storm, and wastewater disposal facilities.

Basic criteria for RD funding are as follows:

- Dependent on inability to obtain funds from other sources at reasonable terms.
- A 45 percent grant is available if the median household income of the service area exceeds 80 percent of the statewide non-metropolitan median household income.
- A 75 percent grant is eligible if the service area is below the higher of the poverty line or 80 percent of the state non-metropolitan median household income, and the project is necessary to alleviate a health and safety issue.

Eligible applicants include municipalities; counties; non-profit corporations, associations, or cooperatives; and federally-recognized Indian tribes in rural areas with populations less than 10,000.

PUBLIC WORKS TRUST FUND (PWTF)

The Public Works Trust Fund (PWTF) is a revolving loan fund designed to help local governments finance public works projects through low-interest loans and technical assistance. The PWTF, established in 1985 by legislative action, offers loans substantially below market rates, payable over periods ranging up to 20 years; 30 years for severely distressed communities. To be eligible for the PWTF programs, an applicant must be a local government such as a City, county, or a special purpose utility district.

PWTF has four loan programs including Construction, Preconstruction, Planning, and Emergency. PWTF loan terms are summarized in Table 9-11.

TABLE 9-11

Public Works Trust Fund Loan Types and Terms

Loan Type	Local Match	Interest Rate	Term	Loan Limit
Construction(1)	15%	0.50%	20 Years	$10,000,000
	10%	1.00%	20 Years	$10,000,000
	5%	2.00%	20 Years	$10,000,000
Preconstruction(2)	15%	0.50%	20 Years	$ 1,000,000
	10%	1.00%	20 Years	$ 1,000,000
	5%	2.00%	20 Years	$ 1,000,000
Planning(3)(4)	0%	0.00%	6 Years	$ 100,000
Emergency(4)(5)	0%	3.00%	20 Years	$ 500,000

(1) Interest rates are reduced to a range of 0.25 to 0.5 percent and loan terms are extended to 30 years for communities that are determined to be 'Distressed' (51 percent of the population is less than 80 percent of the Median Household Income) or 'Severely Distressed' (51 percent of the population is less than 50 percent of the Median Household Income). In both cases, no match is required.

(2) Preconstruction loans can be refinanced to a 20-year term, if the applicant obtains a subsequent PWTF Construction loan.

(3) Preconstruction loans can be refinanced to a 20-year term, if the applicant obtains a subsequent PWTF Construction loan.

(4) While a match is not required, it is recommended.

(5) The loan limit may be increased to $1 million with 0.5 percent interest rate, if applicant is in a distressed county directly related to a Governor, Federal, or other locally declared natural disaster.

The Construction Program accepts applications once per year in the spring, and the money becomes available approximately 1 year later. The Preconstruction and Planning programs are open on a year-round basis and must be submitted to the Public Works

Board prior the 15th of the month to be reviewed at the next Board meeting. These funds become available shortly after the Public Works Board makes their final decision as to the award. Emergency projects must have a locally declared emergency and are applied for on an open cycle depending on the availability of funds. Project expenditures are reimbursable from the date of the declared emergency.

An applicant must have a long-term plan for financing its public works needs. If the applicant is a county or City, it must adopt the 1/4 percent real estate excise tax that is dedicated to public works construction projects. Eligible public works projects include streets and roads, bridges, storm sewers, sanitary sewer collection and treatment systems, and domestic water. Loans are presently offered only for purposes of repair, replacement, rehabilitation, reconstruction, or improvement of existing eligible public works systems. Eligible project costs can include expenses related to serving 20-year forecasted growth as identified in growth management comprehensive plans.

Since substantially more trust fund dollars are requested than are available, local jurisdictions must compete for the available funds. The applications are carefully evaluated, and the Public Works Board submits a prioritized list of those projects to the Legislature that are recommended to receive low-interest financing. The Legislature reviews the list and indicates its approval through the passage of an appropriation from the Public Works Assistance Account to cover the cost of the proposed loans. Once the Governor has signed the appropriation bill into law (an action that usually occurs by the following April), those local governments recommended to receive loans are offered a formal loan agreement with appropriate interest rates and terms as determined by the Public Works Board.

COMMUNITY ECONOMIC REVITALIZATION BOARD (CERB)

The Community Economic Revitalization Board's (CERB) prime mission is to partner with business and industry and local governments to maintain and create jobs. Established by the Legislature in 1982, CERB provides low-interest loans or, in unique circumstances, grants to help finance local public infrastructure necessary to develop or retain stable business and industrial activities. Projects eligible for funding include roads, domestic and industrial waters systems, sanitary and storm sewers, port facilities, and general purpose industrial buildings.

Typically, CERB provides loans in the amount of $1 million and, where applicable, grants in the amount of $300,000. The interest rate is tied to the current cost of a 10-year bond and a local match of 10 percent is required.

Eligible applicants include Washington State subdivisions in partnership with private enterprise. If there is no economic partner, a local government can produce a feasibility study that documents realistic job retention or creation. Applications must be submitted 45 days prior to a regularly scheduled CERB meeting, which typically meets in January, March, July, and November.

DRINKING WATER STATE REVOLVING FUND (DWSRF)

In 1996, Congress established the Drinking Water State Revolving Fund through the reauthorization of the federal Safe Drinking Water Act. The program is managed by both the Washington State Department of Health and the Washington State Public Works Board. The purpose of the program is to provide low-interest loans to assist publicly- and privately-owned water systems improve drinking water and protect public health.

Eligible publicly-owned water systems include City and county governments, public utility districts, and special purpose districts. Privately-owned systems are eligible as long as they are a Group A system.

Eligible projects include the following:

- Water systems that exceed health standards,
- Replacement of aging infrastructure,
- Acquisition of real property,
- Planning and design costs,
- Water conservation projects,
- Reservoirs (clear wells) that are part of a treatment process,
- Distribution reservoirs (finished water),
- Existing systems who chose to connect to a municipal system,
- Upgrade to or creation of a Group A system.

Maximum award per single water system is $6,000,000 and for combining systems an award of $12,000,000 is available. DWSRF requires a 1 percent loan fee, but no local match. A summary of interest rates and loan terms is presented in Table 9-12.

TABLE 9-12

Drinking Water State Revolving Fund Loan Terms

Applicant's Income Level	Interest Rate	Repayment period
Water system not economically disadvantaged	1.5%	20 years
Water system with an affordability index between 1.5 and 2.0%	1.0%	20 years or life of project, whichever is less
Water system with an affordability index between 2.01 and 3.5%	30% subsidy 1.5% on loan	20 years
Water system with an affordability index of 3.5% or higher	50% subsidy 1.0% on loan	20 years
Eligible restructuring/consolidation projects proposed by municipal Group A water systems	50% principal forgiveness 1.0% on loan	20 years

REVENUE BONDS

The most common source of funds for construction of major utility improvements is the sale of revenue bonds. These are tax-free bonds issued by a City. The major source of funds for debt service on revenue bonds is from monthly water or sewer service charges. In order to make qualify to sell revenue bonds marketable to investors, the bonds typically have contractual provisions for the City to meet debt coverage requirements. The City must show that its annual net operating income (gross income less operation and maintenance expenses) must be equal to or greater than a factor, typically 1.2 to 1.4 times the annual debt service on all par debt. If a coverage factor has not been specified it will be determined at the time of any future bond issues.

GENERAL OBLIGATION BONDS

A City may by council action or special election issue general obligation bonds to finance almost any project of general benefit to the City. The bonds are repaid by tax assessments levied against all privately-owned properties within the City. This includes vacant property that would not otherwise contribute to the cost of the specific improvements. This type of bond issue is usually reserved for municipal improvements that are of general benefit to the public, such as arterial streets, bridges, lighting, municipal buildings, firefighting equipment, parks, and water and wastewater facilities. General obligation bonds are the most attractive bonds to investors because they are backed by the municipality's full taxing authority and carry the lowest rate of interest of any type of bond that a City may issue.

Disadvantages of general obligation bonds include the following:

- Voter approval is often required. The City will incur the legal costs of drafting a ballot measure and pay for the cost of holding a special election. There is also the additional cost of investing staff time in public education of the need for the project, yet there is always uncertainty to the outcome of elections.

- There are legal, as well as practical limits on the amount of general obligation debt a City can issue. Financing capital improvements through general obligation debt reduces the ability of the City to issue additional general obligation debt, which is often the only source of outside financing for many general government facilities.

UTILITY LOCAL IMPROVEMENT DISTRICTS

Another potential source of funds for improvements can be obtained through the formation of Utility Local Improvement Districts (ULIDs) involving a special assessment made against properties benefiting by the improvements. ULID bonds are further backed by a legal claim to the revenues generated by the utility, similar to revenue bonds.

Water and wastewater system expansion is a frequent application of ULID financing. Typically, ULIDs are formed by the City at the written request (by petition) of the property owners within a specific section of the City's service area. Upon receipt of a sufficient number of signatures or petitions, and acceptance by the City council, the local improvement area is formed. Therefore, a water or wastewater system is designed for that particular area in accordance with the City's water or wastewater comprehensive plan. Each separate property in the ULID is assessed in accordance with the special benefits the property receives from the water or wastewater system improvements. A Citywide ULID could form part of a financing package for large-scale capital projects such as a water or wastewater line extension or replacement that benefits all residents in the service area. The assessment places a lien on the property that must be paid in full upon sale of the property. ULID participants have the option of paying their assessment immediately upon receipt, thereby reducing the portion of the costs financed by the ULID bonds.

The advantages of ULID financing, as opposed to rate financing, to the property owner include:

- The ability to avoid interest costs by early payment of assessments.

- If the ULID assessment is paid in installments, it may be eligible to be deducted from federal income taxes.

- Low-income senior citizens may be able to defer assessment payments until the property is sold.

- Some Community Development Block Grant funds are available to property owners with incomes near or below poverty level. Funds are available only to reduce assessments.

The major disadvantage to the ULID process is that it may be politically difficult to approve formation. The ULID process may be stopped if 40 percent of the property owners protest its formation. Also, there are significant legal and administrative costs associated with the ULID process, which increases total project costs by approximately 30 percent over other financing options.

APPENDIX A

CITY OF DUPONT WATER FACILITIES INVENTORY (WFI) 2011

EL RANCHO MADRONA WATER FACILITIES INVENTORY (WFI) 2011

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: 01/21/2011
Printed: 4/27/2011
WFI Printed For: On-Demand
Submission Reason: Pop/Connect

RETURN TO: Northwest Regional Office, 20435 72nd Ave S STE 200, Kent, WA, 98032

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 1700 CIVIC DRIVE DUPONT, WA 98327	TITLE:MANAGER
STREET ADDRESS IF DIFFERENT FROM ABOVE ATTN ADDRESS CITY STATE ZIP	STREET ADDRESS IF DIFFERENT FROM 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: fforeman@ci.dupont.wa.us	Owner Fax Phone: | E-mail:

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 — SMA NAME: _____ SMA Number:
- [ ] Managed Only
- [ ] Owned Only

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
- [ ] 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 SOURCE CATEGORY									19 USE			20	21 TREATMENT						22	23	24 SOURCE LOCATION			
Source Number	LIST UTILITY'S NAME FOR SOURCE AND WELL TAG ID NUMBER. Example: WELL #1 XYZ456. IF SOURCE IS PURCHASED OR INTERTIED, LIST SELLER'S NAME. Example: SEATTLE	INTERTIE SYSTEM ID NUMBER	WELL	WELL FIELD	WELL IN A WELL	SPRING	SPRING FIELD	SPRING IN	SEA WATER	SURFACE WATER	RANNEY / INF.	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	WELL # 1 & 2			X											X	E						100	200	NE NE	35	19N	01E
S02	26050Q/FT. LEWIS (CONT)	26050 Q													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	WELL #1 ABM995				X									X	N							0	0			00N	00E
S08	WELL #2 AEF218				X									X	N							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	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?)	0	3320	Unspecified
A. Full Time Single Family Residences (Occupied 180 days or more per year)	2738		
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	582		
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)	122	122	
B. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	66	66	
28. TOTAL SERVICE CONNECTIONS		3508	

29. FULL-TIME RESIDENTIAL POPULATION

A. How many residents are served by this system 180 or more days per [illegible] 8020

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?	3576	3576	3576	3576	3576	3576	3576	3576	3576	3576	3576	3576
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
	10	10	10	10	10	10	10	10	10	10	10	10

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: _____

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

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 2
Updated: 01/21/2011
Printed: 4/27/2011
WFI Printed For: On-Demand
Submission Reason: Inactivate

RETURN TO: Northwest Regional Office, 20435 72nd Ave S STE 200, Kent, WA, 98032

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
22613 R	EL RANCHO MADRONA	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 1700 CIVIC DRIVE DUPONT, WA 98327	TITLE:MANAGER
STREET ADDRESS IF DIFFERENT FROM ABOVE	STREET ADDRESS IF DIFFERENT FROM	
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: fforeman@ci.dupont.wa.us	Owner Fax Phone: | E-mail:

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 — SMA NAME: _____ SMA Number:
- [ ] Managed Only
- [ ] Owned Only

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

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

13. WATER SYSTEM OWNERSHIP (mark only one)				14. STORAGE CAPACITY (gallons)
[ ] Association	[ ] County	[ ] Investor	[ ] Special District	
[x] City / Town	[ ] Federal	[ ] Private	[ ] State	40,000

15	16	17	18								19		20	21					22	23	24			
	SOURCE NAME	INTERTIE	SOURCE CATEGORY								USE			TREATMENT					DEPTH		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	SPRING	SPRING FIELD	SPRING IN	SEA WATER	SURFACE WATER	RANNEY / INF.	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	InAct 01/19/2011 WELL # 1 AEF218		X										X			Y		X					293	80	NW SE	33	19N	01E

APPENDIX B

2009 SANITARY SURVEY

CITY OF DUPONT WATER RIGHTS

APPLICATION FOR CHANGE/TRANSFER

EL RANCHO MADRONA WATER RIGHTS

WATER RIGHTS SELF-ASSESSMENT

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
20435 72nd Ave. S. , Suite 200, K17-12 Kent, Washington 98032 -2358

December 29, 2009

FRED FOREMAN
CITY OF DUPONT
303 BARKSDALE AVE
DUPONT WA 98327

Subject: DuPont Water System, City of; ID #20500
Pierce County
Results of 2009 Sanitary Survey

Dear Mr. Foreman:

I would like to thank you for taking time to meet with me during my recent Sanitary Survey of the City of DuPont's water system. Sanitary Surveys are the Department of Health's (DOH) tool to conduct routine inspections of public water systems and also afford the agency the opportunity to offer technical assistance to improve water system operations and enhance protection of public health. In general, your water system is in good sanitary condition and you should be commended for your efforts and diligence on the water system. Your work helps to protect and enhance the Public Health of your water system's customers.

The following comments are recommendations to improve the Public Health protection for your water system. A couple of items have not been addressed from the previous survey and are included below. Recommendations from the 2009 survey are included below the previous survey items. A summary of the results of my survey is included with this letter.

Items Not Addressed from Previous Survey

1. **Bell Hill Reservoir Overflow Outlet** - The outlet of the Bell Hill reservoir discharges to a stormwater manhole. ***The Bell Hill reservoir overflow outlet into the stormwater manhole must be screened or outfitted with a flapper or tideflex gate.***
2. **Routine O&M** – There is no formal valve exercising program but valves on the large main lines were exercised this year. Additionally, it was reported that the City goal for reservoir cleaning was 10 years but there is no documentation of this. Both reservoirs were cleaned and inspected within the last year. ***It is recommended that the Water System Plan (WSP) update establish and document valve exercising and reservoir cleaning goals for the water system.***

Additional Recommendations

3. **Cross Connection Control Plan** - A cross connection control plan has been adopted by the City and it has been largely implemented by the Water Department. It appears that the responsibilities and activities involved in implementing the plan are divided between the City's building and water departments. It was reported that this division of responsibilities is not documented and that it is not always clear whether the plan is being implemented properly due to miscommunication between the departments. ***A valid cross connection plan must clearly define the responsibilities that will be carried out during implementation and by whom. It is expected that a revised cross connection plan will be completed in time for the water system's upcoming WSP update.***

4. **Reservoirs** – The vents on the Bell Hill reservoir are located on the outside face of the reservoir and are vertical and placed near the roof line. Vents of this type have been involved in several contamination events in the last 6 years in Pierce County. ***It is strongly recommended that the vents be modified to be downward facing to reduce the risk of windblown contaminants entering the reservoir.*** Finally, it was reported that there is no routine schedule for accessing reservoir roofs and checking vents and hatches. ***It is recommended that all reservoir roofs be accessed and appurtenances checked at least one a year.***

5. **Sources** – All of the wells have sample taps that will allow raw water samples to be collected; however, the chlorination systems for Bell Hill Wells 1 and 2 and for Hoffman Hill Well #1 must be shut off in order to collect raw water samples. Raw water sample taps will become more important with the upcoming implementation of the Groundwater Rule. ***Installation of additional sample taps at these wells to collect raw water samples without shutting down the chlorination systems is recommended.***

6. **Hoffman Hill BPS** - The Hoffman Hill BPS consists of four pumps and supplies the upper pressure zone of the distribution system around the Hoffman Hill reservoir. It has a reported capacity of 1,350 gpm and consists of two 40 HP pumps and two 15 HP pumps and is supplied by the Hoffman Hill reservoir. The reported capacity includes fire flow capacity which was designed to be supplied by one of the 40 HP pumps. During the survey it was reported that one of the 40 HP pumps turns on to meet high demand periods. This indicates that the smaller pumps may be undersized to meet these demands. The use of one of the 40 HP pumps reduces the reliability of the fire flow pumps by eliminating the availability of a redundant fire flow pump. ***The capacity of the Hoffman Hill BPS must be addressed in the City's upcoming WSP update.***

7. **Chlorine Monitoring** - At the time of the survey grab samples were being collected from each of the reservoirs to monitor free chlorine residuals going to the distribution system. This is a good method for determining the chlorine residuals being supplied to customers but it is not an effective method of process control for the chlorination systems. ***It was discussed that the chlorine pumps should be monitored on a regular basis to verify they are operating properly.***

Regulations establishing a schedule of fees, including fees for sanitary surveys, were adopted July 1, 2008 (WAC 246-290-990). An itemized bill for $459.00 is enclosed. Please remit your complete payment in the form of a check or money order within thirty days of the date of this letter to: **DOH, Revenue Section, PO Box 1099, Olympia WA 99507-1099.**

Thank you for your efforts. Please feel free to contact me at (253) 395-6757 if I can be of any assistance to you in answering any questions or in addressing any of these issues and recommendations.

Sincerely,

John Ryding

John Ryding, P.E.
WSDOH Regional Engineer

Enclosures

cc: Tacoma-Pierce County Health Department

Washington State Department of Health

WATER SYSTEM SANITARY SURVEY REPORT

STATE OF WASHINGTON DEPARTMENT OF HEALTH (DOH)
– NORTHWEST DRINKING WATER OPERATIONS –

WATER SYSTEM:	**DuPont Water System, City of**	**SYSTEM MANAGER / OPERATOR:**	Fred Foreman, Manager, (253) 912-5381
COUNTY:	Pierce	**SYSTEM OWNER:**	**City of DuPont**
PWS ID#:	**20500 P**	**INSPECTED BY:**	John Ryding
SYSTEM TYPE:	Group A - Community	**INSPECTION DATE:**	**12/16/09**

APPROVAL STATUS:	The City of DuPont's water system is served entirely by groundwater sources and consists of 3,164 active residential connections (as listed on their Water Facilities Inventory, WFI) and 186 non-residential connections. The water system serves a permanent residential population of approximately 7,650 and a non-residential population of approximately 3,700. The water system has approved capacity to serve an unspecified number of connections.
OPERATING PERMIT STATUS:	Green – The water system is in substantial compliance.

	ADEQUATE (YES/NO)	OBSERVATIONS/*RECOMMENDATIONS*
CAPACITY		
Source capacity	Yes	The water system is served by five permanent well sources. Hoffman Hill Well No. 2 (S09) has been constructed and brought on-line since the previous survey in 2003. The total capacity of the wells is approximately 6,200 gpm (~ 9 MGD). The maximum day production in the last year was reported to be approximately 3 MGD. The water system appears to have adequate source capacity. The source capacity will be documented in an upcoming Water System Plan (WSP) update.

	ADEQUATE (YES/NO)	OBSERVATIONS/*RECOMMENDATIONS*
Storage capacity	Yes	The current reservoir capacity is 4 million gallons (MG). This is supplied by a gravity 3 MG steel reservoir on Hoffman Hill and a 1 MG concrete form reservoir on Bell Hill, which supplies a booster station into the distribution system. The reservoirs have been sized to meet planned industrial development in DuPont, including Intel, and planned residential development in the City. There appears to be adequate storage and capacity will be reanalyzed in the upcoming Water System Plan update.
Distribution	Yes	It was reported that the water system is capable of meeting 30 psi during peak hour demand. The City has a goal of meeting 40 psi throughout the distribution system during all times. Significant new residential development has been constructed since the previous survey with flow through fire suppression systems which require a minimum pressure of 55 psi for proper operation. The distribution system appears to have adequate capacity and it will be analyzed during the upcoming Water System Plan Update.
WATER QUALITY MONITORING	→	The water system has kept up well with source monitoring requirements. The City has several monitoring waivers that allow reduced monitoring frequencies. The highest nitrate result from the five wells in the last three years is 1.0 mg/L in 2009 from Hoffman Hill Well #1. None of the wells exhibit arsenic above 5 ug/L which is well below the MCL of 10 ug/L. Most of the wells have non detectable amounts of iron and manganese. Bell Hill Well 2 has a manganese level of 0.10 mg/L which exceeds the Secondary MCL of 0.05 mg/L. It was reported that this is typically mitigated by operating this well with one or more of the other Bell Hill wells which results in a dilution of manganese to levels in the Bell Hill reservoir that do not cause negative aesthetic effects. Coliform – The water system has a very good coliform monitoring history in the last two years. There have been two positive routine samples during this period in September 2009 and November 2008. All of the repeat samples collected after these positive samples were satisfactory. The water system is required to collect 10 monthly coliform samples and has a Coliform Monitoring plan with a map which identifies the routine and repeat sample site locations. Lead/Copper –The water system meets the lead and copper Action Levels and is currently due to collect a set of 30 samples by the second half of 2011. DBPs – The water system collected two samples in 2004 and in 2007. The highest TTHM result was 2.7 ug/L in 2004. None of the samples had detectable levels of HAAs. The water system is due to collect two more samples next year.
SURFACE WATER:	NA	The water system uses groundwater wells which are more than 50 feet deep and more than 200 feet from any

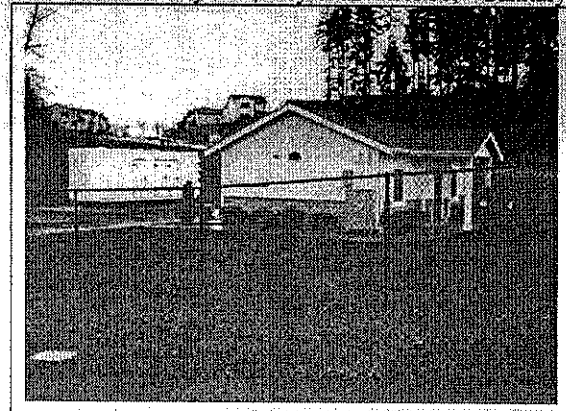
	Adequate (Yes/No)	Observations/*Recommendations*
Treatment Rule/GWI		apparent surface water source. The wells do not appear to have characteristics of groundwater under the influence of surface water (GWI).
Operations and Maintenance		
Routine O & M	Yes	The water system appears to be well maintained. There is a goal to flush hydrants annually and distribution mains are flushed on an as needed basis. Source meters are typically calibrated annually. Service meters are outfitted with touch read capability. There is no formal valve exercising program but valves on the large main lines were exercised this year. Additionally it was reported that the City goal for reservoir cleaning was 10 years but there is no documentation of this. Both reservoirs were cleaned and inspected within the last year. ***It is recommended that the WSP update establish and document valve exercising and reservoir cleaning goals for the water system.***
Complaints	Yes	There have been no complaints recorded with the Department of Health in the last five years. Complaints about the water system are routed through City Hall to the water staff. Complaints are rare and typically generate a written work order request to water staff.
Operator Certification	Yes	The water system is required to have a certified operator at the WDM 2 level or higher. Fred Foreman is the lead certified operator for the System and is certified as a WDM 2 and a CCS (# 2854). Besides Mr. Foreman, there are four other operators certified as WDM 2 and CCS. One of these operators, Larry Clark (9784), also has a BTO certification. One other operator is certified as a WDM 1, CCS, and BTO (Paul Jacoby (10262)). The water system appears to meet the minimum operator certification requirements.
Consumption/ Production Data	Yes	Source meters are read every business day and service meters are read bimonthly. Data is logged into electronic tracking software. Distribution leakage was reported to be approximately 4% last year and the City has started to submit annual Water Use Efficiency Rule leakage reports. It was reported that the City still needs to develop a public process for developing conservation goals for the water system.
Water Rights	Yes	It was reported that the City has adequate water rights. The WSP will analyze the status of the City's water rights.
Cross-Connection Control	Yes but Documentation Needed	A cross connection control plan has been adopted by the City and it has been largely implemented by the Water Department. It appears that the responsibilities and activities involved in implementing the plan are divided between the City's building and water departments. It was reported that this division of

	ADEQUATE (YES/NO)	OBSERVATIONS/RECOMMENDATIONS
		responsibilities is not documented and that it is not always clear whether the plan is being implemented properly due to miscommunication between the departments. ***A valid cross connection plan must clearly define the responsibilities that will be carried out during implementation and by whom. It is expected that a revised cross connection plan will be completed in time for the water system's upcoming WSP update.***
FACILITIES		
Source	Yes	All of the wells were in good condition and had screened vents and check or globe valve protection. The wells were outfitted with surge protection and pressure relief valves. There were no apparent unprotected openings in any of the wells. Each of the Bell Hill wells pumps to the Bell Hill reservoir, which then supplies the Bell Hill booster pump station. The Hoffman Hill wells pump to the Hoffmann Hill reservoir which maintains pressure on the distribution system by gravity. All of the wells have sample taps that will allow raw water samples to be collected; however, the chlorination systems for Bell Hill Wells 1 and 2 and for Hoffman Hill Well #1 must be shut off in order to collect raw water samples. Raw water sample taps will become more important with the upcoming implementation of the Groundwater Rule. ***Installation of additional sample taps at these wells to collect raw water samples without shutting down the chlorination systems is recommended.***
Sanitary Control Area / Wellhead Protection	Yes	The Sanitary Control Areas for most of the sources were clear of potential contaminant sources and appeared to be adequate. There are residential roads in the SCA of Hoffman Hill Well #2. Engineering justification for the reduction of the SCA was provided for the approval of this well. The water system has a Wellhead Protection Plan that is expected to be updated during the WSP update.
Storage	Yes	The reservoirs were in good condition. Each had screened vents and locked hatches. The outlet of the Hoffman Hill reservoir was protected by a tideflex valve which prevents animals and insects from entering the reservoir. The outlet of the Bell Hill reservoir discharges to a stormwater manhole. ***The Bell Hill overflow outlet into the stormwater manhole must be screened or outfitted with a flapper or tideflex gate. This recommendation remains outstanding from the previous sanitary survey.*** The vents on the Bell Hill reservoir are located on the outside face of the reservoir and are vertical and placed near the roof line. Vents of this type have been involved in several contamination events in the last 6 years in Pierce County. ***It is strongly recommended that the vents be modified to be downward facing to reduce the risk of windblown contaminants entering the reservoir.*** Finally, it was reported that there is no routine schedule for accessing reservoir roofs and checking vents and hatches. ***It is recommended that reservoir roofs be accessed and appurtenances checked at least one a year.***

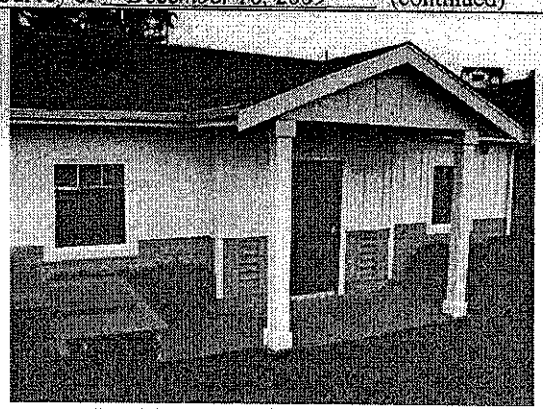
	ADEQUATE (YES/NO)	OBSERVATIONS/*RECOMMENDATIONS*
Distribution	Yes	There has been no indication of low pressure problems as mentioned above. Approximately 99% of the distribution system consists of ductile iron pipe with small amounts of AC pipe.
Pumping	Yes but Questions on Hoffman Hill BPS	There are two booster pump stations (BPS) in the water system, Bell Hill and Hoffman Hill. The Bell Hill BPS consists of 6 pumps with a total capacity of approximately 3,750 gpm. The BPS is supplied by the Bell Hill reservoir and pumps into the main pressure zone of the distribution system. It was originally designed to supply 3,000 gpm for fire suppression to the Intel facility prior to the installation of the Hoffman Hill reservoir. It appears there is adequate capacity, redundancy and power reliability for the booster pump station. The Hoffman Hill BPS consists of four pumps and supplies the upper pressure zone of the distribution system around the Hoffman Hill reservoir. It has a reported capacity of 1,350 gpm and consists of two 40 HP pumps and two 15 HP pumps and is supplied by the Hoffman Hill reservoir. The reported capacity includes fire flow capacity which was designed to be supplied by one of the 40 HP pumps. During the survey it was reported that one of the 40 HP pumps turns on to meet high demand periods. This indicates that the smaller pumps may be undersized to meet these demands. The use of one of the 40 HP pumps reduces the reliability of the fire flow pumps by eliminating the availability of a redundant fire flow pump. ***The capacity of the Hoffman Hill BPS must be addressed in the City's upcoming WSP update.***
Treatment	Yes	The City provides hypochlorite disinfection with sodium hypochlorite. Mr. Foreman stated that the City was not required to disinfect by DOH but has chosen to do so. The residual chlorine concentration target is 0.4 to 0.5 mg/L. Twelve percent sodium hypochlorite is injected into the discharge of the wells at Bell Hill prior to entry to the Bell Hill reservoir. There is pumping redundancy in the Bell Hill facility and an inventory of spare parts for the diaphragm pumps is kept. The maximum holding time for the hypochlorite is 2 months. 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% and injected into the mains near the wells prior to entry to the Hoffman Hill reservoir. During the survey the generation system for Hoffman Hill Well #1 was out of service and it was reported that it would be replaced with another on-site generation system. The system was installed in 2000 and it was reported that maintenance of the existing system is difficult due to lack of support and replacement parts. These generation systems have some redundancy in that the operators can make 0.8% solution by diluting stock 12% hypochlorite with water in the holding tank in the event that the on-site generator is down for any reason. At the time of the survey grab samples were being collected from each of the reservoirs to monitor free chlorine residuals going to the distribution system. This is a good method for determining the chlorine residuals being supplied to customers but it is not an effective method of process control for the chlorination

	ADEQUATE (YES/NO)	OBSERVATIONS/*RECOMMENDATIONS*
		systems. ***It was discussed that the chlorine pumps should be monitored on a regular basis to verify they are operating properly.***
Reliability	Yes	The water system has multiple wells, three million gallons of gravity storage, and emergency generators for Bell Hill Wells 1 and 2, Bell Hill BPS, Hoffman Hill Well #2, and the Hoffman Hill BPS. The water system appears to have adequate reliability.

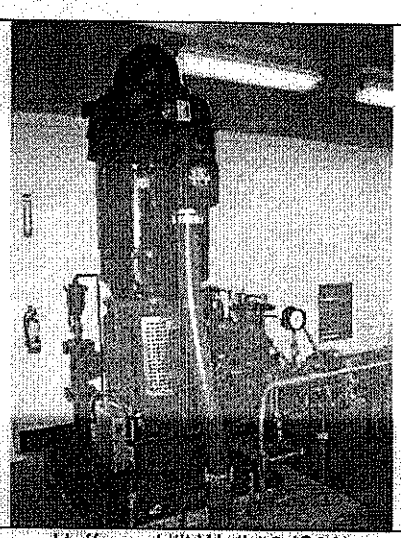
Photographs



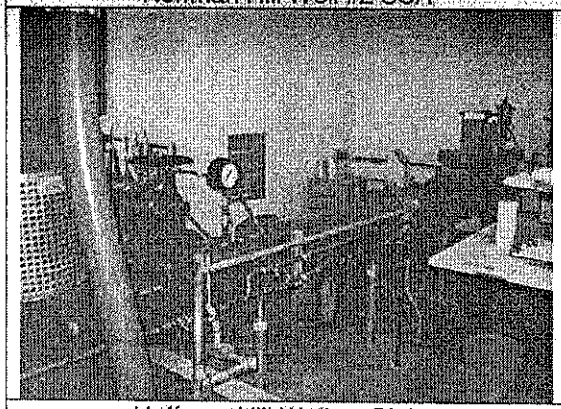
Hoffman Hill Well #2 SCA



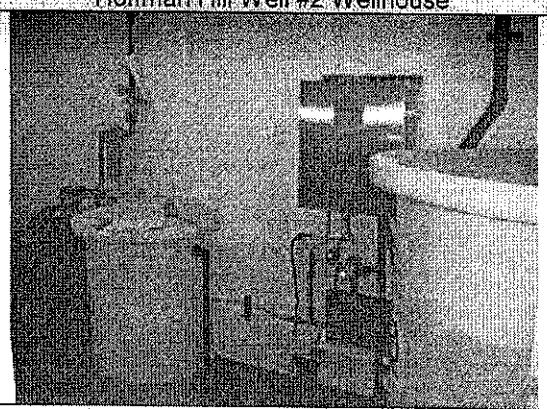
Hoffman Hill Well #2 Wellhouse



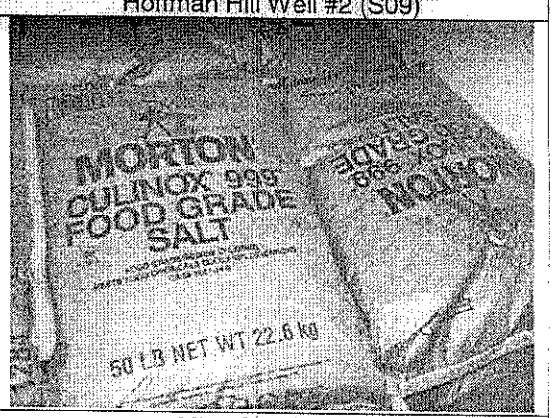
Hoffman Hill Well #2 (S09)



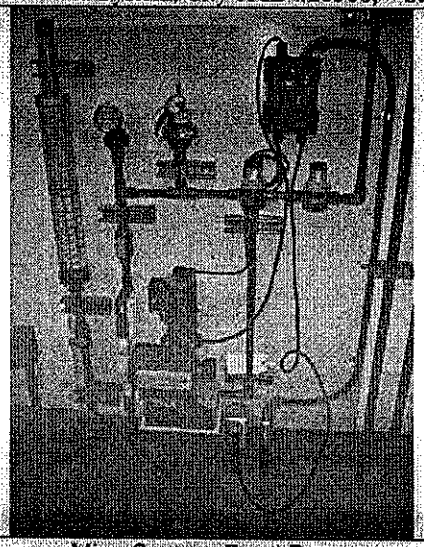
Hoffman Hill Well #2 Piping



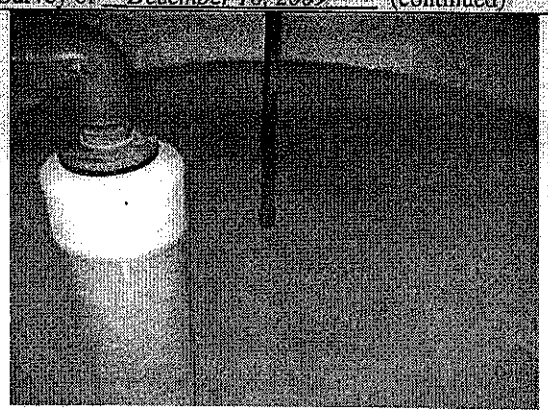
Hoffman Hill Well #2 Miox System



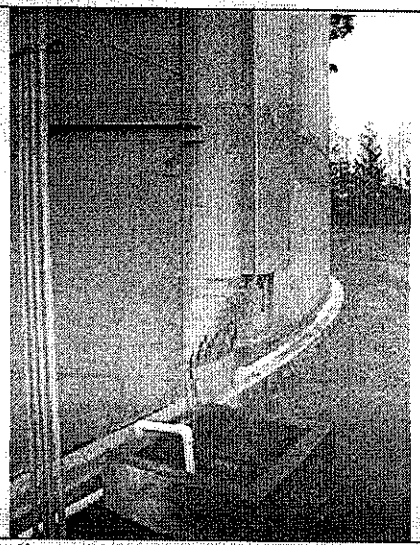
Miox Salt Source



Miox System Feed Pump



Miox 0.8% NaOCl Solution



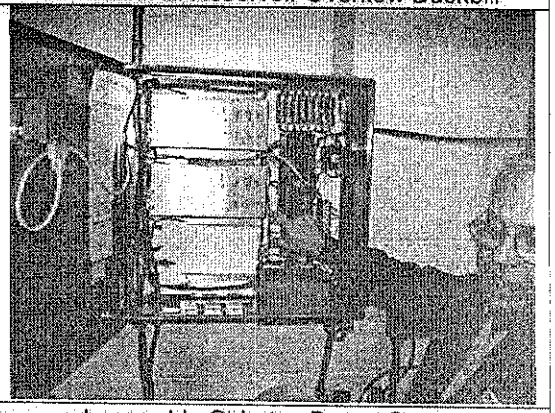
Hoffman Hill Reservoir Overflow Duckbill



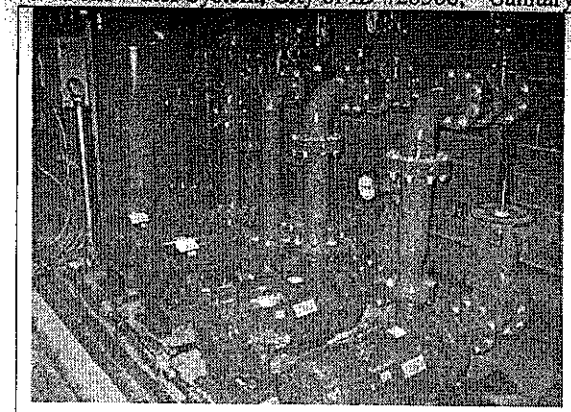
Hoffman Hill Well #1 (S05)



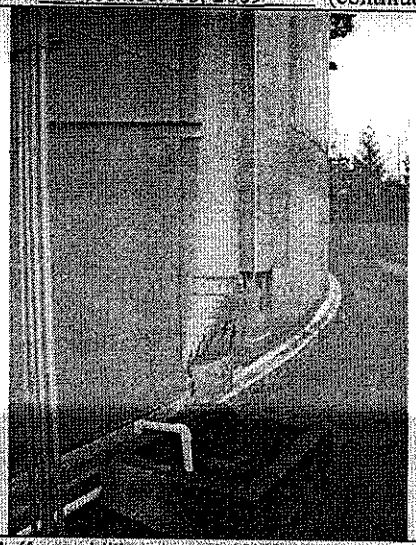
Hoffman Hill Well #1 Raw Sample Tap



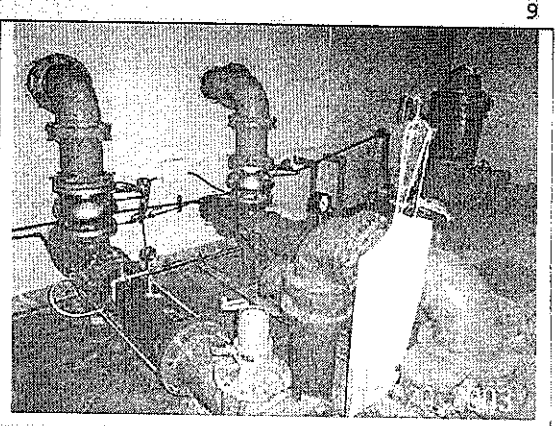
Inoperable Chlortec Power Supply



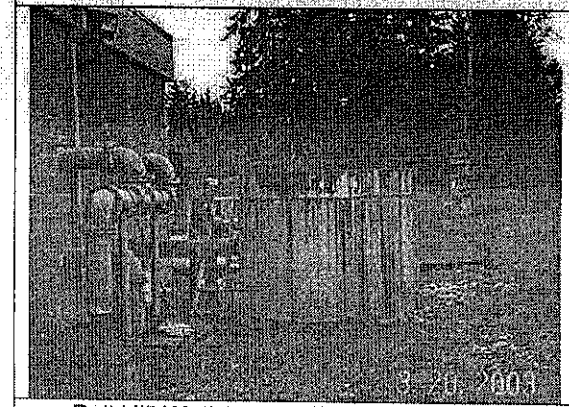
Hoffman Hill BPS



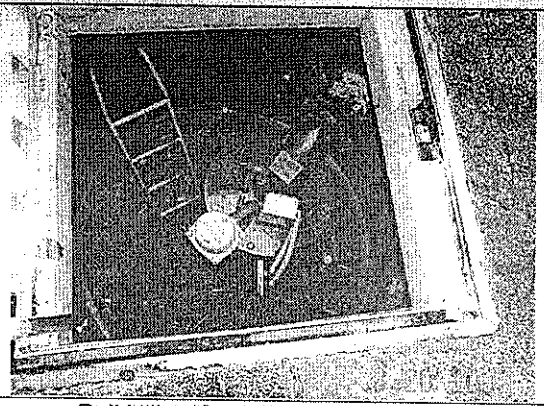
Hoffman Hill reservoir Overflow Duckbill



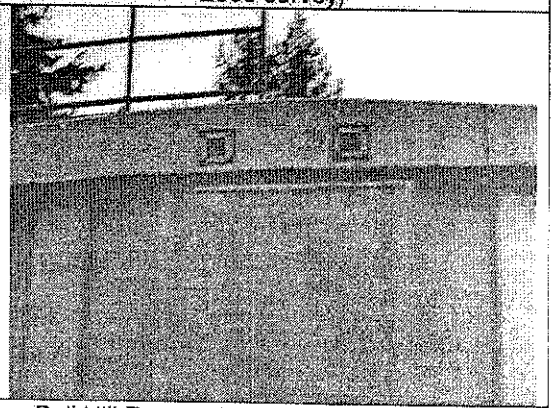
Bell Hill BPS Inlet from Bell Hill Wells (from 2003 survey)



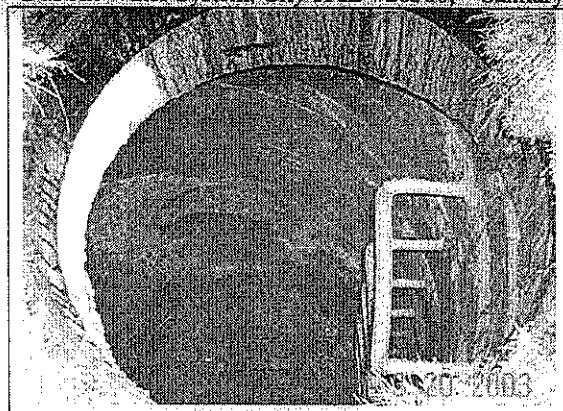
Bell Hill Well 1 Vault (from 2003 survey)



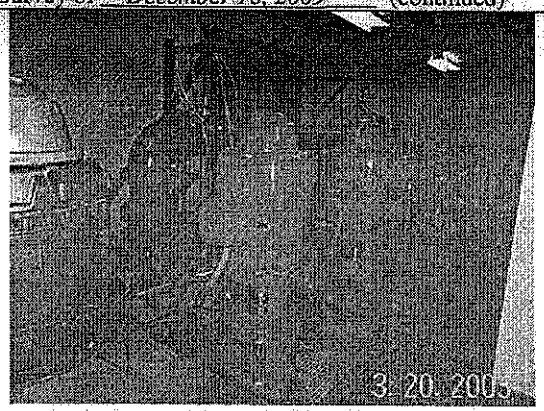
Bell Hill 1 (S03) (from 2003 survey)



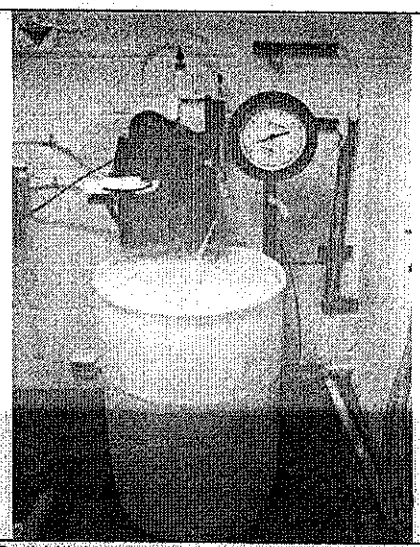
Bell Hill Reservoir Vertical Screened Vents



Bell Hill Reservoir Unprotected Overflow Outlet (from 2003 survey – has not been corrected)



Bell Hill BPS (from 2003 survey)



Bell Hill Wells Hypochlorination System

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 amendatory 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 amendatory 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 90.14.160.

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 Gail Bloomstrom

FOR COUNTY USE ONLY

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
November 7, 1988	G2-27450	G2-27450 P	

NAME
City of DuPont

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
301 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 described public waters of the State of Washington, subject to existing rights and to the limitations and provisions set out 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
	1,000	1,237

QUANTITY, TYPE OF USE, PERIOD OF USE		
1,237 acre-feet per year	Municipal supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
1,200 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.

ENGINEERING DATA
OK DLJ

by Gaes Blomstrom

DESCRIPTION OF PROPOSED WORKS

A 16" x 516' well equipped with a pump capable of discharging 1,000 gpm.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	Completed	February, 1, 1994

PROVISIONS

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.

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.

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.

"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 Resource 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.

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 (attached), 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 permit, 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.

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 9th *day of* April, *19* 93.

Mary Riveland, Director

Department of Ecology

ENGINEERING DATA
OK

by Gale Blomiton

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

he 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 tate of Washington, subject to existing rights and to the limitations and provisions set herein.

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	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.

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 8th *day of* December, *19* 98

Department of Ecology

by _____
J. Mike Harris, Section Supervisor

ENGINEERING DATA
OK JW

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
December 1, 1989	G2-27663	G2-27663	

NAME
City of DuPont

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
PO Box 455	DuPont	Washington	98327-0455

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 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

APP LOCATION OF DIVERSION–WITHDRAWAL
75[illegible]et 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

PROVISIONS

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.

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 7th *day of* October, *19* 97.

Department of Ecology

ENGINEERING DATA
OK

by Jeff Bloomstrom

PERMIT

No. G2-27863 P

DEPARTMENT OF ECOLOGY
State of Washington

RECEIVED
JUN 22 2009
Washington State Department of Ecology

STATE OF WASHINGTON

APPLICATION FOR CHANGE/TRANSFER OF WATER RIGHT

For filing with the Department of Ecology or with County Conservancy Boards

A NON-REFUNDABLE MINIMUM FEE OF $50.00 PAYABLE TO THE DEPARTMENT OF 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: Division of water right between Applicant and Pacific Northwest Golf Association, Inc.

FOR OFFICE USE ONLY

CHANGE No._____ WRIA_____

DATE ACCEPTED____/____/____ BY_____

FEE $_____ REC'D ____/____/____

CHECK No. _____

ECY Coding: 001-002-WR10285-000011

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.
FR/Cal 3 NW Landing, LLC	( )	( )
ADDRESS		
1111 3rd Avenue, Suite 2360		
CITY	**STATE**	**ZIP CODE**
Seattle	WA	98101

CONTACT NAME (IF DIFFERENT FROM ABOVE)	PHONE NO.	FAX NO.
Tom McDonald, Cascadia Law Group PLLC	(360) 786-5057	(360) 786-1835
ADDRESS		
606 Columbia Street NW, Suite 212		
CITY	**STATE**	**ZIP CODE**
Olympia	WA	98501

2. Water Right Information:

WATER RIGHT OR CLAIM NUMBER	RECORDED NAME(S)
170	Weyerhaeuser Company

DO YOU OWN THE RIGHT TO BE CHANGED? ☒ YES ☐ NO

IF NO, PROVIDE OWNER(S) NAME and ADDRESS: Also used and owned by Pacific Northwest Golf Association, Inc., 355 118th Avenue SE, Suite 100, Bellevue, WA 98005.

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._____ CERT. NO._____ CERT. OF CHANGE NO._____

3. Point(s) of Diversion/Withdrawal:

A. Existing

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #
Well	1	SE	N W	27	19	1E		

B. Proposed

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #
Well	1	SE	N W	27	19	1E		
Well (SEE ATTACHED SHEET FOR CONTINUATION)	2	SW	SW	27	19	1E		

DO YOU OWN THE EXISTING AND PROPOSED POINT(S) OF DIVERSION/WITHDRAWAL?

EXISTING: ☐ YES ☒ NO PROPOSED: ☒ YES ☒ NO – IF NO, PROVIDE OWNER(S) NAME:

Current well site at golf course. Well sites in Section 33 and 34 are City of DuPont "Hoffman" well sites.

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 and remediation	1,250 gpm	690	Year round

B. Proposed

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE
Irrigation - golf course (PNGA)	800	370	Seasonal
Community supply (FR/Cal 3 NW Landing, LLC)	450	320	Year round

5. Place of Use:

A. Existing

LEGAL DESCRIPTION OF LANDS WHERE WATER IS PRESENTLY USED:

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(S) NAME:

B. Proposed

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(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:

See attached sheet.

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.

Please contact the State Department of Revenue for further information. The phone number is (360) 570-3265. The address is: Department of Revenue, Real Estate Excise Tax, PO Box 47477, Olympia, WA 98504-7477.

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.

FR/CAL 3 NW LANDING, LLC, a Delaware limited liability company
By: FirstCal Industrial 3, LLC, a Delaware limited liability company, its sole member
By: FR FirstCal 3, LLC,a Delaware limited liability company, its managing member
By: First Industrial Investment, Inc., a Maryland corporation, its sole member
By: Gary Danklefsen, Regional Director

Joan McDonald as agent for this applicant — (Applicant) — 6/11/09 (Date)

(Water Right Holder) — / / (Date)

(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:*** ____/____/____

ATTACHMENT FOR

APPLICATION FOR CHANGE

Point(s) of Diversion/Withdrawal - ☐ Existing ☒ Proposed:

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #
Well	3	SE	SW	27	19	1E		
Well	4	SE	NE	33	19	1E		
Well	5	N W	N W	34	19	1E		

DO YOU OWN THE ABOVE POINT(S) OF DIVERSION/WITHDRAWAL? ☐ YES ☐ NO – IF NO, PROVIDE OWNER(S) NAME:

Purpose(s) of Use - ☐ Existing ☐ Proposed:

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE

Place of Use - ☐ Existing ☐ Proposed:

LEGAL DESCRIPTION OF LANDS:

¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES

DO YOU OWN ALL THE LANDS IN ABOVE PLACE OF USE? ☐ YES ☐ NO – IF NO, PROVIDE OWNER(S) NAME:

6. Remarks and Other Relevant Information.

Water Right No. 170 was exercised by Weyerhaeuser Company for remediation and irrigation of the golf course. As reflected in Weyerhaeuser's request for an extension of the development schedule, the golf course was near completion and Weyerhaeuser intended to use the remediation water for its planned commercial development. Weyerhaeuser has sold the golf course to Pacific Northwest Golf Association, Inc. (PNGA), and the commercial development to FR/Cal 3 NW Landing, LLC, the Applicant herein. FR/Cal 3 NW Landing, LLC is the successor to Weyerhaeuser's future commercial development, including the intent to exercise the remedial portion of the water right for the commercial development. First Industrial Acquisitions, Inc. is the joint venture development partner with FR/Cal 3 NW Landing, LLC for this development. In extending the development schedule, Ecology stated that a change application could be filed to change the remediation water right for the commercial development. The City of DuPont and the Nisqually Indian Tribe also now own smaller parcels of land that are within the place of use of the water rights; however, neither parcels nor parties were involved or participated in the determined future development plan for FR/Cal 3 NW Landing, LLC's commercial development. First Industrial has discussed this application with PNGA and the City of DuPont. PNGA may request that portion of the water right exercised for irrigation of the golf course be split and reissued solely to PNGA.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300

RECEIVED
NOV 0 8 2007
Cascadia Law Group PLLC

November 1, 2007

Cascadia Law Group
Attn Thomas McDonald
606 Columbia Street NW
Suite 212
Olympia, WA 98501

Re: Water Right No. 170 (Weyerhaeuser Company – Extension Request)

Dear Mr. McDonald:

We are pleased to let you know that your extension request on the development schedule of this water right has been granted. Your new deadline to complete construction and send a Completion of Construction form is **June 1, 2010.** Your new deadline to put the water to full beneficial use and send a completed Proof of Appropriation form is **June 1, 2012.**

Reason for granting extension:

- Nature and scope of the project pertaining to the continued construction of the DuPont Works Golf Course located within the Consent Decree Area. Due diligence evidenced by consistent development of the golf course and continued remediation within the Consent Decree Area.

This extension is conditional upon compliance with the Report of Examination authorizing the 2002 change decision. The ROE authorized use of water for irrigation - site remediation and found that,

> Approximately 200 acres will be intensively irrigated, with a projected average water demand of up to 1 MGD. While irrigation will occur primarily between the months of April and October, the course will be playable year-round, and it is possible that water will be used during other times of the year for continued remediation needs.

Continued remediation work is generally defined to include clean up and development of the site, dust control, or any other measures taken to remove past pollutants or contaminants from the area.

Environmental remediation is a transitory process and would exclude long-term irrigation outside of the golf course area, water supply for domestic use, water supply for the City of DuPont, or fire control. If your client wishes to use water for these purposes, we recommend that an application seeking to formally change the water right be submitted to the Department of Ecology.

Your right to appeal

Mail your appeal to:
Pollution Control Hearings Board
PO Box 40903
Olympia, Washington 98504-0903

OR

Deliver your appeal to:
Pollution Control Hearings Board
4224 – 6th Ave SE Rowe Six, Bldg 2
Lacey, Washington 98503

AND MAIL TO BOTH ADDRESSES BELOW

Mail your appeal to:
Department of Ecology
Appeals Coordinator
PO Box 47608
Olympia, Washington 98504-7608

AND

Mail your appeal to:
Thomas Loranger
Department of Ecology
PO Box 47775
Olympia, Washington 98504-7775

If we can provide further assistance, please contact us at (360) 407-6300.

Sincerely,

Thomas Loranger
Water Resources Section Manager

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
AMENDED APPLICATION FOR CHANGE
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 acts amendatory 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 acts amendatory thereto, and the rules and regulations of the Department of Ecology)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
May 20, 1948	870	765	170

NAME
Weyerhaeuser Company

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
PO Box 100	DuPont	Washington	98327

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
3 Wells

TRIBUTARY OF (IF SURFACE WATER)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE FEET PER YEAR
QUANTITY, TYPE OF USE, PERIOD OF USE	1250	690.5
690.5 Acre-feet per year	Irrigation and Site Remediation	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
Well 1: 90 feet South and 500 feet West;
Well 2: 30 feet South and 520 feet West;
Well 3: 300 feet South and 400 feet West all of the North quarter corner of Section 27.

LOCATED WITHIN THE SMALLEST LEGAL SUBDIVISION	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	W.R.I.A.	COUNTY
NE¼ NW¼	27	19	1E	11	Pierce

RECORDED PLATTED PROPERTY

LOT	BLOCK	(GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Consent Area (Parcel 1)

That portion of the South half of Section 22 and that portion of the West half of Section 26 and that portion of Section 27, ALL in Township 19 N., Range 1 E.W.M., Pierce County, Washington, being more particularly described as follows:

COMMENCING at the West quarter corner of said Section 26, being a 6" X 6" concrete monument with "X"; THENCE along the West line of said Section, N 01° 47' 39" E, 2635.01 feet to the Northwest corner of said Section, being a 6" X 6" concrete monument with "X"; THENCE along the West line of said Section, S 01° 47' 39" W, 554.70 feet to the TRUE POINT OF BEGINNING; THENCE S 88° 47' 08" E, 1304.71 feet; THENCE S 33° 00' 19" E, 901.00 feet; THENCE S 01° 40' 37" W, 1140.43 feet; THENCE S 39° 35' 03" W, 1290.96 feet to an existing 7 foot high chain link fence with barb wire atop; THENCE along said fence line, the following bearings and distances: S 54° 01' 26" W, 1898.35 feet; N 82° 31' 10" W, 1797.29 feet; N 68° 34' 59" W, 3235.77 feet; N 02° 55' 12" W, 203.54 feet; N 14° 26' 10" E, 386.38 feet; N 16° 56' 22" E, 557.84 feet; N 22° 03' 49" E, 1918.07 feet; N 30° 51' 26" E, 610.41 feet; N 60° 43' 57" E, 203.50 feet; N 45° 11' 21" E, 1390.65 feet; N 35° 14' 28" E, 45.20 feet; N 12° 10' 36" E, 20.58 feet; THENCE N 44° 40' 54" E, 20.34 feet to a point on the Southerly monumented line of Sequalitchew Creek as shown on that Record of Survey by ESM, Inc. as filed under Recording No. 8907170351, Records of Pierce County, Washington. THENCE along said monumented line, the following bearings and distances: N 44° 40' 54" E, 70.26 feet; S 53° 19' 01" E, 95.14 feet; S 72° 27' 15" E, 108.17 feet; S 73° 26' 19" E, 170.31 feet; S 09° 01' 31" E, 75.90 feet; S 59° 28' 35" E, 86.92 feet; N 27° 03' 38" E, 55.73 feet; S 56° 01' 12" E, 77.30 feet; S 42° 37' 43" E, 145.44 feet; S 46° 02' 34" E, 265.02 feet; S 55° 18' 22" E, 186.10 feet; THENCE leaving said monument line, S 76° 12' 57" E, 188.49 feet; THENCE N 52° 52' 30" E, 75.60 feet; THENCE N 80° 48' 55" E, 77.99 feet; THENCE S 75° 01' 48" E, 55.61 feet; THENCE S 81° 24' 05" E, 39.01 feet; THENCE S 22° 17' 33" E, 83.02 feet to said monumented line of Sequalitchew Creek; THENCE along said monumented line, the following bearings and distances: S 61° 16' 46" E, 243.97 feet; S 50° 59' 49" E, 193.72 feet; S 25° 32' 26" E, 215.85 feet; S 26° 05' 39" E, 165.20 feet; S 36° 52' 17" E, 143.38 feet; S 20° 09' 56" E, 96.99 feet; S 15° 40' 54" E, 191.12 feet; S 33° 57' 49" E, 65.28 feet; S 35° 33' 50" E, 126.48 feet; S 44° 41' 41" E, 147.28 feet; S 54° 34' 32" E, 70.01 feet; THENCE leaving said monumented line

Report Continued

FINDINGS:

y finding that a portion of these certificates is eligible for this change and that water is available for the beneficial use o irrigation. This change will not affect existing rights, nor will the use of water be detrimental to the public welfare.

RECOMMENDATION:

I recommend approval of this request and issuance of a superseding certificate to allow the change in purpose of use from industrial use to irrigation. However, in order to consolidate the water rights associated with this project, I recommend that a single certificate, Certificate 170-A, be superseded to reflect the use of all three wells.

The withdrawal rate will be limited to 1,250 gpm, and the annual quantity will be limited to 690.5 acre-feet per year. The period of use is year-round, as needed, with the understanding that most of the water will be used during irrigation season. A portion of Certificate 170-A will be relinquished, and Certificates of water right 633-D and 634-D will be relinquished.

The legal description will be refined to describe the boundaries of the clean-up area.

A superseding certificate will be issued after the project is completed and all allocated water put to full beneficial use. This report of examination constitutes Ecology's authorization to begin construction of the proposed project.

The superseding certificate shall be subject to the following provisions:

Provisions

"Weyerhaeuser has agreed to voluntarily relinquish a portion of water certificate 170-A amounting to 200 gpm, and 1,649.5 acre-feet per year, and completely relinquish certificates 633-D and 634-D. The Relinquishment forms must be filed with the Department of Ecology prior to issuance of the superseding certificate."

"Wells 1, 2 and 3 may be pumped in any combination provided that the withdrawals from all three wells is limited to 1,250 gpm, and 690.5 acre-feet per year."

The water user is advised that quantities recommended, and the number of acres to be irrigated, may be reduced at the time of nce of a final water right commensurate with the capacity of the installed system, and the number of acres actually ed.

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 (installation, operation, and maintenance requirements are attached). Meter readings shall be recorded at least monthly.

"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 (totalling 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.)

9. Static water level below measuring point to the nearest 0.1 foot.

For Water Quality Monitoring:

1. Unique Well ID Number
2. Sampling date and time
3. Chloride concentration (mg/L)
4. Submit paper copy of laboratory report"

"The right holder is advised that notice of Proof of Appropriation of water, (under which the final superseding 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 Wolbl Date: February 12, 1998

FINDINGS OF FACT AND DECISION

Upon reviewing the above report, I find that all facts relevant 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 to the public welfare.

Therefore, I ORDER a Superseding Certificate be issued under Ground Water Application Number 170, subject to existing rights and indicated provisions, to allow appropriation of public (ground or surface) water for the amount and uses specified in the foregoing report.

Signed at Olympia, Washington, this 12th day of February 1998.

J. Mike Harris
Water Resources Supervisor
Southwest Regional Office

Weyerhaeuser

P.O. Box 900
DuPont, Washington 98327
Tel (253) 924-7053
Fax (253) 924-6050

MEMORANDUM

DATE: January 27, 1998

FROM: Geneve Smith

SUBJECT: Water Rights at Weyerhaeuser's DuPont Site

TO: Jill Walsh
Ecology

We had our legal department review the "Report of Examination" for changing the use of water rights on the three wells here. There are a couple of corrections that need to be made.

1. Page 1, box at top right corner, Certificate Number - we think it should read 170-A.

2. Page 2, 4th paragraph under INVESTIGATION, please re-word as follows:

   In 1976, Weyerhaeuser Real Estate Company bought the DuPont Company land with the intent of building a deep water export facility. The plan to build an export facility was given up on and a decision was made to develop a Planned Community. In 1985, Weyerhaeuser began an investigation on the former manufacturing site and discovered contamination, which needed to be cleaned up before the land could be developed. The clean-up site extends along both sides of the Sequalitchew Creek canyon, and includes deposits of arsenic, mercury, cadmium and lead contamination.

3. Page 3, 2nd para under RECOMMENDATION, line 3, should read "A portion of Certificate 170-A will be..."

4. Page 3, 3rd para, delete the word "toxic" from sentence.

5. Page 5, 2nd para under FINDINGS OF FACT AND DECISION, Line 2, should read 170-A.

6. Page 6, Continuation of legal description, 4th line, after the last THENCE it should read "THENCE S 75°".

I realize this means a re-printing of the Report. If you would like, we could ink in the correction on the last page that has Mike Harris' signature (both the 170-A on front and the legal description change on back) so he doesn't have to re-sign it. But we would appreciate it if you could make the other changes noted above.

As soon as we receive the corrected pages, we will proceed with getting the Relinquishment Certificates signed and sent to you. If you have any questions, please give me a call.

PACIFIC ENVIRONMENTAL AND REDEVELOPMENT CORPORATION

MEMORANDUM

TO: TOM MCDONALD

FROM: JEFFREY D KING

SUBJECT: WATER USEAGE – DUPONT WORKS REMEDIATION PROJECT

DATE: 6/16/09

CC: NONE

Tom:

The following describes my recollection of the amount of water usage during the remediation project at the former DuPont Works site (Site) located in DuPont, Washington and my role in managing that project.

Project and Water Usage History: The former DuPont Works Remediation Project was a large scale environmental cleanup project which involved 19 years of study, permitting and remedial action. During the last four years of the Project Weyerhaeuser and DuPont (the parties responsible for the cleanup) where required by the State of Washington Department of Ecology (through Ecology's Cleanup Action Plan) and their own internal policies to water all construction areas and roads to keep dust at a minimum. Our goal is no visible dust. Due to the soil type at the site this required extensive watering. To ensure that water was applied in the proper amounts air monitoring stations were installed along the southern fence line that separated the neighboring property south the Site with the Site.

The intensity of watering was greatest during the time period between the spring of 2003 and the spring of 2004 when Quadrant Homes begin construction of homes near the south boundary. This was also the time period when the most of the remedial activities were occurring near the south boundary.

During this period the watering schedule was most intensive during April to the end of October when, to keep to our goal of "no visible dust," we had 4-5,000 gallon water trucks and 1-10,000 water truck active each work day for an average of 9.5 hours per day. During an average day each water 5,000 gallon truck would make, during highest usage, between 1.5 and 2.5 trips per hour. The 10,000 gallon truck, due to its larger size, would make 1.25 trips per hour.

In November, and March we cut back the watering to 2-5,000 gallon water trucks

My Role: I was the day-to-day Project Manager at the Site responsible to Weyerhaeuser and DuPont for all operations on the Site, the development and completion of technical studies and reporting, and the interactions with governmental agencies and interested parties including Ecology. I started working at the Site in October of 1991 and continued in that role until the cleanup was completed in March of 2007. In this role I actively directed, through my company's construction manager, the frequency of water application.

I hope summary meets your needs. If not please contact me at 425-238-2212.

WATER USAGE AT THE FORMER DUPONT WORKS CLEANUP SITE

High use period - Spring of 2003 - Spring of 2004

High Usage Period

Size of Truck	Number of Trucks	Trips per Hr.	Gal per Hour	Hours per Day	Trips per day	Gal per Day	Workdays/Gal per Month	Months/Gal per Month
5,000	4	2	40,000	9.5	19	380,000	22	7
10,000	1	1.25	12,500	9.5	12	118,750		
			52,500	498,750	31	498,750	10,972,500	76,807,500

Moderate Usage Period

Size of Truck	Number of Trucks	Trips per Hr.	Gal per Hour	Hours per Day	Trips per day	Gal per Day	Workdays/Gal per Month	Months/Gal per Month
5,000	2	2	20,000	7.5	15	150,000	22	2
10,000	0	1.25	-	7.5	9	-		
			20,000	150,000	24	150,000	3,300,000	6,600,000

Low Usage Period

Size of Truck	Number of Trucks	Trips per Hr.	Gal per Hour	Hours per Day	Trips per day	Gal per Day	Workdays/Gal per Month	Months/Gal per Month
5,000		2	-	5.5	11	-	22	2
10,000	0	1.25	-	5.5	7	-		
			-	-	18	-	-	-

TOTAL ANNUAL USAGE							Gallons	83,407,500

[illegible]

Size of Truck	Number of Trucks	Trips per Hr.	Gal per Hour	Hours per Day	Trips per day	Gal per Day	Workdays/Gal per Month	Months/Gal per Month
5,000	5		"	10	3	120,000	22	10
10,000	0	0	-	0	0	-		
			-	-	3	120,000	2,640,000	26,400,000

Well Production - Maximum Production

Gallons per Minute	Minutes per Hour	Gallons per Hour max	Gallons per Day max
1,250	60	75,000	712,500

DESCRIPTION OF PROPOSED WORKS

Well 1: 331 feet deep with a 24-inch casing
Well 2: 252 feet deep with a 30-inch casing
Well 3: 265 feet deep with a 12-inch casing

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	September 1, 1999 9/1/2001 9/1/2006	September 1, 2000 9/1/2002 9/1/2007

REPORT

BACKGROUND:

On August 7, 1997, the Weyerhaeuser Company filed three *Applications for Change of Water Right* to change the purpose of use of Ground Water Certificates 170-A, 633-D and 634-D from industrial supply to irrigation.

Ground Water Certificate 170-A (priority date May 20, 1948) authorizes a withdrawal of 1450 gallons per minute (gpm) and 2340 acre-feet per year for industrial use. Certificates 633-D and 634-D authorize rights amounting to 320 gpm and 17.68 acre-feet per year, and 550 gpm and 305 acre-feet per year, respectively.

A legal notice of the proposed change was published. No objections to the change were received.

INVESTIGATION:

The investigation of this application included a site visit with Weyerhaeuser's Vern Moore, on October 8, 1997, and a review of the information submitted by the applicant. I also reviewed relevant Department of Ecology records including water right records, well construction logs and other hydrologic information, and applicable publications.

From 1909 to 1976, the E.I. DuPont de Nemours Company operated an explosive manufacturing plant approximately 5 miles south of the Town of Steilacoom. The company built the Town of DuPont near the manufacturing plant to house the company's employees. The town was served by a separate water system.

Water use at the manufacturing plant was authorized by three ground water certificates totaling 2,320 gpm and 2,663 acre-feet per year. Formerly, DuPont owned approximately 3,200 acres of generally undeveloped land. Approximately 800 acres of the property was used for construction of their western powder manufacturing facility, which produced dynamite and other explosives.

In 1976, Weyerhaeuser Company bought the DuPont Company land with the intent of building a deep-water export facility. In 1985, Weyerhaeuser began an investigation on the former manufacturing site and discovered contamination, which must be cleaned up before the land can be developed. The clean-up site extends along both sides of the Sequalitchew Creek canyon, and includes deposits of arsenic, mercury, cadmium and lead contamination.

Prior to 1976, water was used on the site for a variety of industrial purposes, including steam production, nitroglycerin production, acid plant cooling water, cooling water for the ammonia neutralizing plant, and the plant's laundry facility.

The last production of explosives occurred on March 25, 1976, and clean up of the buildings and surrounding area began on March 29, 1976. It has been over two decades since the wells were used for industrial supply, however, over the last 20 years the water has been used for other purposes - primarily during the remediation process, as dust control for the Northwest Landing construction, and for fire suppression.

Final reclamation plans for the site include the development of a golf course within the formerly contaminated area. It is the intent of these *Applications for Change* to change the purpose of use from industrial supply to irrigation. While the majority of the original DuPont water rights have been relinquished for a prolonged period of non-use, my investigation shows that the portion which has been exercised within the last 5 years is still eligible to be changed.

Weyerhaeuser has estimated that the recent water use from these wells is 690.5 acre-feet per year, withdrawn at a rate of 1250 gpm. The company requests that these quantities be changed to allow for irrigation of the proposed golf course. For administrative convenience, Weyerhaeuser has agreed to voluntarily relinquish the portion of water that is no longer in use.

The development schedule for the golf course is dependent on the progress of the remediation efforts. Current plans involve

Water Rights Self-Assessment
For Existing Water Right(s) Status

Permit, Certificate, or Claim #	Name of Rightholder or Claimant	Priority Date	Source Name / Number	Primary or Supplemental	Existing Water Rights		Existing Consumption		Current Water Right Status (Excess / Deficiency)	
					Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
Permit/Certif.										
1 G2-00800S(636)	City of DuPont	11/11/1925	Historic V. #1	Primary	60	44	0	0	60 (1)	44 (1)
2 G2-00799S(635)	City of DuPont	11/11/1925	Historic V. #2	Primary	150	138	0	0	150 (1)	138 (1)
3 G2-20970C	City of DuPont	4/27/1973	El Rancho	Primary	80	18	0	0	80 (2)	18 (2)
4 G2-27326C	City of DuPont	4/22/1988	Bell Hill #1	Primary	900	1149	750	555	150	594
5 G2-27450P	City of DuPont	11/7/1988	Bell Hill #2	Primary	1000	1237	624	596	376	641
6 G2-29489	City of DuPont	4/25/1997	Bell Hill #3	Primary	1000		587		413	
				Supplemental		1210 (3)				
7 G2-27663A	City of DuPont	12/1/1989	Hoffman H. 1,2	Primary	2200	774	1500	387	700	387
				Supplemental		1922 (4)				
8										
9										
Claims										
1 None										
TOTAL	*******	*******	*******		**5390**	**3360**	**3461**	**1538**	**1929**	**1822**

Intertie Name / Identifier	Name of Purveyor Providing Water	Exiting Limits on Intertie Water Use		Exiting Limits on Intertie Water Use		Exiting Limits on Intertie Water Use	
		Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
1 26050	Fort Lewis	N/A	N/A	N/A	N/A	N/A	N/A
TOTAL	-	**0**	**0**	**0**	**0**	**0**	**0**

Pending Water Right Application	Name on Permit	Primary or Supplemental	Date Submitted	Pending Water Rights			
				Maximum Instantaneous Flow Rate (Qi) Requested		Maximum Annual Volume (Qa) Requested	
1 G2-30221	City of DuPont	Primary	12/15/2004	3150		3811	

(1) Due to poor water quality, the City is currently unable to use the Historic Village wells for municipal supply. Certificate 635 and 636 were issued as a municipal water right and are not automatically subject to relinquishment for non-use.

(2) El Rancho was connected to the DuPont water system in 2011. Transfer of water rights is underway.

(3) The annual quantity permitted from this well is based on an 18-hour-per-day pumping schedule at a rate of 1,000 gpm. The permitted annual quantity is supplemental to rights already held by the City of DuPont.

(4) Partially Supplemental. According to the ROE, 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 authorized 774 acre-feet per year as a primary allocation, and 1,922 as supplemental to rights already held by the City of DuPont.

Water Rights Self-Assessment

For Six-Year Projected Water Right(s) Status

Permit, Certificate, or Claim #	Name of Rightholder or Claimant	Priority Date	Source Name / Number	Primary or Supplemental	Existing Water Rights		Future Consumption in Year 2017		Future Water Right Status (Excess / Deficiency)	
					Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
Permit/Certif.										
1 G2-00800S(636)	City of DuPont	11/11/1925	Historic V. #1	Primary	60	44	60	44	0 (1)(5)	0 (1)(5)
2 G2-00799S(635)	City of DuPont	11/11/1925	Historic V. #2	Primary	150	138	150	138	0 (1)(5)	0 (1)(5)
3 G2-20970C	City of DuPont	4/27/1973	El Rancho	Primary	80	18	80	18	0 (2)(5)	0 (2)(5)
4 G2-27326C	City of DuPont	4/22/1988	Bell Hill #1	Primary	900	1149	690	556	210	593
5 G2-27450P	City of DuPont	11/7/1988	Bell Hill #2	Primary	1000	1237	750	562	250	675
6 G2-29489	City of DuPont	4/25/1997	Bell Hill #3	Primary	1000		532		468	
				Supplemental		1210 (3)				
7 G2-27663A	City of DuPont	12/1/1989	Hoffman H. 1,2	Primary	2200	774	1900	532	300	242
				Supplemental		1922 (4)				
8 Transfer App. (5)			Permits Nos. 1,2,3	Primary	See above	See above	See above	See above	See above	See above
9										
Claims										
1 None										
TOTAL	*******	*******	*******		**5390**	**3360**	**4162**	**1850**	**1228**	**1510**

Intertie Name / Identifier	Name of Purveyor Providing Water	Exiting Limits on Intertie Water Use		Exiting Limits on Intertie Water Use		Exiting Limits on Intertie Water Use	
		Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
1 26050	Fort Lewis	N/A	N/A	N/A	N/A	N/A	N/A
TOTAL	-	**0**	**0**	**0**	**0**	**0**	**0**

Pending Water Right Application	Name on Permit	Primary or Supplemental	Date Submitted	Pending Water Rights			
				Maximum Instantaneous Flow Rate (Qi) Requested		Maximum Annual Volume (Qa) Requested	
1 G2-30221	City of DuPont	Primary	12/15/2004	3150		3811	

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(5) Transfer of Historic Village No. 1 and 2 and El Rancho Madrona water rights to new point of withdrawal.

Water Rights Self-Assessment

For Twenty-Year Projected Water Right(s) Status

Permit, Certificate, or Claim #	Name of Rightholder or Claimant	Priority Date	Source Name / Number	Primary or Supplemental	Existing Water Rights		Future Consumption in Year 2031		Future Water Right Status (Excess / Deficiency)	
					Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
Permit/Certif.										
1 G2-00800S(636)	City of DuPont	11/11/1925	Historic V. #1	Primary	60	44	60	44	0 (1)(5)	0 (1)(5)
2 G2-00799S(635)	City of DuPont	11/11/1925	Historic V. #2	Primary	150	138	150	138	0 (1)(5)	0 (1)(5)
3 G2-20970C	City of DuPont	4/27/1973	El Rancho	Primary	80	18	80	18	0 (2)(5)	0 (2)(5)
4 G2-27326C	City of DuPont	4/22/1988	Bell Hill #1	Primary	900	1149	900	840	0	309
5 G2-27450P	City of DuPont	11/7/1988	Bell Hill #2	Primary	1000	1237	1000	900	0	337
6 G2-29489	City of DuPont	4/25/1997	Bell Hill #3	Primary	1000		1000		0	
				Supplemental		1210 (3)				
7 G2-27663A	City of DuPont	12/1/1989	Hoffman H. 1,2	Primary	2200	774	2200	550	0	224
				Supplemental		1922 (4)				
8 Transfer App. (5)			Permits Nos. 1,2,3	Primary	See above	See above	See above	See above	See above	See above
9 Application (6)		6/22/2009	Weyerhauser 170	Primary	450	320	385	77	65	243
Claims										
1 None										
TOTAL	*******	*******	*******		**5840**	**3680**	**5775**	**2567**	**65**	**1113**

Intertie Name / Identifier	Name of Purveyor Providing Water	Exiting Limits on Intertie Water Use		Exiting Limits on Intertie Water Use		Exiting Limits on Intertie Water Use	
		Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
1 26050	Fort Lewis	N/A	N/A	N/A	N/A	N/A	N/A
TOTAL	-	**0**	**0**	**0**	**0**	**0**	**0**

Pending Water Right Application	Name on Permit	Primary or Supplemental	Date Submitted	Pending Water Rights			
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(5) Transfer of Historic Village No. 1 and 2 and El Rancho Madrona water rights to new point of withdrawal.

(6) Application for Change/Transfer (6/22/2009). 450 gpm (320 acre/ft/yr) for Community Supply and 800 gpm (370 acre/ft/yr) for irrigation.

APPENDIX C

WATER SYSTEM STANDARDS

WATER SYSTEM DETAILS

DUPONT WATER MUNICIPAL CODE

STANDARD SERVICE AGREEMENT

ORDINANCE NO. 2003-69 (COORDINATED WATER SYSTEM PLAN ADOPTION)

DUTY TO PROVIDE SERVICE REQUIREMENT

WATER AVAILABILITY FORM

INTER-GOVERNMENTAL AGREEMENT BETWEEN THE CITY OF DUPONT AND FORT LEWIS FOR EMERGENCY WATER SUPPLY INTERTIE

MEMORANDUM OF UNDERSTANDING FOR SALE OF UTILITIES SERVICES

CITY OF DUPONT

PIERCE COUNTY, WASHINGTON

PUBLIC WORKS STANDARDS

SEPTEMBER 2011

G&O JOB #07441

Gray & Osborne, Inc.
CONSULTING ENGINEERS
701 DEXTER AVENUE NORTH SUITE 200
SEATTLE, WASHINGTON 98109 • (206) 284-0860

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 pre-construction 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 two 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 Dwg. 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 re-cut 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 Dwg. 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 Dwg. 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 Dwg. No. 8.3-3.

8.3.7 Road and Stream Crossings (See Dwg. 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 Dwg. 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 two-inch diameter services shall be supplied and installed with a two-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 ¾ 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 Dwg. 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 two-inch-high numbers using black paint.

8.6 Fire Hydrants

(See Dwg. 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-inch 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 Blow-off and Air Release Assemblies

8.7.1 Blow-off Assemblies

Blow-off 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 blow-off assemblies shall be painted with Kelly Moore 1700-64 KEL-GUARD ENAMEL INDIGO BLUE, or City approved substitute. See Dwg. 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 Dwg. 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 Dwg. 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 Dwg. 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 forty-eight (48) hours in advance of such shut off and the City will shut off the mains. Once the water has been shut off, 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, blow-offs, 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 ½-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 five 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.

WATER SYSTEM
STANDARD DETAILS

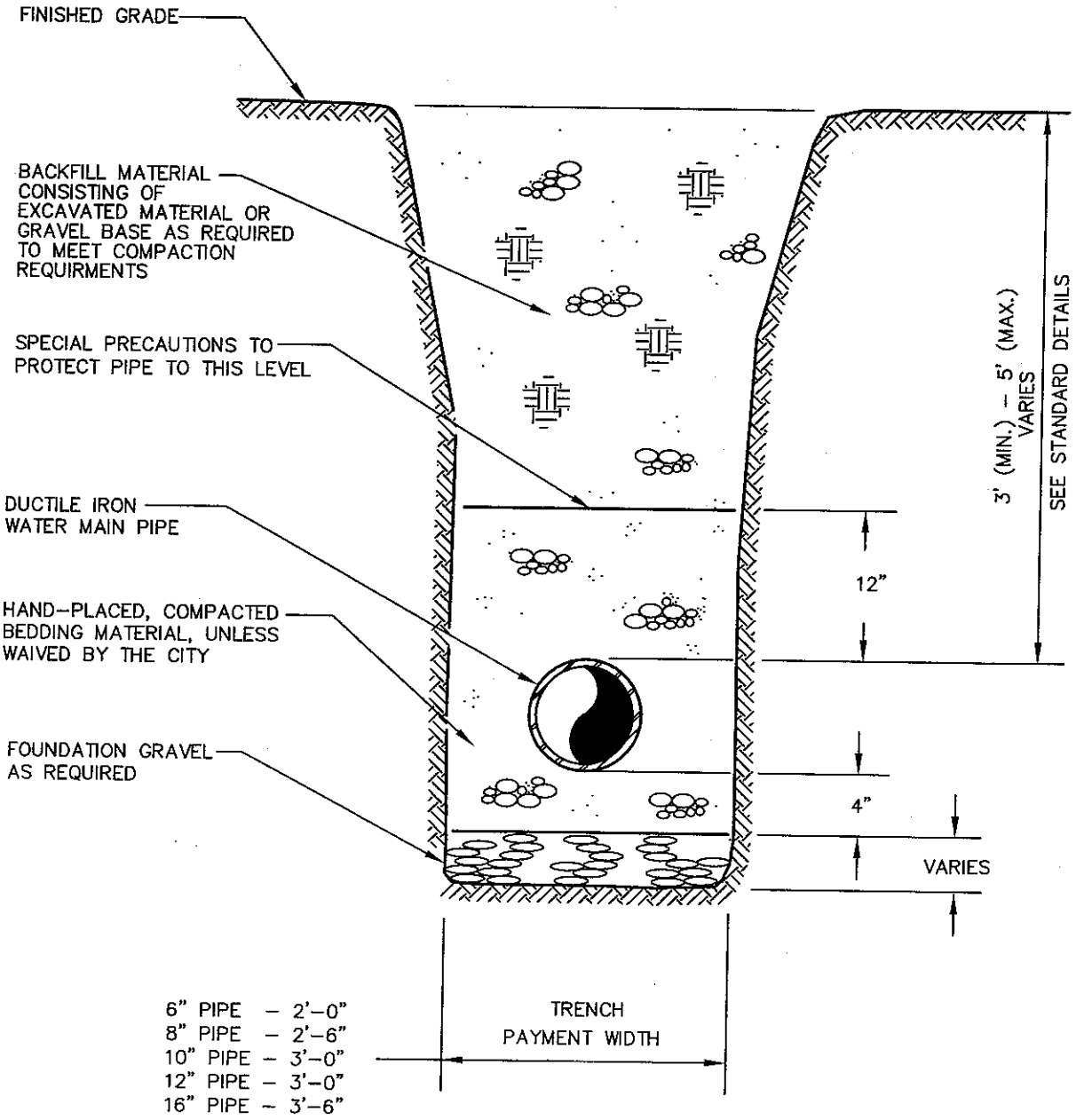
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WATER SYSTEM
STANDARD DETAILS

LIST OF WATER SYSTEM STANDARD DETAILS

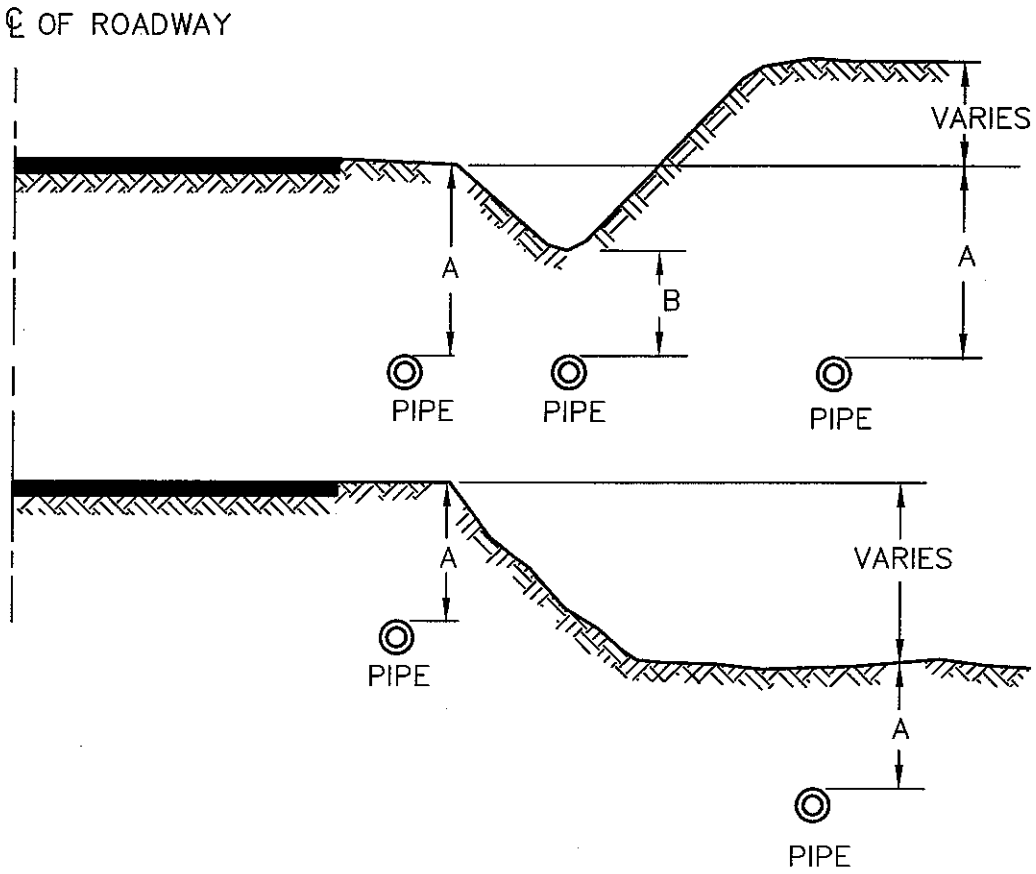
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NOTES:

1) FOR ADDITIONAL REQUIREMENTS, SEE SECTION 8.2 OF THE PUBLIC WORKS STANDARDS.

CITY OF DUPONT			
WATER MAIN TRENCH SECTION			
APPROVED: CITY OF DUPONT DATE			DWG. NO. 8.2-1
DATE: 10/03	DRWN: L.L.	CHKD: T.N.	SCALE: NO SCALE

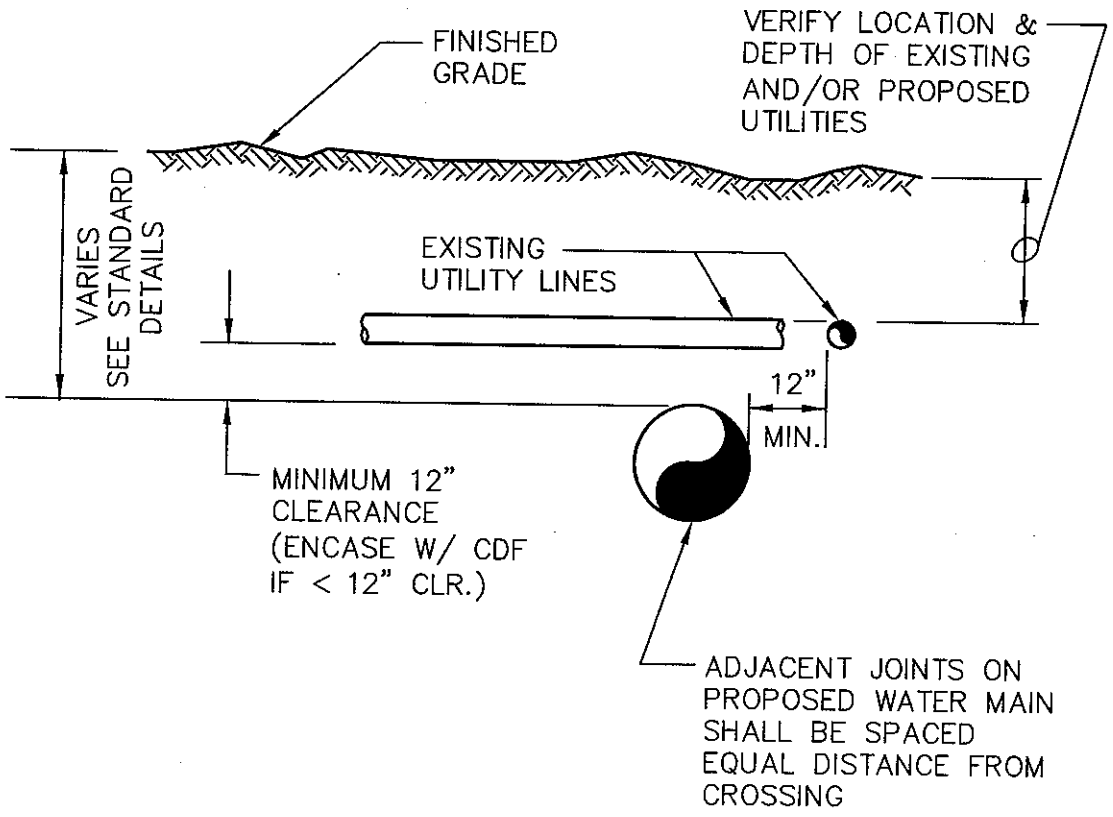


PIPE SIZE	A	B
6" – 12"	36"	24"
14" – 18"	42"	30"
20" & OVER	48"	36"

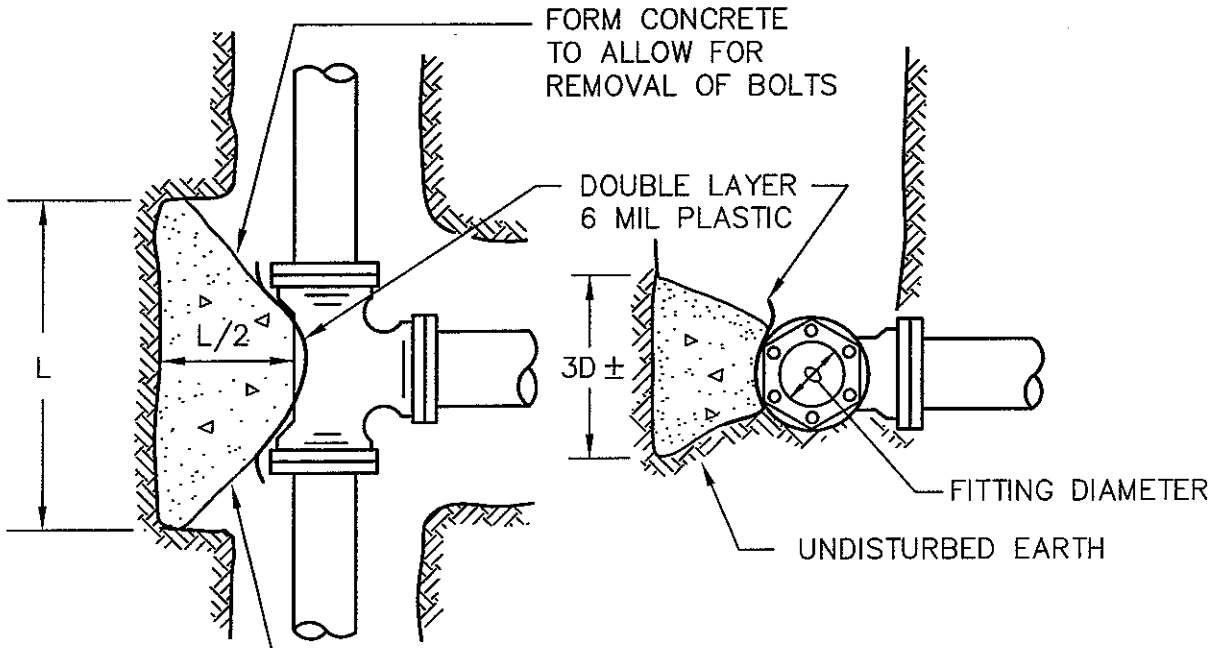
NOTES:

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 DATE			DWG. NO. 8.2-2
DATE: 10/03	DRWN: L.L.	CHKD: T.N.	SCALE: NO SCALE



CITY OF DUPONT			
TYPICAL UTILITY CROSSING			
APPROVED: CITY OF DUPONT DATE			DWG. NO. 8.2-3
DATE: 10/03	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.

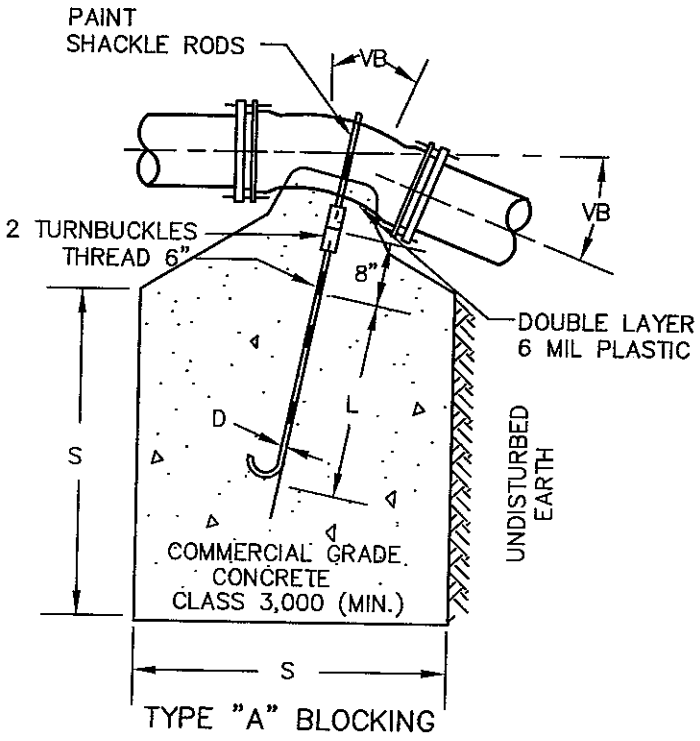
CITY OF DUPONT			
THRUST BLOCKS			
APPROVED: CITY OF DUPONT DATE			DWG. NO. 8.3–1
DATE: 10/03	DRWN: L.L.	CHKD: T.N.	SCALE: NO SCALE

TYPE "A" BLOCKING
FOR 11 1/4°–22 1/2° VERTICAL BENDS

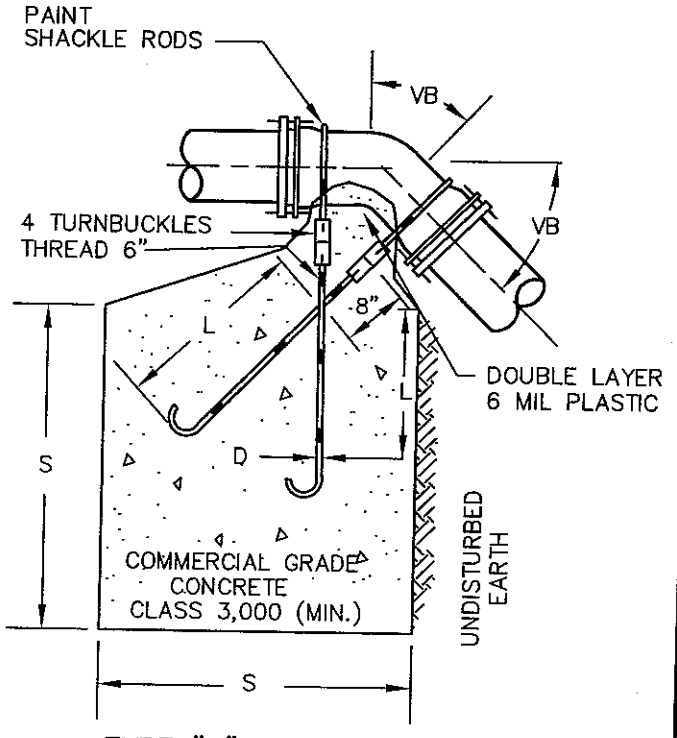
PIPE SIZE NOMINAL DIAMETER– INCHES	TEST PRESSURE PSI	VB VETICAL BEND DEGREES	No. OF CU. FT. OF CONC. BLOCKING	S SIDE OF CUBE (LIN. FT.)	d DIAM. OF SHACKLE RODS (2) INCHES	L DEPTH OF RODS IN CONCRETE (LIN. FT.)
4"	300	11 1/4	8	2	5/8"	1.5
		22 1/2	11	2.2		2.0
6"	300	11 1/4	11	2.2	5/8"	2.0
		22 1/2	25	2.9		
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

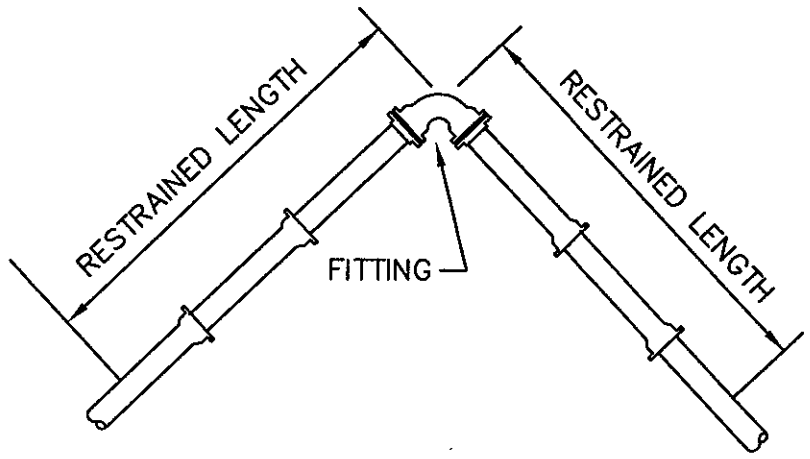
VERTICAL ANCHOR BLOCKS

APPROVED:

CITY OF DUPONT DATE

DWG. NO. 8.3–2

DATE:	DRWN:	CHKD:	SCALE:
10/03	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

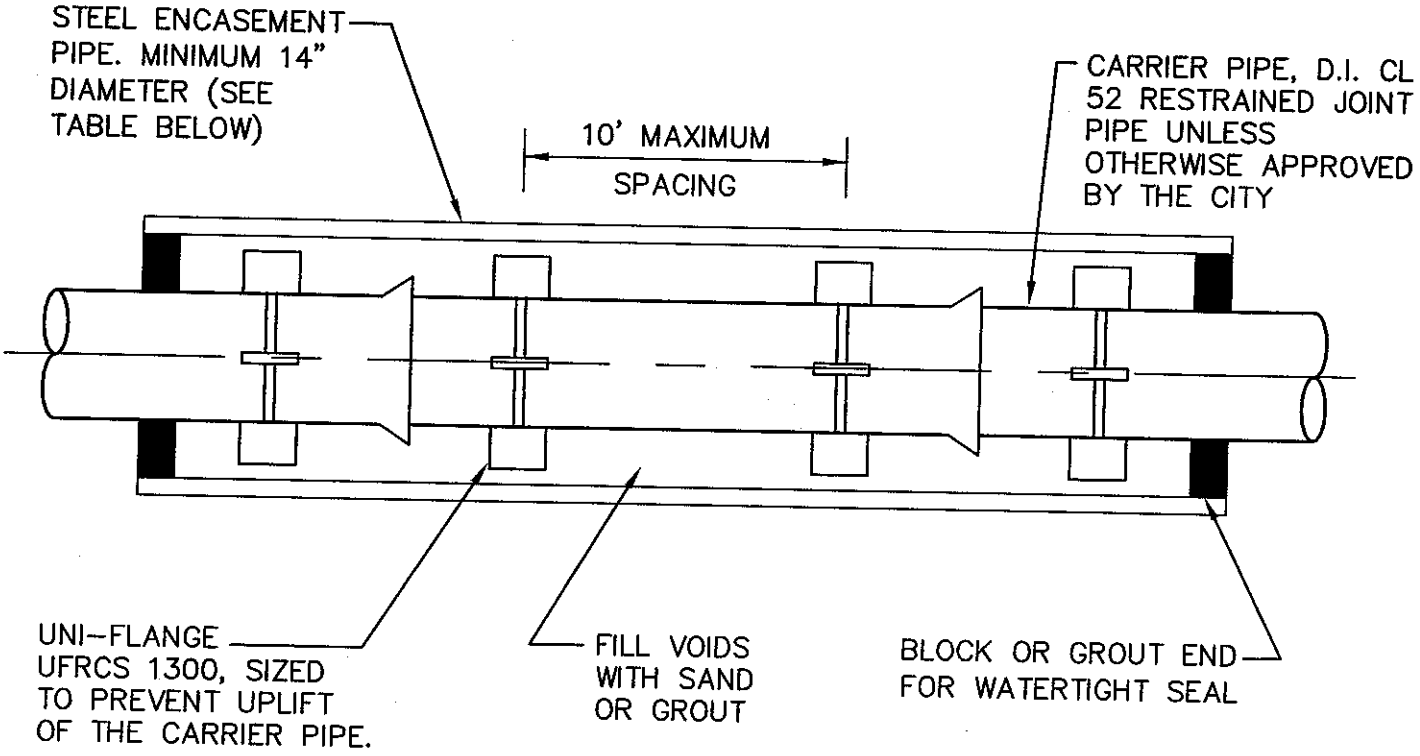
GENERAL NOTES:

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 DATE			DWG. NO. 8.3-3
DATE: 10/03	DRWN: L.L.	CHKD: D.J.M.	SCALE: NO SCALE



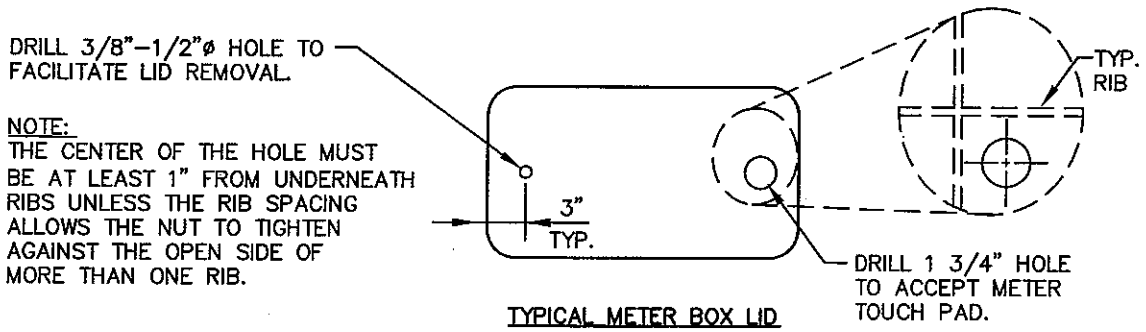
GENERAL NOTES:

1) CARRIER PIPE SHALL BE PRESSURE TESTED PRIOR TO FILLING VOIDS WITH SAND.

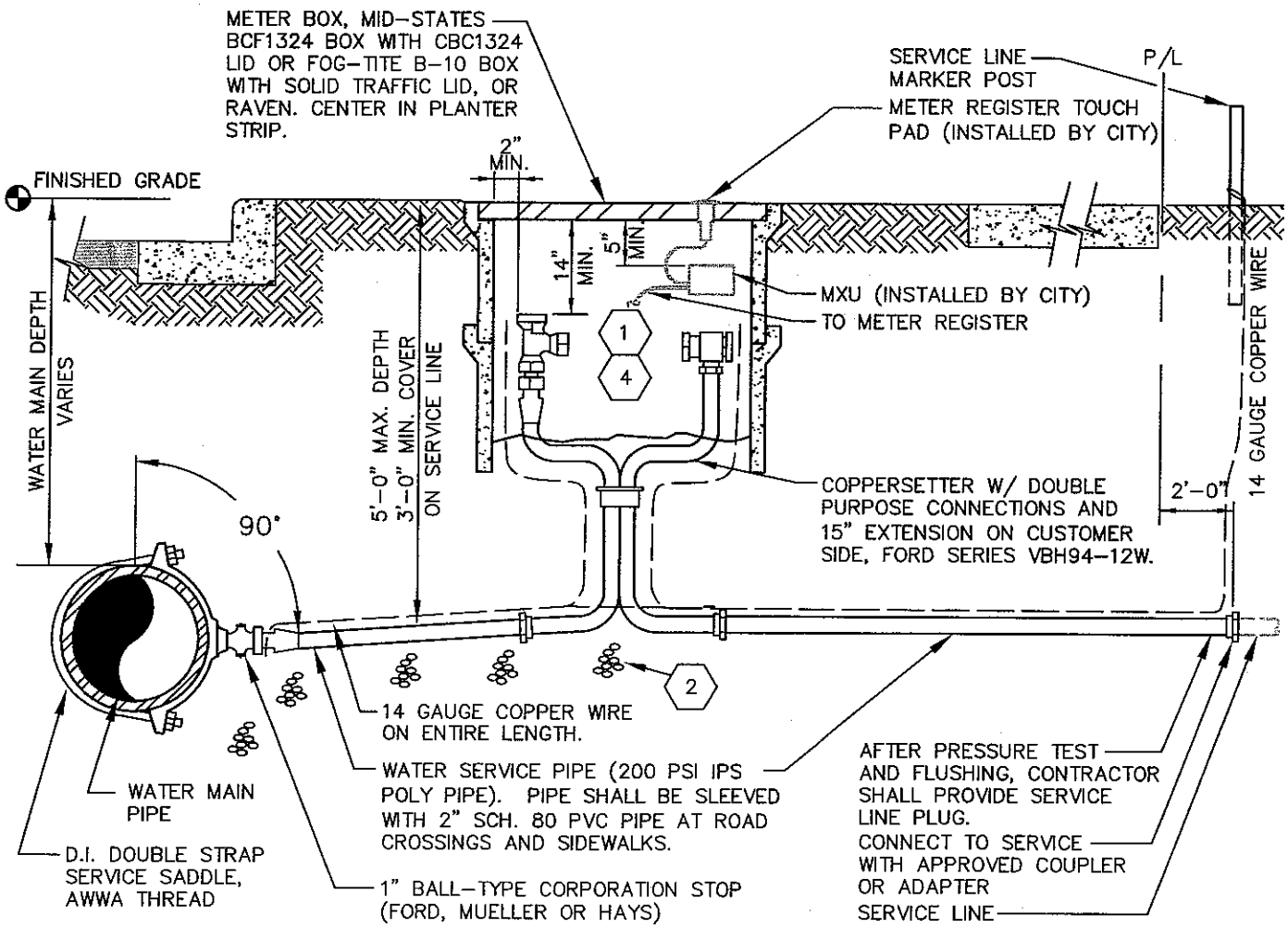
2) CARRIER PIPE WITHIN THE LENGTH OF THE ENCASEMENT PIPE SHALL HAVE RESTRAINED JOINTS.

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 DATE			DWG. NO. 8.3-4
DATE: 10/03	DRWN: L.L.	CHKD: D.J.M.	SCALE: NO SCALE



TYPICAL METER BOX LID



NOTES:

1. METER NOT SHOWN FOR CLARITY. REFERENCE INVENSYS 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.

REVISED: 4/09

CITY OF DUPONT

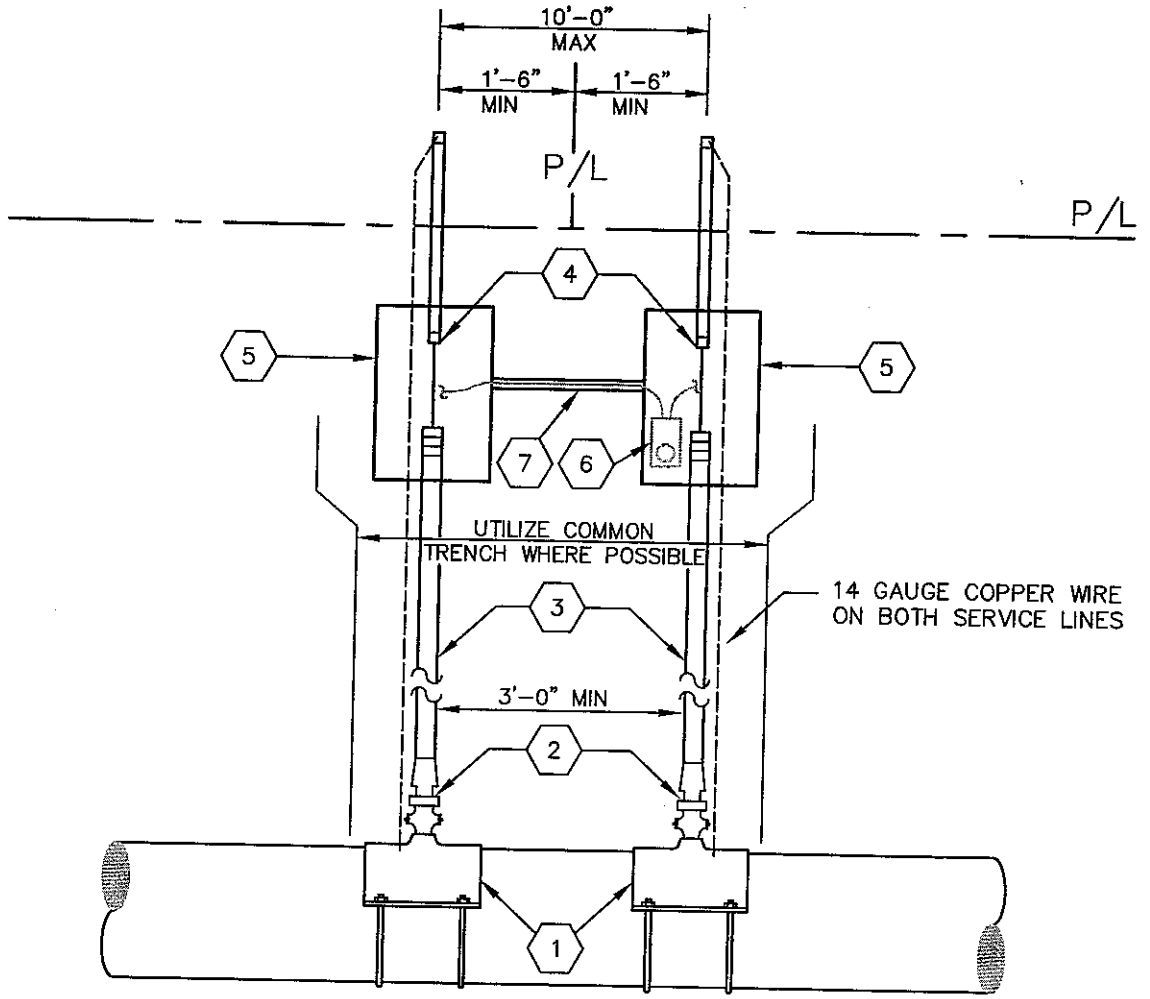
3/4" & 1" SERVICE CONNECTION

APPROVED:

CITY OF DUPONT DATE

DWG. NO. 8.4–1

DATE:	DRWN:	CHKD:	SCALE:
10/03	L.L.	T.N.	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

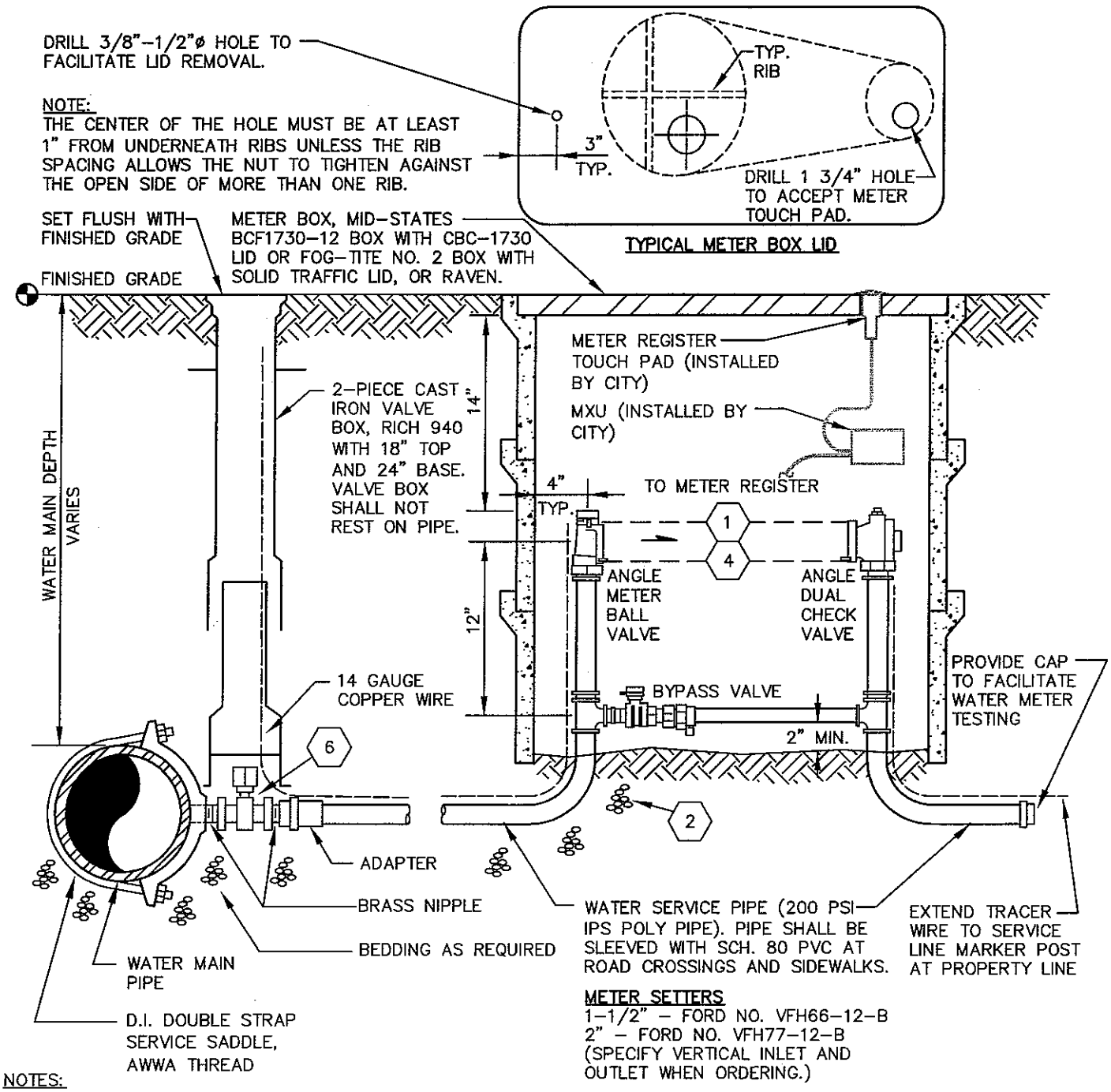
3/4" & 1" DUAL SERVICE CONNECTION

APPROVED:

CITY OF DUPONT DATE

DWG. NO. 8.4-2

DATE:	DRWN:	CHKD:	SCALE:
3/03	L.L.	T.N.	NO SCALE



NOTES:

1. METER NOT SHOWN FOR CLARITY. REFERENCE INVENSYS 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

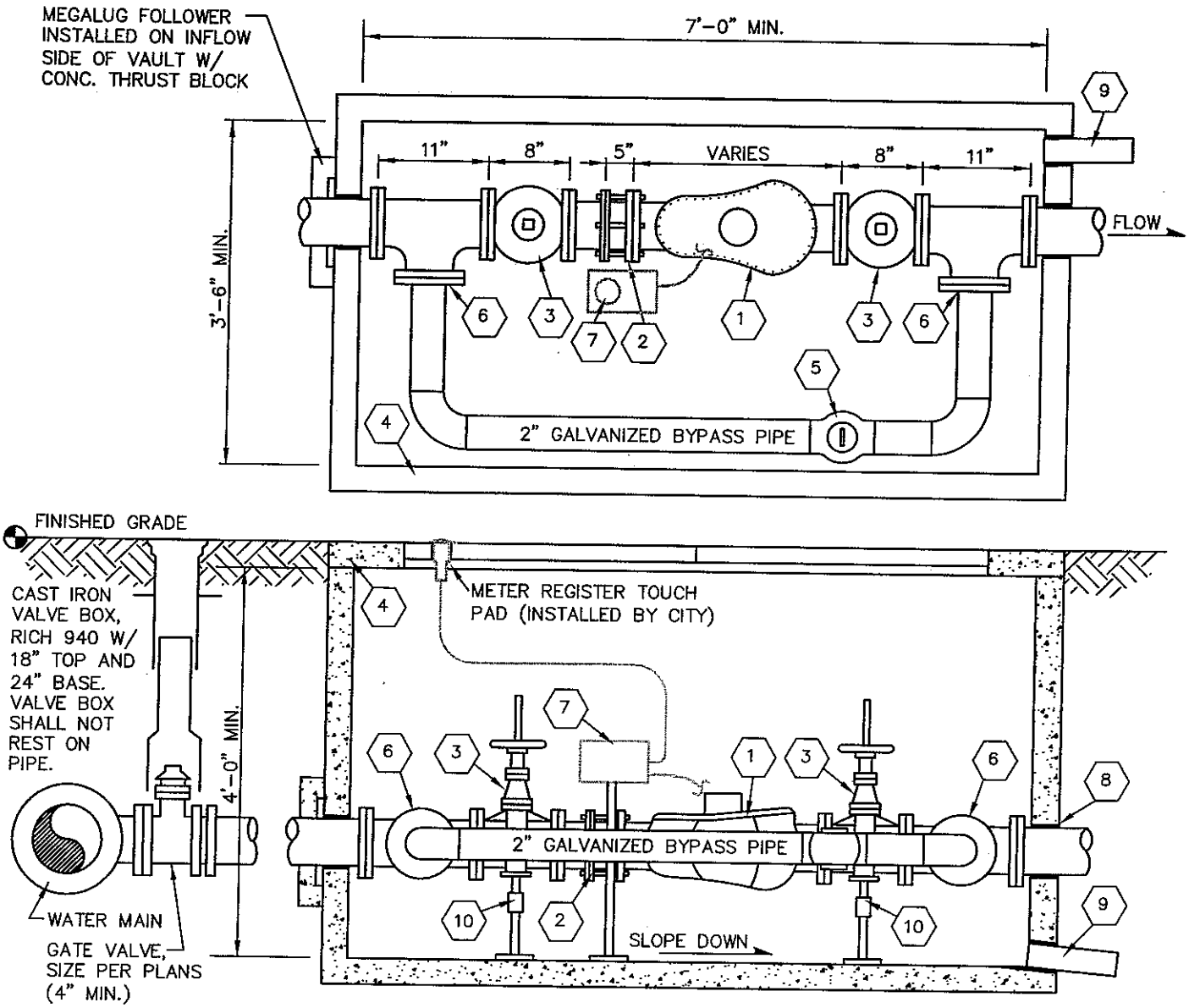
1-1/2" & 2" SERVICE CONNECTION

APPROVED:

CITY OF DUPONT DATE

DWG. NO. 8.4-3

DATE:	DRWN:	CHKD:	SCALE:
RVSD: 7/08	J.C.	D.M.	NO SCALE



1. COMPOUND METER W/ STRAINER, INVENSYS 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

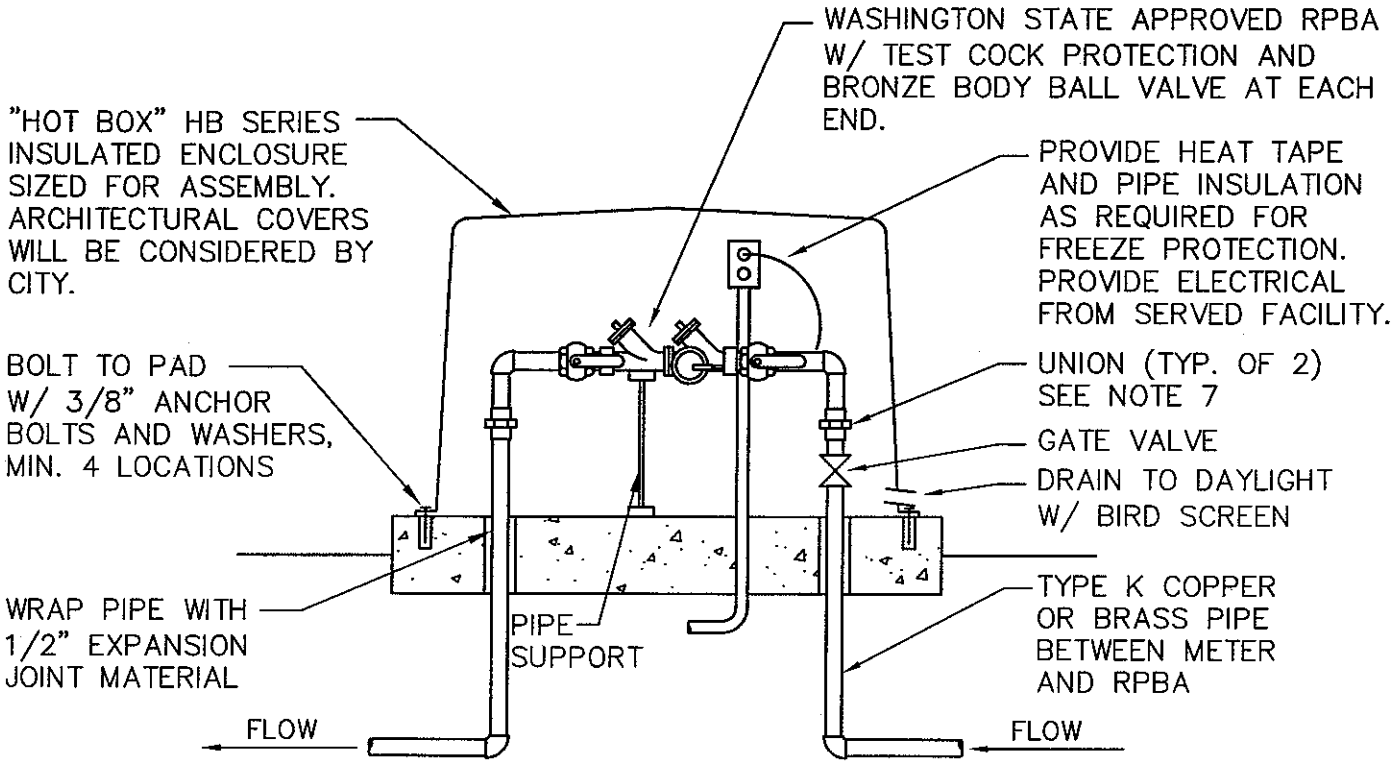
3" & LARGER SERVICE CONNECTION

APPROVED:

CITY OF DUPONT DATE

DWG. NO. 8.4-4

DATE:	DRWN:	CHKD:	SCALE:
6/04	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.

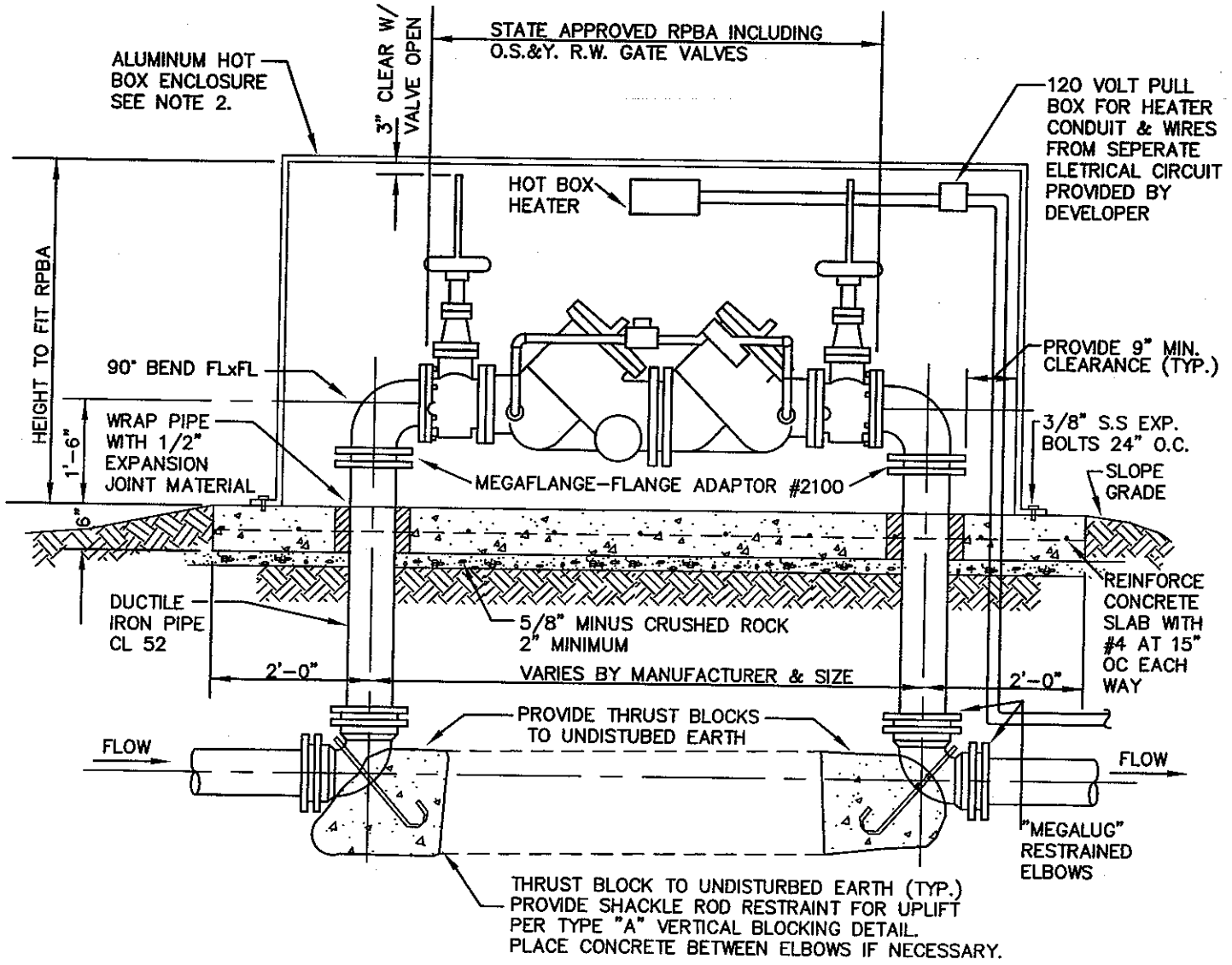
4) SYSTEM SHALL NOT BE PUT INTO SERVICE UNTIL RPBA IS APPROVED BY THE CITY AND TESTED/CERTIFIED BY A WASHINGTON STATE LICENSED TESTER.

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 DATE			DWG. NO. 8.4-5
DATE: 10/03	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

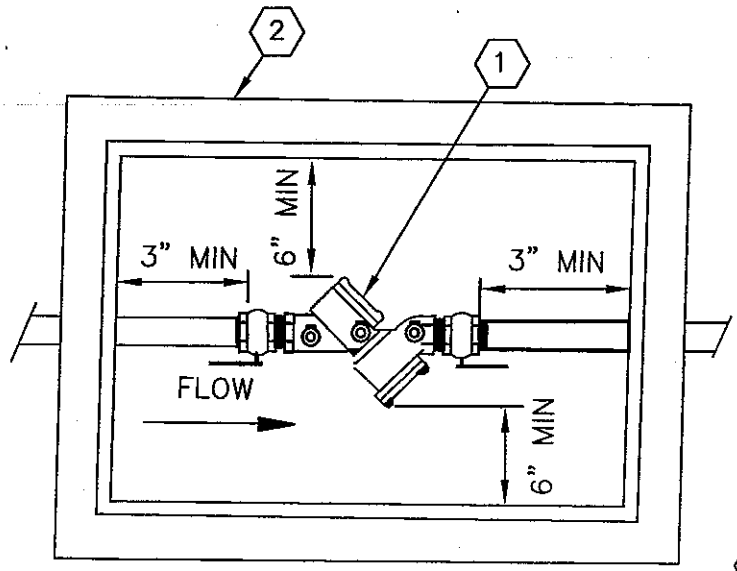
3" & LARGER REDUCED PRESSURE BACKFLOW ASSEMBLY

APPROVED:

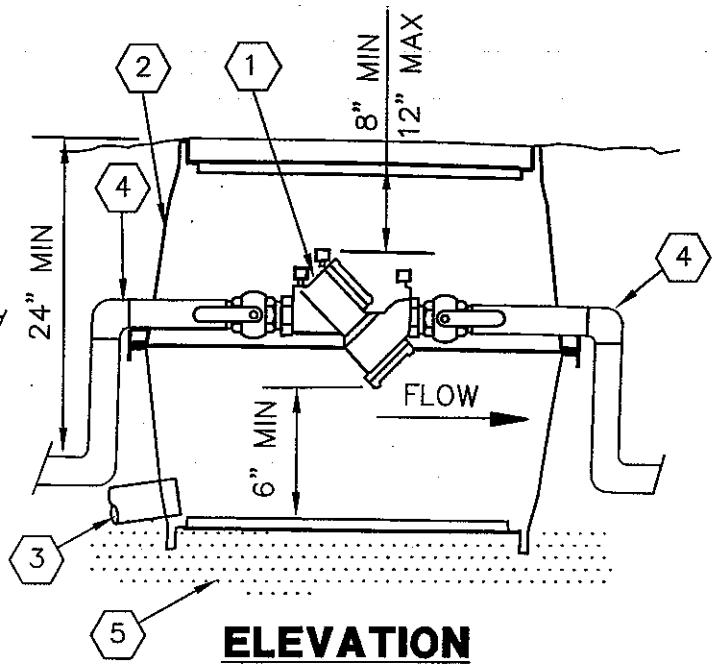
CITY OF DUPONT DATE

DWG. NO. 8.4-6

DATE:	DRWN:	CHKD:	SCALE:
10/03	L.L.	T.N.	NO SCALE



PLAN



ELEVATION

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.

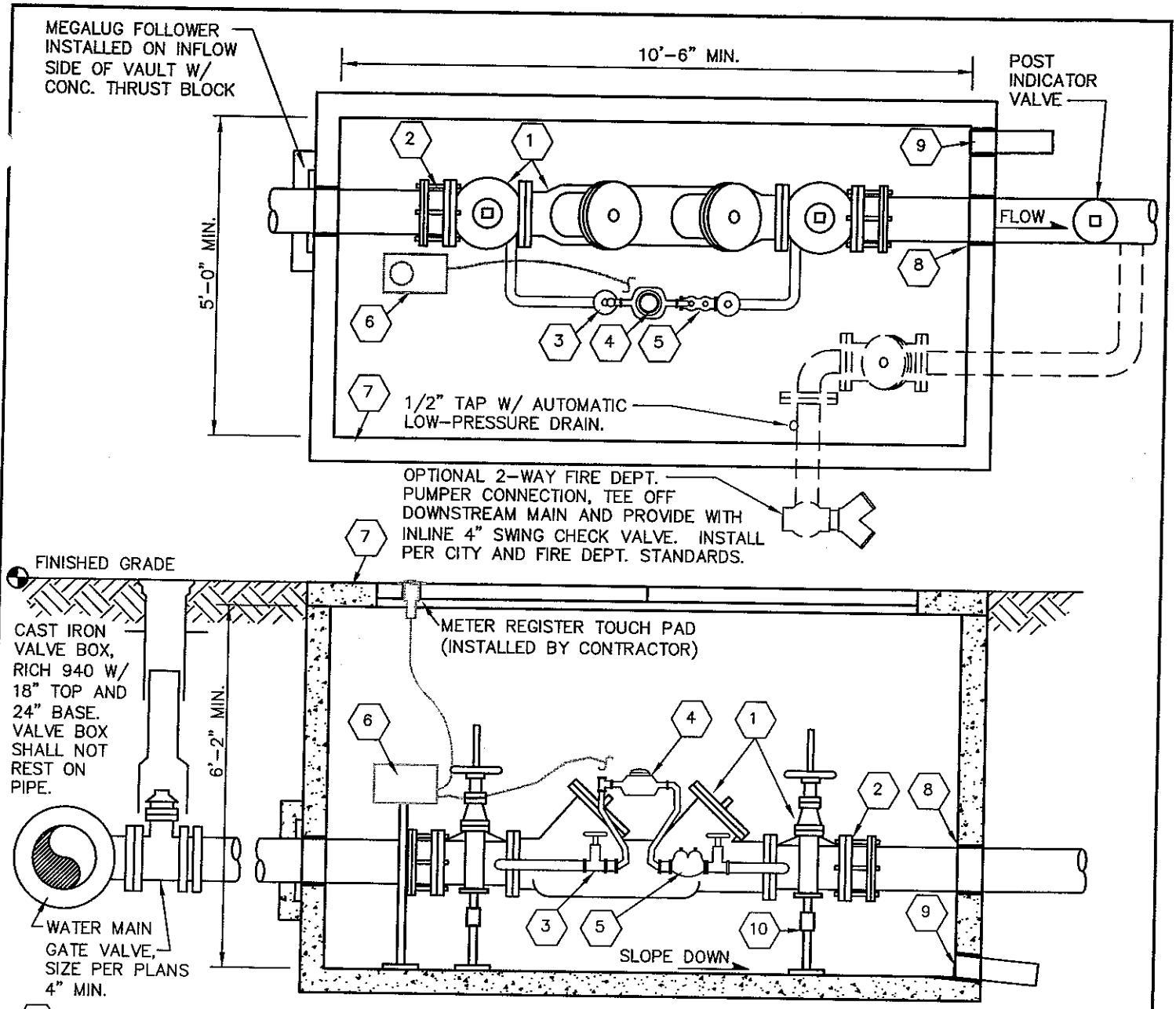
3) COMPLETE ALL WORK IN ACCORDANCE WITH STATE, CITY AND SUPPLIER STANDARDS.

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: CITY OF DUPONT DATE			DWG. NO. 8.4–7
DATE: 10/03	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" INVENSYS 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

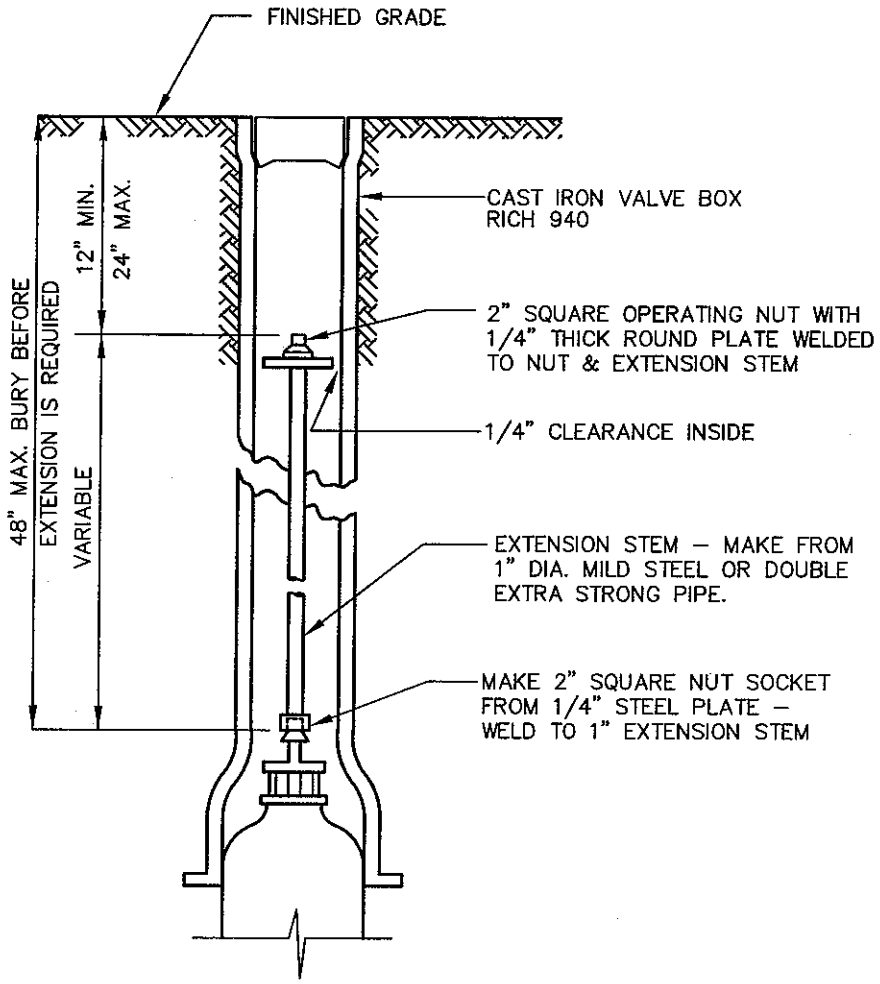
3" & LARGER DOUBLE CHECK VALVE ASSEMBLY

APPROVED:

CITY OF DUPONT DATE

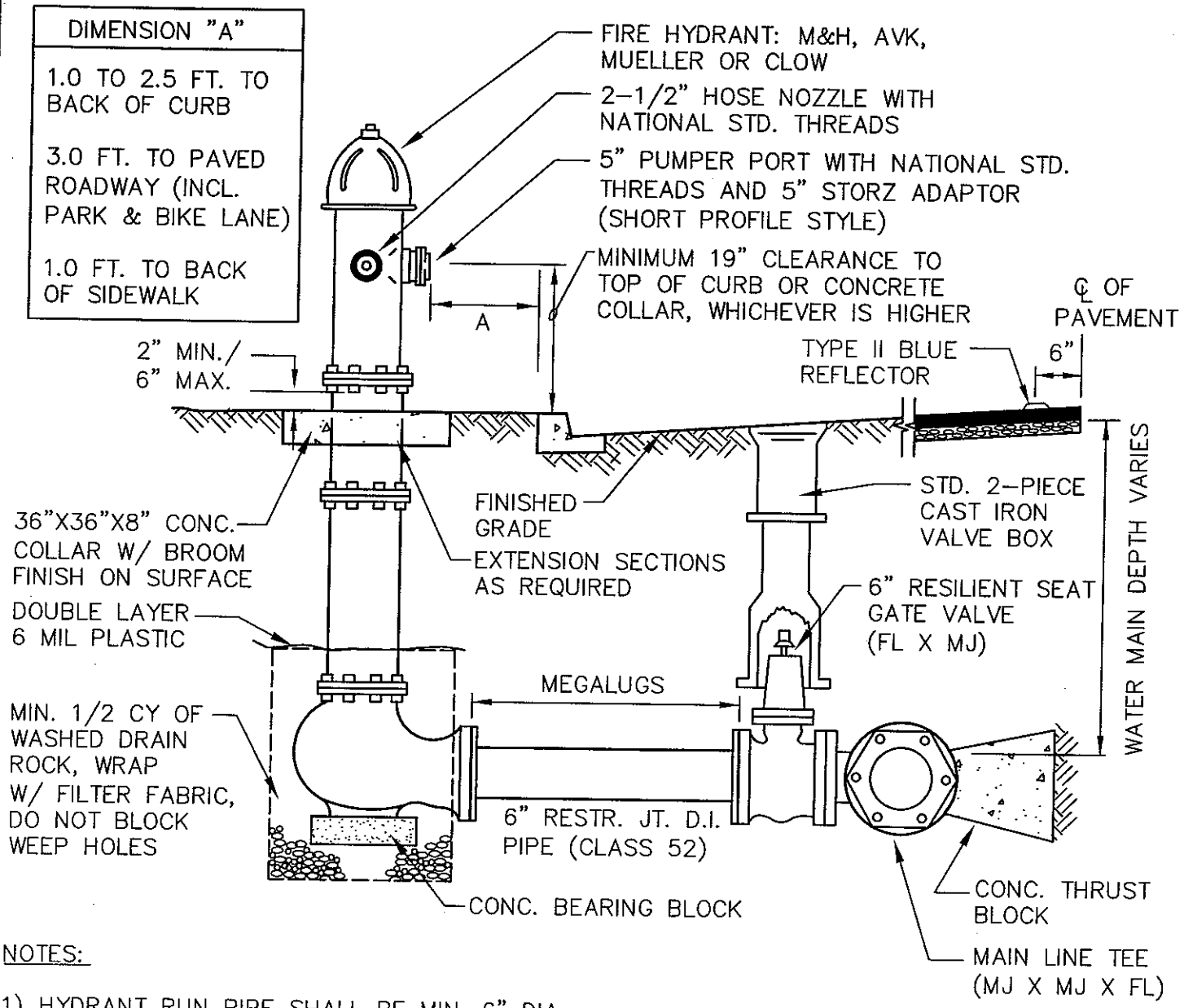
DWG. NO. 8.4-8

DATE:	DRWN:	CHKD:	SCALE:
6/04	P.E.	T.N.	NO SCALE



CITY OF DUPONT			
WATER VALVE STEM EXTENSION			
APPROVED: CITY OF DUPONT DATE			DWG. NO. 8.5
DATE: 10/03	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.

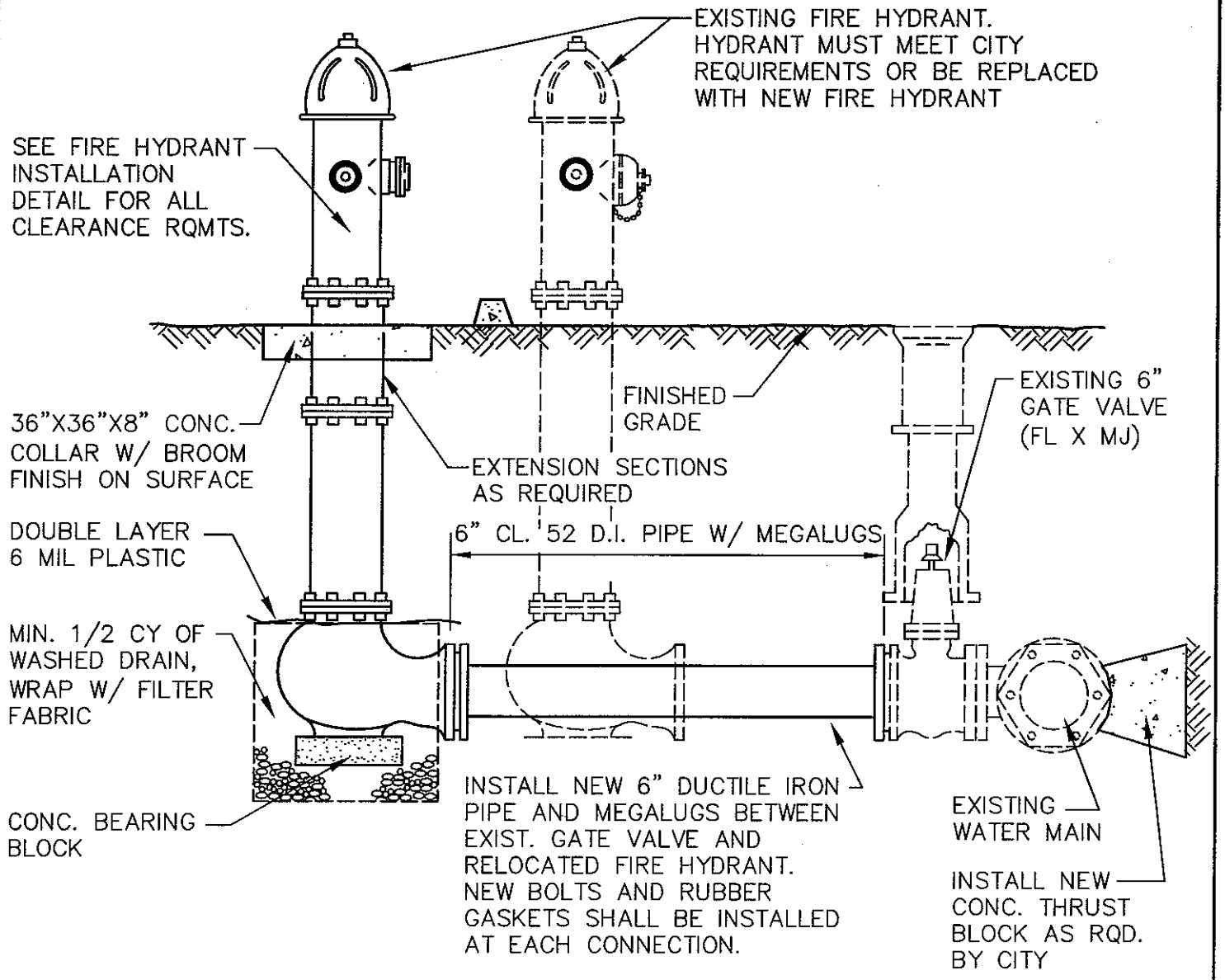
4) INSTALL GUARD POSTS AS RQD. BY CITY.

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 DATE			DWG. NO. 8.6–1
DATE: 8/04	DRWN: J.C.	CHKD: D.J.M.	SCALE: NO SCALE



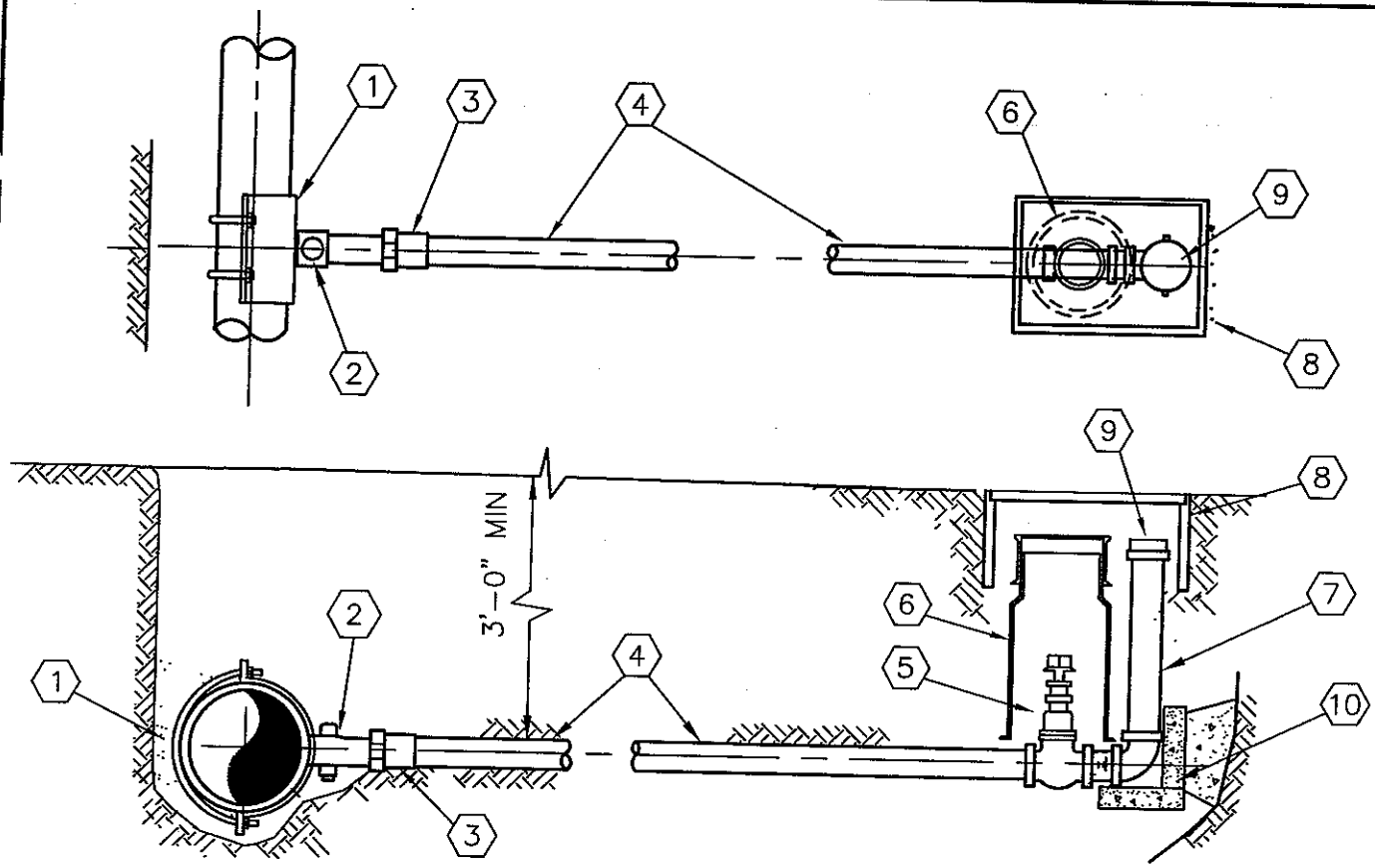
NOTES:

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 DATE			DWG. NO. 8.6-2
DATE: 10/03	DRWN: L.L.	CHKD: T.N.	SCALE: NO SCALE

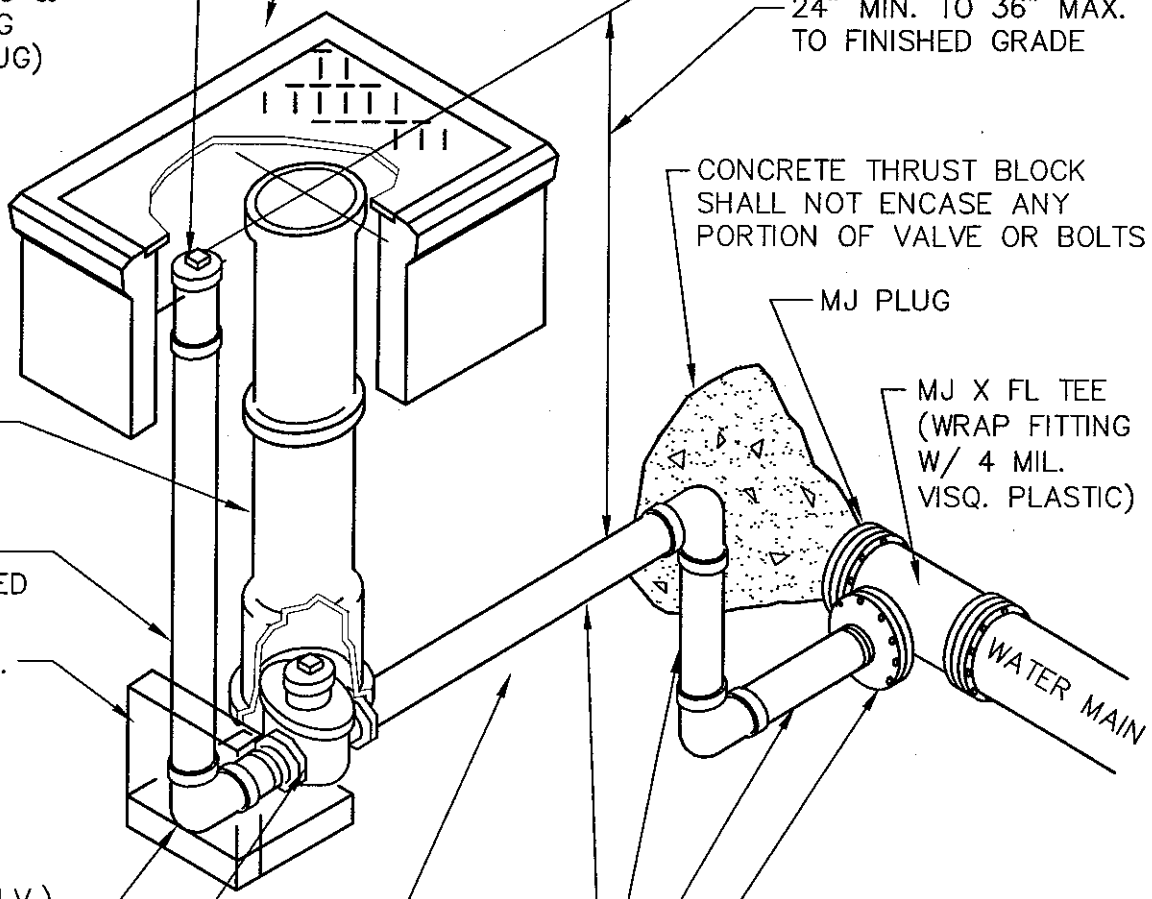


1. D.I. DOUBLE STRAP SERVICE SADDLE
2. 2" CORPORATION STOP
3. ADAPTOR
4. 2" 200 PSI IPS POLY PIPE
5. 2" GATE VALVE WITH SQUARE OPERATING NUT
6. CAST IRON VALVE BOX, RICH 940.
7. 2" GALVANIZED IRON PIPE & FITTINGS
8. METER BOX WITH SOLID LID, FOGTITE B-10, MID-STATES BCF1324-12, OR RAVEN SHALL BE H-20 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.

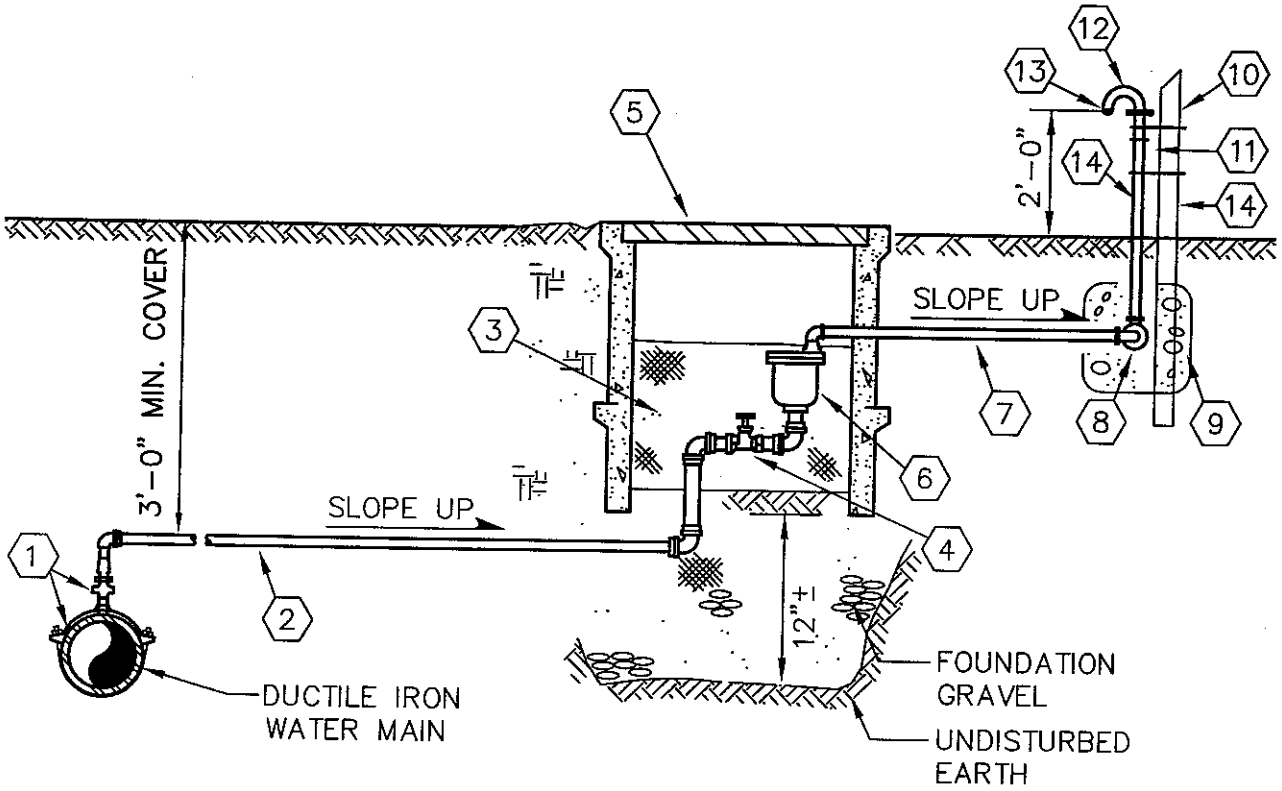
CITY OF DUPONT			
2" IN-LINE BLOWOFF ASSEMBLY			
APPROVED: CITY OF DUPONT DATE			DWG. NO. 8.7-1
DATE: 06/04	DRWN: L.L.	CHKD: T.N.	SCALE: NO SCALE



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 DATE			DWG. NO. 8.7-2
DATE: 06/04	DRWN: L.L.	CHKD: T.N.	SCALE: NO SCALE

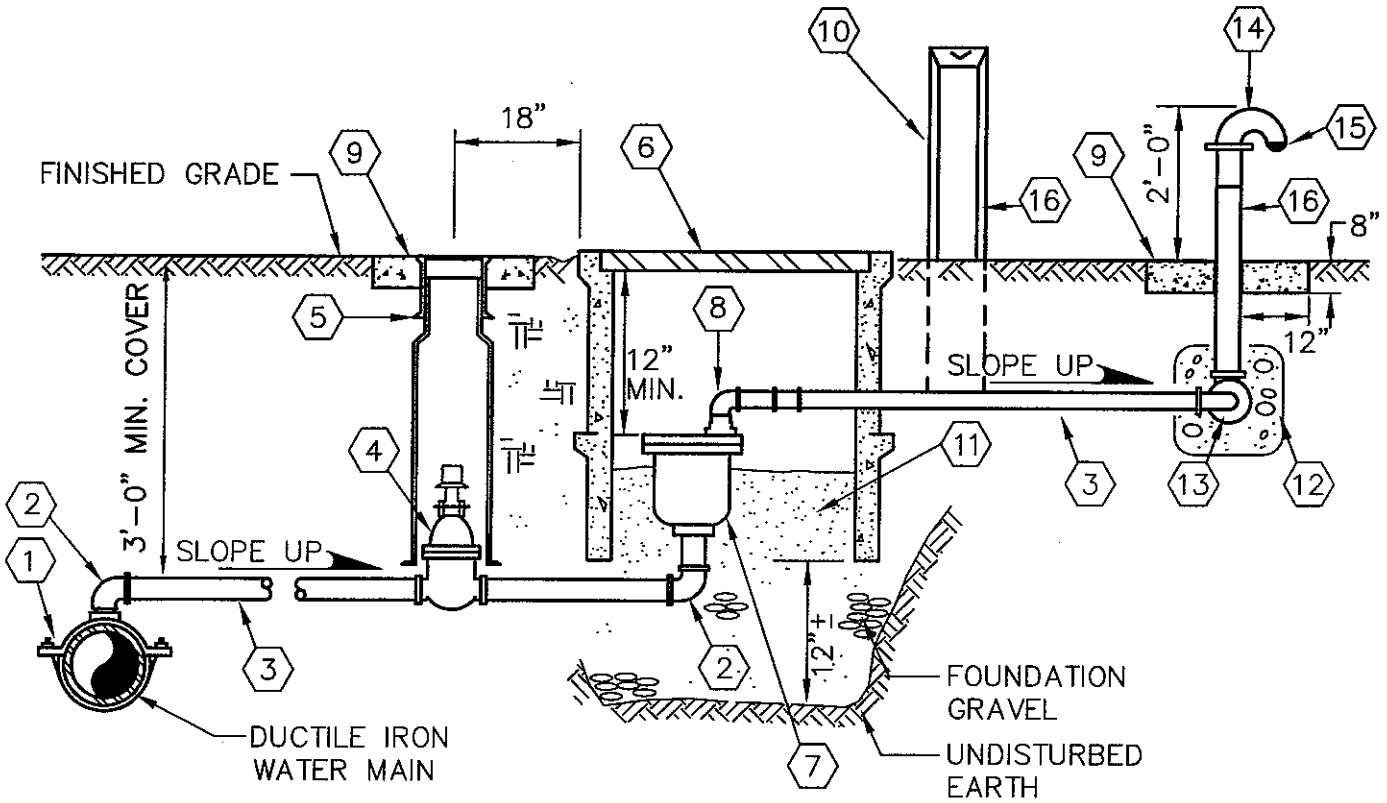


1. DOUBLE STRAP SERVICE CLAMP W/ 1" CORP. STOP
2. 1" WATER SERVICE PIPE (200 PSI IPS POLY PIPE). PIPE SHALL BE SLEEVED WITH 2" SCH. 80 PVC AT ROAD & SIDEWALK CROSSINGS.
3. PEA GRAVEL
4. 1" BALL VALVE (FORD)
5. CONCRETE METER BOX, 17"X28" FOGTITE NO. 2, W/ DIAMOND PLATE STEEL SOLID COVER
6. 1" AIR & VACUUM 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 DATE			DWG. NO. 8.7-3
DATE: 10/03	DRWN: L.L.	CHKD: T.N.	SCALE: NO SCALE

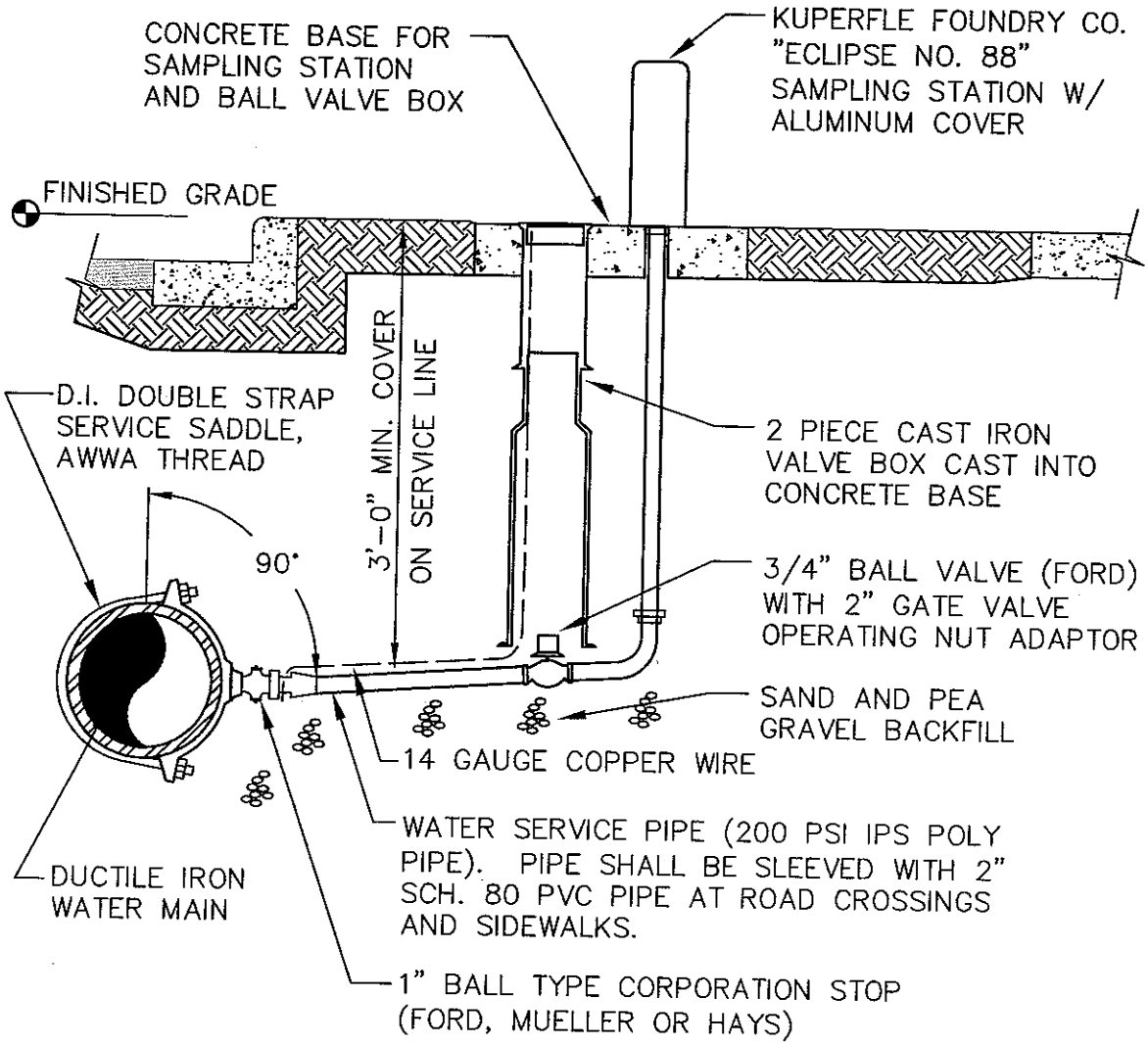


1. DOUBLE STRAP SERVICE CLAMP W/ 2" CORP. STOP
2. 2" SWING JOINT
3. 2" GALVANIZED IRON PIPE
4. 2" AWWA RESILIENT SEAT GATE VALVE W/ OPERATING NUT
5. CAST IRON VALVE BOX
6. CONCRETE METER BOX, 17"X28" FOGTITE NO. 2, W/ DIAMOND PLATE STEEL SOLID COVER
7. 2" AIR & VACUUM RELEASE VALVE, APCO OR CRISPIN MODELS 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.

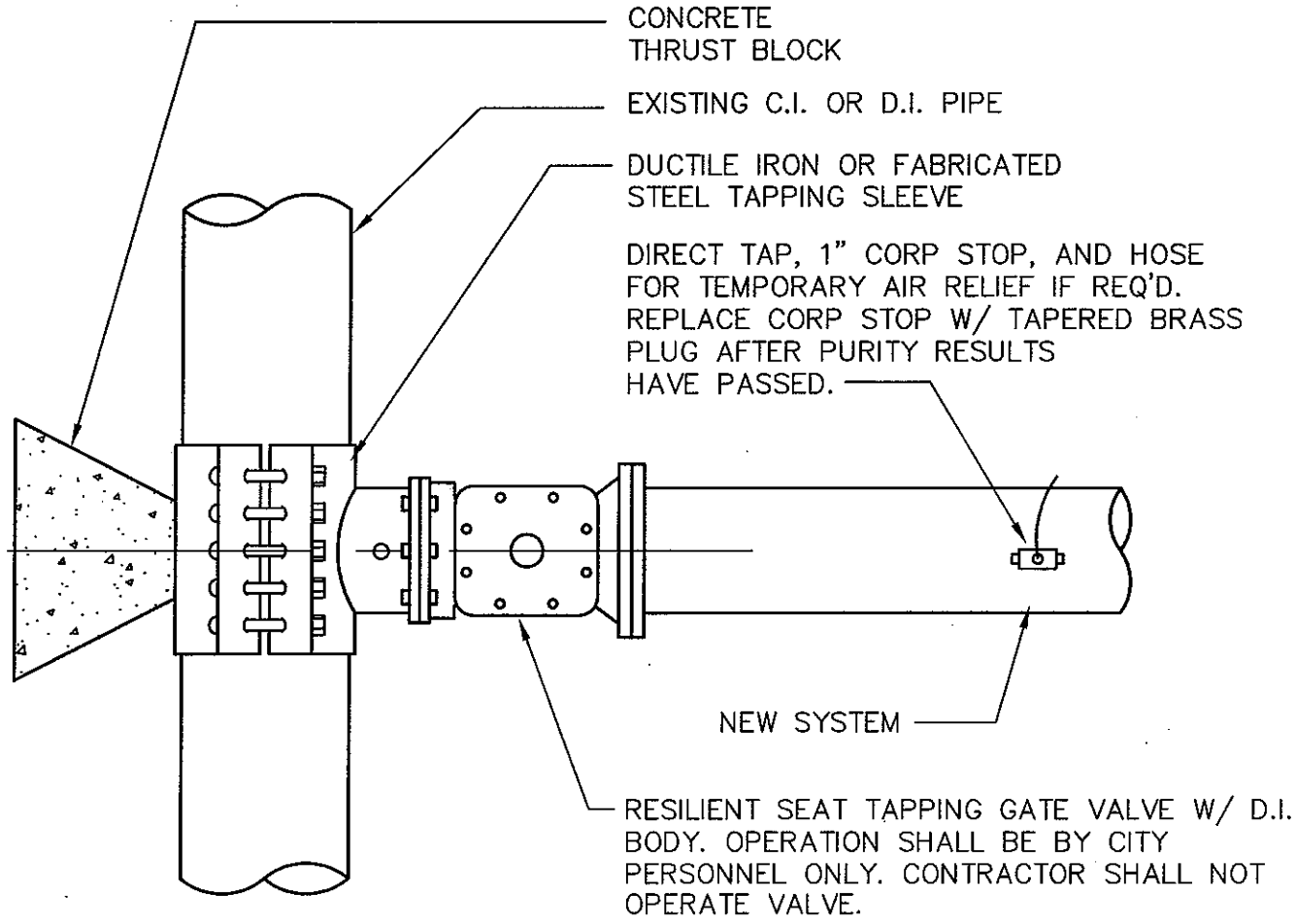
CITY OF DUPONT			
2" AIR & VACUUM RELEASE ASSEMBLY			
APPROVED: CITY OF DUPONT DATE			DWG. NO. 8.7-4
DATE: 10/03	DRWN: L.L.	CHKD: T.N.	SCALE: NO SCALE



NOTES:

1) FOR ADDITIONAL REQUIREMENTS, SEE SECTION 8.8 OF THE PUBLIC WORKS STANDARDS.

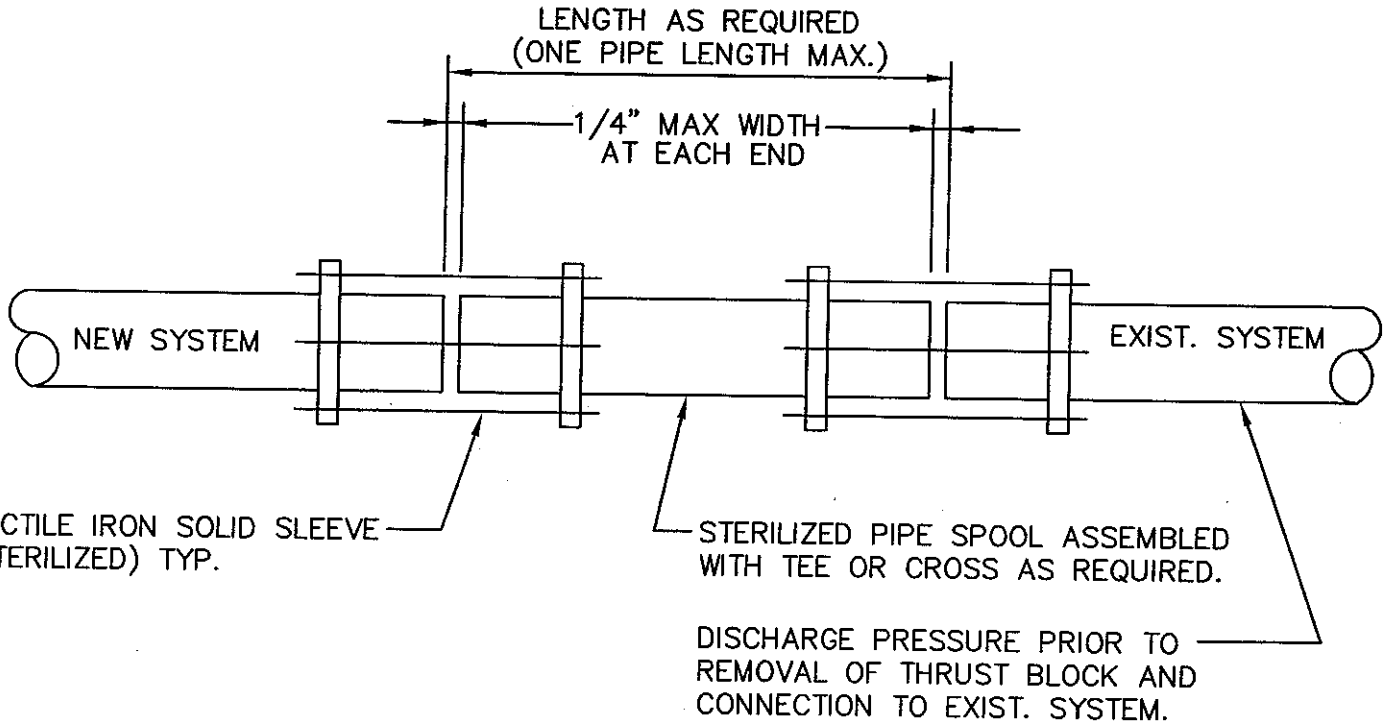
CITY OF DUPONT			
WATER SAMPLING STATION			
APPROVED: CITY OF DUPONT DATE			DWG. NO. 8.8
DATE: 1/04	DRWN: L.L.	CHKD: T.N.	SCALE: NO SCALE



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: CITY OF DUPONT DATE			DWG. NO. 8.10–1
DATE: 10/03	DRWN: L.L.	CHKD: D.J.M.	SCALE: NO SCALE



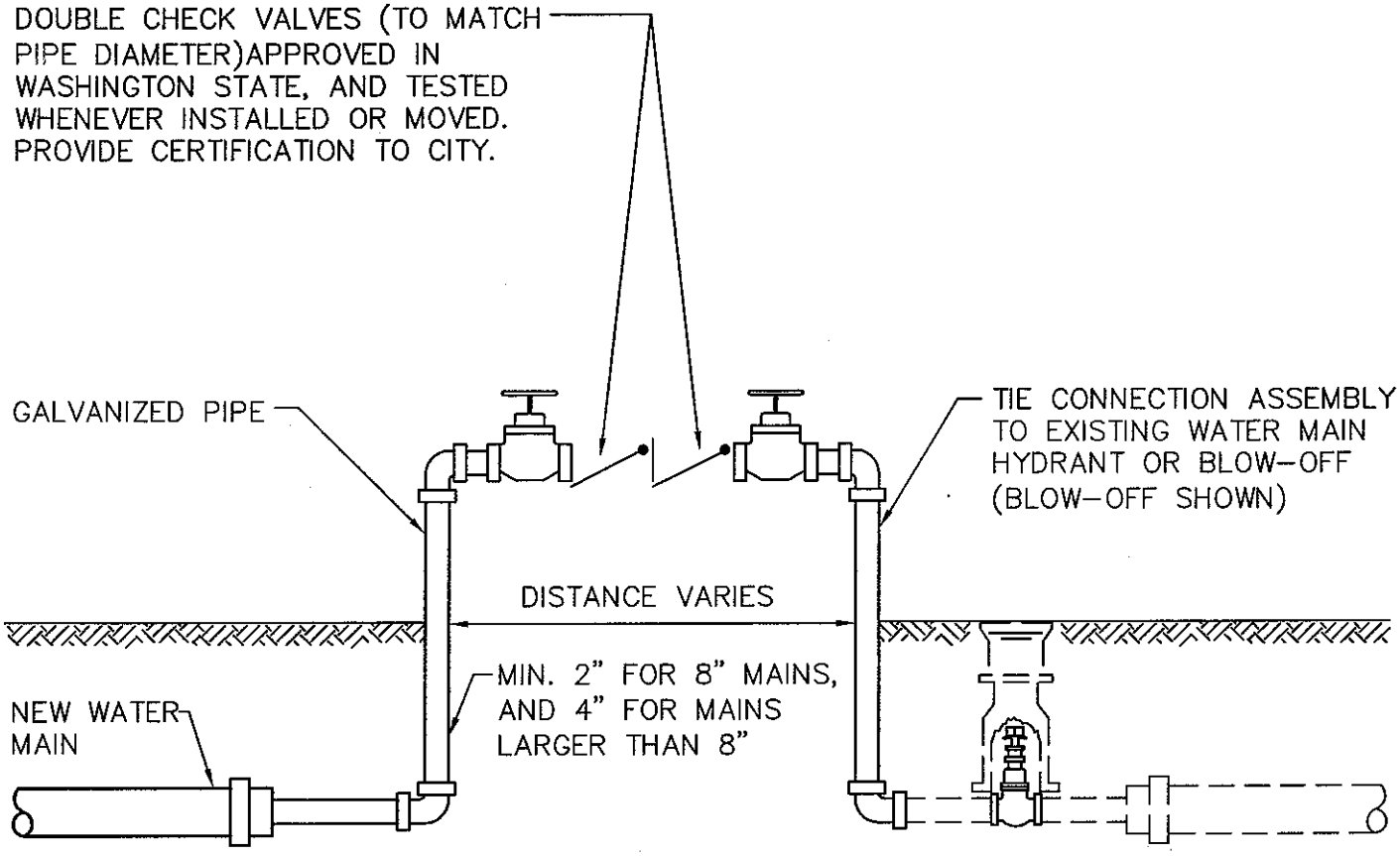
NOTES:

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 DATE			DWG. NO. 8.10-2
DATE: 10/03	DRWN: L.L.	CHKD: D.J.M.	SCALE: NO SCALE



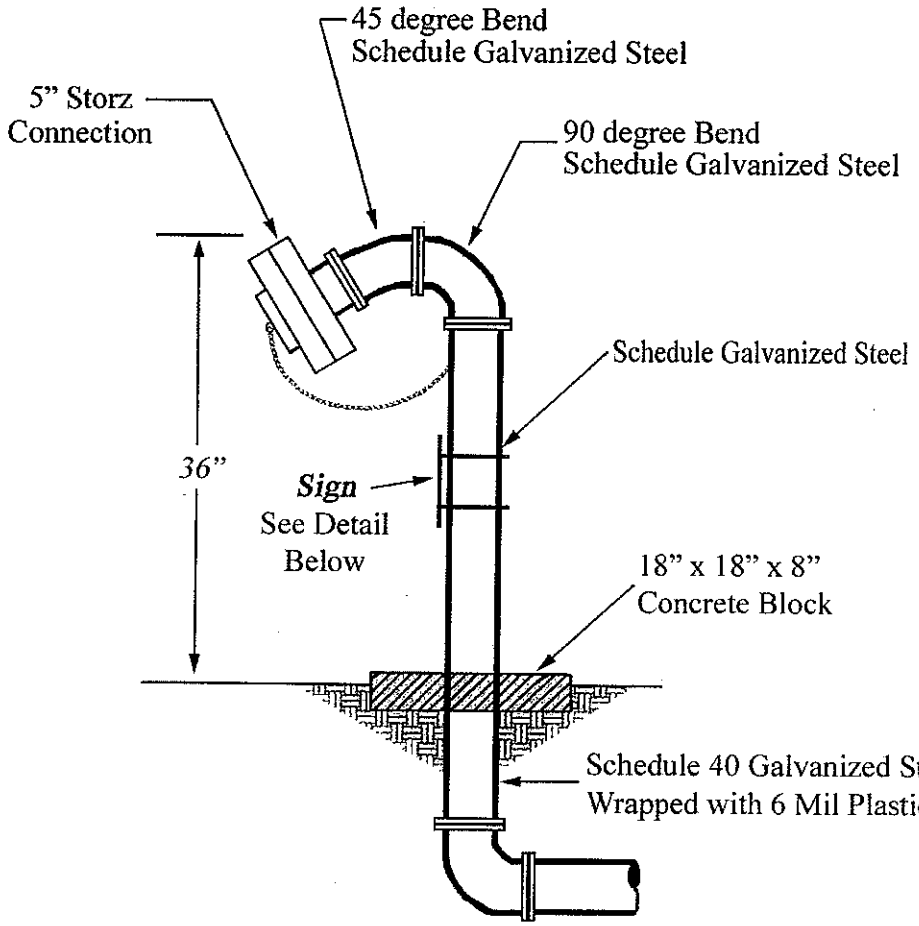
NOTES:

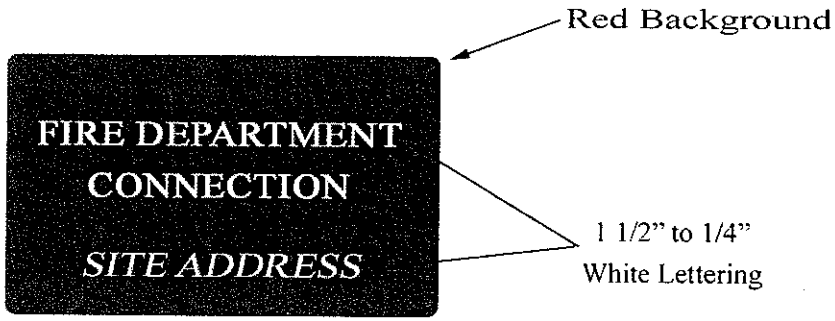
1) PROTECT INSTALLATION FROM DAMAGE AND FREEZING.

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 DATE			DWG. NO. 8.11
DATE: 10/03	DRWN: L.L.	CHKD: T.N.	SCALE: NO SCALE





CITY OF DUPONT			
FIRE DEPARTMENT CONNECTION			
APPROVED: CITY OF DUPONT DATE			DWG. NO. 11.3
DATE: 2/10	DRWN: J.C.	CHKD: D.J.M.	SCALE: NO SCALE

CITY OF DuPONT
WASHINGTON

ORDINANCE NO. 10-908

AN ORDINANCE OF THE CITY OF DuPONT, WASHINGTON, AMENDING DuPONT MUNICIPAL CODE SECTION 21.04.020 RELATED TO ISSUANCE OF PERMITS FOR FIRE HYDRANT USE; AMENDING SECTIONS OF DuPONT MUNICIPAL CHAPTER 21.05 RELATED TO WATER SYSTEM RATES AND CHARGES, AND SPECIFICALLY AMENDING DMC SECTIONS 21.05.010, 21.05.020, 21.05.030, 21.05.040, 21.05.050, AND 21.05.060; ADOPTING NEW DMC SECTION 21.05.021 RELATED TO WATER SERVICE INSTALLATION FEES; ADOPTING NEW DMC SECTION 21.05.022 RELATED TO SYSTEM DEVELOPMENT 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, as a code city, the legislative body of the City of DuPont is vested with all powers possible for a city or town to have under the Constitution of this state, and not specifically denied to code cities by law; and

WHEREAS, RCW Ch. 35.92 authorizes the City of DuPont to construct, condemn and purchase, purchase, acquire, add to, alter, maintain, and operate waterworks, for the purpose of furnishing the City and its inhabitants, and any other persons, with an ample supply of water for all purposes, public and private, with full power to regulate and control the use, distribution, and price thereof; and

WHEREAS, RCW 35.92.025 specifically authorizes the City to charge property owners seeking to connect to the water system of the City, and to charge a reasonable system development charge as determined by the City Council, in order that such property owners shall bear their equitable share of the cost of such system; and

WHEREAS, pursuant to the above described authority, the City Council of DuPont has created a water system utility and adopted regulations, requirements, and procedures applicable thereto, which regulations, requirements, and procedures are codified in Title 21 of the DuPont Municipal Code; and

WHEREAS, the City Council desires to update certain sections of DMC Title 21 to provide for changes to Fire Hydrant Use contained in DMC Chapter 21.04, and the Water System Rates and

Charges contained in DMC Chapter 21.05;

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF DuPONT, WASHINGTON, DO ORDAIN AS FOLLOWS:

Section 1. DMC Section 21.04.020, Amended. DuPont Municipal Code Section 21.04.020 (Issuance of Permits) is hereby amended to read as follows:

21.04.020 Issuance of permits.

The City ~~Clerk~~ may issue hydrant use permits upon application, after consultation with the City ~~Maintenance Superintendent~~Utility Department, for a fee ~~of ten dollars ($10.00)~~as provided for in the ~~latest revision~~most current version of the City fees and charges schedule as adopted by resolution or ordinance of the DuPont City Council.

Section 2. DMC Section 21.05.010, Amended. DuPont Municipal Code Section 21.05.010 (formerly entitled "Building water permit fees" and amended herein to now be entitled "Water meter permit fees") is hereby amended to read as follows:

21.05.010 ~~Building w~~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.~~At the time a building water permit is applied for, the applicant shall pay to the City the building water permit fee as set forth below and for any other charges, if applicable. Permit fees are not refundable.~~

~~(a) For each new building or structure to be connected to the City water system, a charge of $100.00 for a single family home and $135.00 for commercial/multi-family customers will be made.~~

~~(b) For each modification, repair or addition to an existing building's water service where work is done entirely on private property and connected to the City of DuPont water system at a charge of $100.00 for single family homes and $135.00 for commercial/multi family customers will be made.~~

~~(c) For each re-inspection required by the City due to failure of building water construction to comply with State and local construction requirements, a building water re-inspection fee shall be charged in the amount of 70 percent of the original building permit fee.~~

Section 3. DMC Section 21.05.020, Amended. DuPont Municipal Code Section 21.05.020 (formerly entitled "Water service connection fees" and amended herein to now be entitled "Water meter connection fees") is hereby amended to read as follows:

21.05.020 Water ~~service~~ meter connection fees.

A ~~service~~ water meter connection fee, as ~~set forth below~~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 ~~of~~ for each new permanent connection to the water system.

(a) The water meter connection fee for meters up to and including two inches, ~~as listed below,~~ shall include the installation of the meter and associated accessories by the City. ~~The water meter fee does not include source, storage, or distribution capacity.~~

~~Meter Size~~	~~Water Meter Fee~~
~~3/4" and smaller~~	~~$300.00~~
~~1"~~	~~$375.00~~
~~1-1/2"~~	~~$650.00~~
~~2"~~	~~$1,800.00~~

(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) A fee of actual costs (labor, material, and equipment) plus 15 percent shall be charged for water service connections installed by the City.~~

(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.

~~(d) Connection fees for service, storage and transmission outside of LID No. 88-1 boundaries will be determined by the City prior to site plan approval. The connection fee will be based on the cost to provide these facilities.~~

Section 4. New DMC Section 21.05.021, Adopted. A new DuPont Municipal Code Section 21.05.021, to be entitled "Water service installation fees", is hereby adopted to read as follows:

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.

Section 5. New DMC Section 21.05.022, Adopted. A new DuPont Municipal Code Section 21.05.022, to be entitled "System development charge", is hereby adopted to read as follows:

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.

(1) For all new water connections within the SDC area an SDC shall be assessed based upon the following:

(a) Each water connection shall be assigned a "meter equivalent" (ME) factor;

(b) The water connection ME shall be determined based on the proposed water meter size;

(c) The water meter shall be sized in accordance with the current adopted plumbing code as amended and adopted by Chapter 12 of the DuPont Municipal code;

(d) 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;

(e) 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)

(f) 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.

Section 6. DMC Section 21.05.030, Amended. DuPont Municipal Code Section 21.05.030 (Water meter test deposit) is hereby amended to read as follows:

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.

Section 7. DMC Section 21.05.040, Amended. DuPont Municipal Code Section 21.05.040 (formerly entitled "'Turn on' charges" and amended herein to now be entitled "'Turn on' charges – restoration of service") is hereby amended to read as follows:

21.05.040 "Turn on" charges – restoration of service.

~~The~~ 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 ~~$25.00~~assessed for each "turn on" to restore water service after it has been discontinued by the City for any reason ~~as described within the City ordinance regulating the use of water~~ (subject to overtime charges for after hour service).

Section 8. DMC Section 21.05.050, Amended. DuPont Municipal Code Section 21.05.050 (Service trip charge) is hereby amended to read as follows:

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 ~~latest~~most current version of the City fee and charges schedule as adopted by resolution or ordinance of the DuPont City Council ~~of $25.00 (subject to overtime charges for after hour service)~~.

Section 9. DMC Section 21.05.060, Amended. DuPont Municipal Code Section 21.05.060 (Rates) 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 resolution of the DuPont City Council, which shall be on file with the office of the City Clerk.

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 are included in the City fees and charges schedule.

(d) Payment and Penalties. ~~Payments are due upon receipt of billing. A late penalty of 10 percent of the outstanding balance will be assessed 30 days after the billing date. Shut off notices will be sent 60 days after the billing date for all unpaid bills. The customer shall have seven days after the shut off notice is sent to pay the delinquent account in full. If not paid, customer's service will be shut off. To turn service back on, customer must pay all delinquent charges, including penalties, along with a turn on fee as established in the City fees and charges schedule. Payment arrangements may be made with the Utility Department. Any such arrangements must be in writing and signed by the customer and the Department. In any event, payments made by arrangement must pay the delinquent account in full within 60 days of the original shut off notice. Failure to adhere to the payment arrangements will result in immediate shut-off of water service.~~Billing, payment and penalty procedures associated with water utility services shall be as provided for in DMC 17.02. ~~Partial payments received will be applied first in the following order:~~

~~(1) Turn on/account set up fees;~~

~~(2) Outstanding penalties;~~

~~(3) Outstanding delinquent charges;~~

~~(4) All stormwater/surface water charges;~~

~~(5) All water charges.~~

(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, ~~the~~ 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 customer may, at his or her option, instruct the City of DuPont to apply the deposit towards the final bill.~~ The required deposit for water accounts is included in the City fees and charges schedule.

(f) Undeveloped Land Charge. For 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 10. 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 11. Effective Date. This Ordinance shall be published in the official newspaper of the City, and shall take effect and be in full force on January 1, 2011.

ADOPTED BY THE CITY COUNCIL AT A REGULAR MEETING THEREOF ON THE 9th DAY OF November 2010.

CITY OF DuPONT

Tamara L. Jenkins, Mayor

ATTEST/AUTHENTICATED:

Erin Larsen, City Clerk

Approved as to form:

Bob Sterbank, City Attorney

Filed with the City Clerk: 11-12-10
Passed by the City Council: 11-9-10
Date of Publication: 11-16-10
Effective Date: 11-21-10

Ord. No. 10-908

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City of DuPont, WA Municipal Code

Current through Ordinance 10-905, passed October 12, 2010

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.

Chapter 21.01
Water Supply System

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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).

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 PcPT. 20500P
Water Purveyor

Gilland F. Schubert
Representative

Mayor
Title

Receipt Acknowledged:

Tacoma-Pierce County Health Department

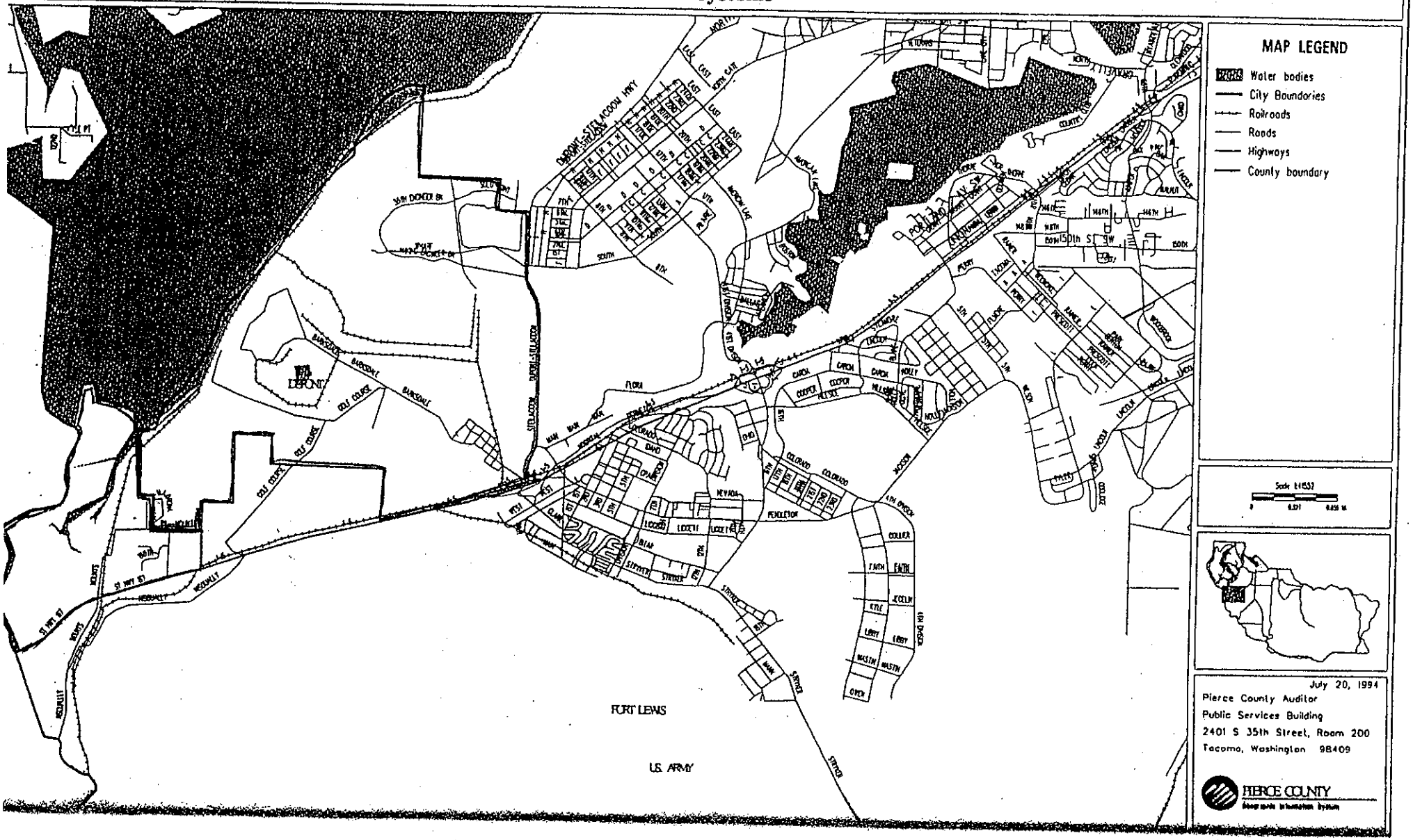
Date

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 \

10/6/00
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

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

Fact Sheet

Municipal Water Law

Duty to Provide Service Requirement

July 2009
DOH 331-366
(Revised)

Municipal water suppliers have a duty to provide service to all new connections within their retail service area when the circumstances meet four threshold factors:*

1. The municipal water supplier has sufficient **capacity** to serve water in a safe and reliable manner.
2. The service request is **consistent** with adopted local plans and development regulations.
3. The municipal water supplier has sufficient **water rights** to provide service.
4. The municipal water supplier can provide service in a **timely and reasonable** manner.

* RCW 43.20.260 *Review of water system plan, requirements – Municipal water suppliers, retail service*

Retail Service Area

The municipal water supplier determines the retail service area and identifies it in its Water System Plan. The retail service area must include all areas where the municipal water supplier currently provides service, and may include areas where new service is proposed. The supplier may extend water service outside the retail service area to provide temporary service for a neighboring water system, if there is a written agreement in place.

Threshold Factors

A municipal water supplier must describe in its Water System Plan how it intends to meet the four threshold factors within the retail service area. A municipal water supplier must provide service for all requests within the retail service area, unless it describes how a situation does not meet one or more of the four threshold factors.

Water System Plans must address the four threshold factors as follows:

1. **Capacity:** Municipal water suppliers must include a capacity determination in their Water System Plan. Capacity determinations incorporate a water system's physical capacity (source, and storage) and water right limitations.
2. **Consistency:** Consistency applies to locally adopted comprehensive plans, land use plans, development regulations, and utility service extension ordinances. Consistency determinations must evaluate land use, six-year growth projections, service extension ordinances, new water service provisions, and other elements Department of Health (DOH) determines related to water supply planning. Municipal water suppliers must ask local governments to determine consistency. If the local government does not complete the determination, the municipal water supplier must document efforts to be consistent and determine consistency. DOH will make the final consistency determination.

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

3. **Water Rights:** Department of Ecology is responsible for water right sufficiency determinations. Municipal water suppliers must include a water right self-assessment in their Water System Plans. DOH will forward a copy of the Water System Plan and water right self-assessment to Ecology for review. We will incorporate water rights into capacity determinations.
4. **Timely and Reasonable:** Municipal water suppliers must include their service policies in their Water System Plan. They also must describe how they will provide new service. DOH will provide guidance about the timely and reasonable concept under the Municipal Water Law.

For More Information

If you have technical questions or concerns, contact:

Linda Kildahl, Technical Assistant to Field Operations
Phone: (360) 236-3186
E-mail: linda.kildahl@doh.wa.gov

Additional fact sheets on Municipal Water Law are online at
http://www.doh.wa.gov/ehp/dw/municipal_water/plan_eng.htm

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

The Department of Health is an equal opportunity agency. For persons with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TTY 1-800-833-6388). For additional copies of this publication, call 1-800-521-0323. This and other publications are available at http://www.doh.wa.gov/ehp/dw

CITY OF DuPONT
1700 Civic Drive · DuPont, WA 98327
Phone: (253) 912-5381 · Fax: (253) 964-1455
www.ci.dupont.wa.us

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.

Printed 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 _____ Existing Source Capacity_____

Number of current/existing users_____ Existing Storage_____

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 Printed Name Date

*****NOTE: Completion of page 2 and water purveyor signature are required*****

CITY OF DuPONT
1700 Civic Drive · DuPont, WA 98327
Phone: (253) 912-5381 · Fax: (253) 964-1455
www.ci.dupont.wa.us

FLOW AND PRESSURE FOR FIRE SUPPRESSION DESIGN

Project Name: _____

Project Location: _____

Developer's Engineer: _____

Telephone: _____

Date: _____

Minimum Fire Flow per Ordinance No 98-614: _____

Required Fire Flow per U.F.C. 1997: _____

1998 Water System Model (see notes 2, 3 and 4 below):

Street Intersection: _____

Node Number: _____

Static Pressure: _____

Fire Flow: _____

Residual Pressure: _____

Fire Suppression System Design Criteria (see note 5 below):

Street Intersection: _____

Static Pressure: _____

Fire Flow: _____

Residual Pressure: _____

Notes:

1. Actual fire flow will be based on building construction type and building square footage with credits for fire sprinklers.
2. The 1998 Water System Model results are based on the build out condition using the land use indicated in the 1995 Comprehensive Plan.
3. Available fire suppression storage is based on the criteria presented in the 1995 Comprehensive Plan, which is defined as 3,000 gpm for 3 hours, or 530,000 gallons.
4. Pipe velocities are limited to 10 feet/second in pipes used for fire flow runs.
5. The model results have been adjusted per City policy. The policy reduces the model results as follows:
   - Static pressure is reduced by 10 psi
   - Available fire flow is reduced by 10% at a minimum allowable pressure of 20 psi

Cc: Public Works Department, Building Department, Fire Department

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: _____

City of Dupont

_____ _____
Authorized Signature Title

Dated: _____

Fort Lewis

_____ _____
Authorized Signature Title

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_____

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 government 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 ~~monthly~~ quarterly to the Purchaser by the Govemment. 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

APPENDIX D

WATER QUALITY SAMPLING EXCEEDANCES

SUMMARY OF THE WATER QUALITY REGULATIONS

WATER QUALITY REGULATIONS

BACKGROUND

The Safe Drinking Water Act (SDWA) of 1974, amended in 1986 and 1996, established specific roles for the federal government, state government, and water system purveyors, with respect to water quality monitoring. The US Environmental Protection Agency (EPA) is authorized to develop national drinking water regulations and oversee the implementation of the act. Once the federal regulations become effective (i.e. promulgated), the States may adopt the federal law and accept the primary responsibility for implementation and enforcement of the law.

In Washington State, State Drinking Water Regulations are published in Washington Administrative Code (WAC) 246-290. These regulations establish monitoring requirements, maximum contaminant levels, and requirements for follow-up actions. The latest version of the WAC is July 1994, which incorporates the SDWA regulations.

On August 6, 1996, additional amendments to the Safe Drinking Water Act were enacted as public law (PL) 104-182. The 1996 amendments updated the regulations concerning arsenic, radon, groundwater disinfection and filtration, as well as authorized more than $12 billion in federal funds for various drinking water programs through the year 2003. These new regulations have not yet been incorporated into Washington State law.

Minimum standards for water quality are specified in terms of Maximum Contaminant Levels (MCLs). Primary MCLs are based on chronic and/or acute human health effects. Secondary MCLs are based on factors other than health effects, including aesthetics.

Public water suppliers have the responsibility of meeting the requirements of the regulations on a day-to-day basis. Monitoring requirements are often established for regulated contaminants to ensure that water systems demonstrate compliance with MCLs or treatment technique requirements. Public water suppliers are also required to retain certain records and submit reports to the Washington State Department of Health (DOH).

EXISTING DRINKING WATER REGULATIONS

Bacteriological

Coliform bacteria describes a broad category of organisms routinely monitored in potable water supplies. Though not all coliform bacteria are pathogenic in nature, they are relatively easy to identify in laboratory analysis. If coliform bacteria are detected, then

pathogenic organisms may also be present. Bacterial contamination in a water supply can cause a number of water borne diseases, so these tests are strictly monitored and regulated by the DOH.

The Coliform Monitoring Rule specifies two types of violations, "nonacute MCL" and "acute MCL". A purveyor is required to notify both the DOH and system consumers if either MCL violation occurs. A violation of bacteriological MCLs occurs during routine sampling when:

- Coliform is detected in more than one sample in a single month (nonacute MCL);
- Coliform is present in a set of repeat samples collected as a follow-up to a sample with fecal coliform or E. coli presence (acute MCL);
- Fecal coliform or E. coli is present in a repeat sample after coliform was detected in the routine sample (acute MCL).

Systems must monitor for coliform in accordance with their Coliform Monitoring Plan.

Residual Disinfectant

WAC 246-290-300, -440, and –664 require residual disinfectant concentration monitoring on a daily basis. For filtered systems serving more than 3,300 people each month, WAC 246-290-664 requires continuous monitoring of the residual disinfectant concentration of water entering the distribution system, with the lowest value reported each day. For distribution systems, residual disinfectant concentration at representative points is required to be measured on a daily basis, or as otherwise approved by the DOH. At a minimum, residual disinfectant concentration within the distribution system must also be measured at the same time and location that routine coliform samples are collected. Water in the distribution system must contain a residual disinfectant concentration throughout the distribution system.

Lead and Copper

In 1991, the EPA promulgated the Federal Lead and Copper Rule (LCR). The State of Washington adopted this rule in 1995, with minimal changes. The LCR is intended to reduce the tap water concentrations of lead and copper that can occur when corrosive source water causes lead and copper to leach from water meters and other plumbing fixtures.

The LCR requires an initial monitoring phase, in which tow rounds of water sampling are conducted for lead and copper. If the Action Levels of 0.015 mg/L for lead and 1.3 mg/L for copper are exceeded in more than 10 percent of the samples, the water system is required to take additional action to reduce lead and copper concentrations.

Consumer Confidence Report (CCR)

This rule was finalized on August 19, 1998. The Consumer Confidence Report Rule requires community water system purveyors to prepare and distribute an annual report of water quality analyses to their customers. Purveyors are required to submit the Consumer Confidence Report (CCR) to their customers before the 1st of July each year.

Stage 1 Disinfectants/Disinfection Byproducts Rule (DBPR)

Trihalomethanes (THMs) are a group of organic compounds that can be formed as a result of drinking water disinfection by chlorine, and are often referred to as disinfection byproducts. TTHMs include the sum of the concentrations of four disinfection byproducts, including trichloromethane, bromodichloromethane, dibromochloromethane, and tribromomethane. Under Stage 1 of the DBPR, the MCL for TTHMs is 0.08 mg/L (80 µg/L) and is based on the running annual average of four samples, one per quarter. The MCL for HAA5 is 0.06 mg/L (60 µg/L) and is based on the running annual average of four quarterly samples.

The Stage 1 D/DBP Rule became effective for large surface water systems in January of 2002. Small systems and groundwater systems had to be in compliance by January 2004. This rule is aimed at water systems that introduce a disinfectant during any part of the treatment process.

Systems are also required to have a percent reduction in Total Organic Carbon (TOC) found in the source water. The reduction in TOC required is dependent upon treatment techniques.

IOCs, VOCs and SOCs

The State of Washington has adopted Federal MCLs and monitoring regulations for inorganic chemicals and physical parameters (IOCs), volatile organic compounds (VOCs), and synthetic organic compounds (SOCs). The Federal standards were originally promulgated in the Phase I Rule and updated in the Phase II and Phase V Rules. Lists of current state MCLs for IOCs, VOCs, and SOCs is provided below.

TABLE 1

Primary Water Quality Standards Inorganic Chemical Characteristics[1]

Chemical	Primary MCL (mg/L)
Antimony (Sb)	0.006
Arsenic (As)	0.01
Asbestos	7 million fibers/liter (length > 10 microns)
Barium (Ba)	2.0
Beryllium (Be)	0.004
Cadmium (Cd)	0.005
Chromium (Cr)	0.1
Copper (Cu)	[2]
Cyanide (HCN)	0.2
Fluoride (F)	4.0
Lead (Pb)	[2]
Mercury (Hg)	0.002
Nickel (Ni)	0.1
Nitrate (as N)	10.0
Nitrite (as N)	1.0
Selenium (Se)	0.05
Sodium (Na)	[2]
Thallium (Tl)	0.002

(1) Source: DOH Drinking Water Regulations, effective April 1999.

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

TABLE 2

Secondary Water Quality Standards Inorganic Chemical and Physical Characteristics[1]

Chemical/Characteristic	Secondary MCL (mg/L)
Chloride (Cl)	250.0
Fluoride (F)	2.0
Iron (Fe)	0.3
Manganese (Mn)	0.05
Silver (Ag)	0.1
Sulfate (SO4)	250.0
Zinc (Zn)	5.0
Color	15 Color Units
Hardness	None Established
Specific Conductivity	700 umhos/cm
Total Dissolved Solids (TDS)	500

Source: State DOH Drinking Water Regulations, effective April 1999.

TABLE 3

Regulated VOCs and SOCs

Organic Chemical	Federal Regulation	Primary MCL (mg/L)[1]	Organic Chemical	Federal Regulation	Primary MCL (mg/L)[1]
Volatile Organic Chemicals (VOCs)					
Vinyl Chloride	Phase I	0.002	Monochlorobenzene	Phase II	0.1
Benzene	Phase I	0.005	Ortho-Dichlorobenzene	Phase II	0.6
Carbon Tetrachloride	Phase I	0.005	Styrene	Phase II	0.1
1,2-Dichloroethane	Phase I	0.005	Tetrachloroethylene	Phase II	0.005
Trichloroethylene	Phase I	0.005	Toluene	Phase II	1
para-Dichlorobenzene	Phase I	0.075	Trans-1,2-Dichloroethylene	Phase II	0.1
1,1-dichloroethylene	Phase I	0.007	Xylenes (total)	Phase II	10
1,1,1-Trichloroethane	Phase I	0.2	Dichloromethane	Phase V	0.005
cis-1,2-Dichloroethylene	Phase II	0.07	1,2,4-Trichloro-benzene	Phase V	0.07
1,2-Dichloropropane	Phase II	0.005	1,1,2-Thrichloro-ethane	Phase V	0.005
Ethylbenzene	Phase II	0.7			
Synthetic Organic Chemicals (SOCs)					
Arochlor	Phase II	0.002	2,4,5-TP	Phase II	0.05
Aldicarb	Phase II[2]	0.003	Benzo(a)pyrene	Phase V	0.0002
Aldicarb sulfone	Phase II[2]	0.003	Dalapon	Phase V	0.2
Aldicarb sulfoxide	Phase II[2]	0.004	Di(2-ethylhexyl) adipate	Phase V	0.4
Atrazine	Phase II	0.003	Di(2-ethylhexyl) phthalate	Phase V	0.006
Carbofuran	Phase II	0.04	Dinoseb	Phase V	0.007
Chlordane	Phase II	0.002	Diquat	Phase V	0.02
Dibromochloro-propane	Phase II	0.0002	Endothall	Phase V	0.1

TABLE 3 – (continued)

Regulated VOCs and SOCs

Organic Chemical	Federal Regulation	Primary MCL (mg/L)[1]	Organic Chemical	Federal Regulation	Primary MCL (mg/L)[1]
2,4-D	Phase II	0.07	Endrin	Phase V	0.002
Ethylene dibromide	Phase II	0.00005	Glyphosate	Phase V	0.7
Heptachlor	Phase II	0.0004	Hexachlorobenzene	Phase V	0.001
Heptachlor epoxide	Phase II	0.0002	Hexachloro Cyclopentadiene	Phase V	0.05
Lindane	Phase II	0.0002	Oxamyl (vydate)	Phase V	0.2
Methoxychlor	Phase II	0.04	Picloram	Phase V	0.5
Polychlorinated biphenyls (PCBs)	Phase II	0.0005	Simazine	Phase V	0.004
Pentachlorophenol	Phase II	0.001	2,3,7,8-TCDD (dioxin)	Phase V	$3x10^{-8}$
Toxaphene	Phase II	0.003			

(1) 40 CFR 141.61(a) & (c); adopted by State Board of Health, effective April 1999

(2) Delayed; re-proposal of MCLs for aldicarb compounds expected in the future.

Information Collection Rule (ICR)

The Information Collection Rule (ICR) generates large volumes of data on the occurrence of microbiological agents, disinfection by-products, and treatment for a variety of surface waters across the country. The ICR specifies which systems are required to comply based on service area population. Systems serving 100,000 people or more are required to conduct monitoring under the ICR.

Radionuclides Rule

Existing state law requires monitoring of existing drinking water sources for radionuclides. Radionuclides include radioactive substances occurring naturally in surface waters. Regulated substances include radium-226, radium-228, uranium, and gross alpha and beta particles.

Table 4 summarizes radionuclide MCLs as defined by EPA's Radionuclide Rule and Washington State Department of Health's WAC 246-290.

TABLE 4

Radionuclide MCLs

Radionuclide	MCL
Radium – 226	3 pCi/L
Radium – 228	20 pCi/L
Combined Radium - 226 and 228	5 Ci/L
Uranium	20 µg/L
Gross Alpha (excluding Uranium)	15 pCi/L
Gross Beta	4 millirem

WAC 246-290 requires radionuclide samples once every four years.

Interim Enhanced Surface Water Treatment Rule (IESWTR)

The purpose of the IESWTR is to improve control of microbial pathogens, specifically the protozoan Cryptosporidium, in drinking water and address risk trade-offs with disinfection byproducts. The rule requires systems to meet strengthened filtration requirements as well as to calculate levels of microbial inactivation to ensure that microbial protection is not jeopardized if systems make changes to comply with disinfection requirements of the Stage 1 Disinfection and Disinfection Byproducts Rule (DBPR). The IESWTR applies to public water systems that use surface water or ground water under the direct influence of surface water and serve more than 10,000 people.

Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR)

The LT1ESWTR applies to public water systems that use surface water or groundwater under the direct influence of surface water and serve fewer than 10,000 persons. The LT1ESWTR builds upon the framework established for systems serving a population of 10,000 or more in the IESWTR.

Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR)

The LT2ESWTR builds upon the existing LT1ESWTR to further address *Cryptosporidium* in high risk surface water systems.

Under the LT2ESWTR, systems will monitor their water sources to determine treatment requirements. This monitoring includes an initial two years of monthly sampling for *Cryptosporidium*. To reduce monitoring costs, small filtered water systems will first monitor for *E. coli*—bacterium which is less expensive to analyze than *Cryptosporidium*—and will monitor for *Cryptosporidium* only if their *E. coli* results exceed specified concentration levels.

Monitoring starting dates are staggered by system size, with smaller systems beginning monitoring after larger systems. Systems must conduct a second round of monitoring six years after completing the initial round to determine if source water conditions have changed significantly. Systems may use (grandfather) previously collected data in lieu of conducting new monitoring, and systems are not required to monitor if they provide the maximum level of treatment required under the rule.

This summary of the LT2ESWTR was taken from, and more details are available at, the following web site:

http://www.epa.gov/safewater/disinfection/lt2/regs_factsheet.html

Filter Backwash Recycling Rule

The Filter Backwash Recycling Rule relates to those systems that recycle filter backwash water. The rule is intended to ensure that the 2-log Cryptosporidium removal requirement established in the IESWTR and the LT1ESWTR is not jeopardized by recycle practices.

Unregulated Contaminant Monitoring Rule (UCMR)

The 1996 amendments to the SDWA require EPA to publish a list of non-regulated contaminants every five years, which may warrant regulation due to their health effects and their potential for occurrence in public water systems. The rule was published on September 17, 1999 and supplemented on March 2, 2000 and January 11, 2001. The data generated by the UCMR will be used to evaluate and prioritize contaminants on the Drinking Water Contaminant Candidate List.

Three different lists of contaminants based on the availability of established analytical methods are included in the Rule. These lists are included as Table 5. List 1 includes 12 chemical contaminants for which analytical methods exist. Monitoring of List 1 contaminants is to occur at approximately 2,800 large water systems and a representative sample of 800 small water systems. The monitoring results from these systems will be used to estimate national occurrence of the 12 contaminants on List 1. Surface water systems will monitor quarterly during a 1-year period and groundwater systems will monitor twice in a 1-year period. Assessment monitoring was to be done within the three years of 2001 to 2003, which allowed coordination with the 3-year compliance (for regulated contaminants) monitoring cycle. One of these quarterly or semi annual sampling events was to occur in the most vulnerable period of May through July, or an alternate vulnerable period designated by the State.

List 2 contaminants are those for which analytical methods have just been developed and for which EPA has less occurrence data than the contaminants on List 1. Monitoring for List 2 contaminants occurred in 2001 through 2003 for a randomly selected set of 300 large and small systems. List 3 contaminants have in recent years emerged as drinking water concerns and, in most cases, only have methods in an early stage of development. Monitoring of List 3 contaminants will be performed only after future rulemaking specifies methods.

TABLE 5

UCMR Monitoring List

List 1: Assessment Monitoring of Contaminants with Available Methods	List 2: Screening Surveys of Contaminants with Methods Just Developed	List 3: Pre-Screen Testing of Contaminants Needing Research on Methods
2,4-dinitrotoluene	1,2-diphenylhydrazine	Lead-210
2,6-dinitrotoluene	2-methyl-phenol	Polonium-210
Acetochlor	2,4-dichlorophenol	Cyanobacteria
DCPA mono-acid degradate	2-4-dinitrophenol	Echoiruses
DCPA di-acid degradate	2, 4, 6-trichlorophenol	Coxsackieviruses
4, 4'-DDE	Diazinon	Helicobacter pylori
EPTC	Disulfoton	Microsporidia
Molinate	Diuron	Caliciviruses
MTBE	Fonofos	Adenoviruses
Nitorbenzene	Linuron	
Perchlorate	Nitrobenzene	
Terbacil	Prometon	
	Terbufos	
	Aeromonas(1)	
	Alachlor ESA(2)	
	RDX(2)	

(1) The Screening Survey for Aeromonas occurred in 2003. Applicable public water systems were notified.

(2) The monitoring period for Alachlor ESA, RDX and all List 3 contaminants will be performed only after future rulemaking specifies methods.

Arsenic Rule

The Arsenic Rule establishes a non-enforceable Maximum Contaminant Level Goal (MCLG) for arsenic of zero and an enforceable Maximum Contaminant Level (MCL) for arsenic of 0.01 mg/L (10 µg/L). This regulation applies to non-transient non-community water systems, which are not presently subject to standards on arsenic in drinking water, and to community water systems.

Groundwater Rule

The U.S. Environmental Protection Agency (EPA) finalized their Groundwater Rule (GWR) in November 2006. The rule builds upon the Total coliform Rule (TCR) by addressing the health risks of fecal contamination in groundwater sources used by public water systems. These federal requirements became effective December 1, 2009. The

Department of Health received an extension until November 2010 to complete the rulemaking process and adopt the federal rule into state statute. The basic requirements of the Groundwater Rule include: Source water monitoring (triggered and assessment), Compliance monitoring, Sanitary surveys and corrective actions, and Public notification.

Sulfate Rule

The EPA proposed Sulfate rule will establish a primary sulfate MCL. The primary sulfate MCL in the proposed rule of 500 mg/L is based on taste and odor effects.

Aldicarb Rule

Final MCLs for the pesticides aldicarb, aldicarb sulfone, and aldicarb sulfoxide have been established under the Phase II Rule for SOCs and IOCs. However, the effective date for these MCLs was postponed when the EPA agreed to reexamine the health effects data for aldicarb compounds. The EPA is expected to propose MCLs of 7 µg/L for each pesticide with a 9 µg/L composite total.

Radon

Though a radon MCL was included in the originally proposed Radionuclide Rule, it was determined that a radon MCL will now be issued as a separate rule. In November of 1999, EPA proposed a preliminary radon MCL of 300 pCi/L. The EPA is considering an alternative MCL of 4,000 pCi/L if states or water purveyors implement a multimedia mitigation program aimed at reducing household indoor-air health risks from radon gas from soil as well as tap water.

Stage 2 Disinfectants/Disinfection By-Products Rule

The Stage 2 DBPR applies to public water systems (PWSs) that are community water systems (CWSs) or nontransient noncommunity water systems (NTNCWs) that add a primary or residual disinfectant other than ultraviolet light or deliver water that has been treated with a primary or residual disinfectant other than ultraviolet light. The key provision in this rule is the change in calculating the maximum contaminant level (MCL). Up to now, compliance with the MCL was calculated using a running annual average (RAA) to average compliance samples across the distribution system sampling locations. Under Stage 2 DBPR, the MCL will be calculated using locational running annual averages (LRAAs). PWSs must maintain the locational rolling annual average (LRAA) for each compliance sampling location at or below 0.080 mg/L total trihalomethane (TTHM) and 0.060 mg/L haloacetic acids (HAA5). All systems, including consecutive systems, must comply with the MCLs for TTHM and HAA5 LRAA using compliance sampling locations identified under the Initial Distribution System Evaluation (IDSE) or in specific instances, using existing Stage 1 DBPR compliance monitoring locations.

In addition to setting the new requirement for LRAA, the Stage 2 DBPR sets rules for determining the required locations of the LRAA sampling sites through an initial

distribution system evaluation (IDSE), including a standard monitoring option based on Stage 1 monitoring results, and an alternative option based on modeling and sampling, sets standards for reduced monitoring and monitoring waivers, sets compliance dates for submittal of IDSE reports based on population served, sets long term monitoring requirements to apply after approval of the IDSE report, sets response requirements for exceedance of the LRAA MCL, and sets minimum reporting requirements.

This summary of the Stage 2 D/DBP rule was taken from, and more details are available at, the following web site:

http://www.awwa.org/Advocacy/govtaff/issues/Issue02_Disinfectants_By-Products.cfm

Washington State Department of Health

Division of Environmental Health
Office of Drinking Water

Help

Individual System View - DUPONT WATER SYSTEM, CITY OF - Water System Id - 20500

Compliance Actions | Operating Permits | Operators | Reports | Water Use Efficiency

General Information | Source Information | Samples | Exceedances

Type	Source	DOE Source	Collect Date	Analyte	Result Quantity	Units	Test Panel	Analyte Group	Sample Number	Lab Number
MCL2	04		12/20/2000	MANGANESE	0.218	mg/L	IOC	IOC	47359	089
MCL2	04		4/7/1999	MANGANESE	0.174	mg/L	IOC	IOC	37584	089
MCL2	04		5/6/1997	MANGANESE	0.114	mg/L	IOC	IOC	28867	089
MCL2	04		12/19/1995	MANGANESE	0.157	mg/L	IOC	IOC	23556	089
MCL1	09		11/12/2008	CYANIDE	0.500	mg/L	IOC	IOC	25191	089
P	Distribution		9/22/2009	TOTAL COLIFORM	Present	/100ml	COLI_AP	MICRO	16761	089
P	Distribution		11/10/2008	TOTAL COLIFORM	Present	/100ml	COLI_AP	MICRO	86704	089
P	Distribution		8/14/2002	TOTAL COLIFORM	Present	/100ml	COLI_AP	MICRO	72842	089
P	Distribution		10/15/2001	TOTAL COLIFORM	Present	/100ml	COLI_AP	MICRO	48596	089

Records 1 - 9 of 9

Export CSV

Links to external resources are provided as a public service and do not imply endorsement by the Washington State Department of Health

Department of Health, Office of Drinking Water

Street Address:
243 Israel Road S.E. 2nd floor
Tumwater, WA 98501

Mail:
PO BOX 47822
Olympia, WA 98504-7822

Phone: (360) 236-3100

Send inquiries about DOH and its programs to the Health Consumer Assistance Office
Comments or questions regarding this Web site? Send email to EH Help Desk or call 360-236-3113.

APPENDIX E

DISINFECTANT BYPRODUCT (DBP) MONITORING PLAN

STAGE 2 DISINFECTION BYPRODUCTS RULE (STAGE 2 DBPR) INITIAL DISTRIBUTION SYSTEM EVALUATION (IDSE) STANDARD MONITORING PLAN

COLIFORM MONITORING PLAN

WATER QUALITY MONITORING REPORT FOR THE YEAR 2010 (CITY OF DUPONT

CONSUMER CONFIDENCE REPORT 2009

Coliform Monitoring Plan for: City of DuPont

A. System Information

Water System Name	County	System I.D. Number
City of DuPont	Pierce	20500P
Attach copy of current WFI		
Number of Routine Samples Required Monthly by Regulation: 10 (ten)	Number of Sample Sites Needed to Represent the Distribution System: 5	

Sources:

SO1 Well No. 1 and 2 (emergency)
Treatment: None

SO3 Well No. 1 - Bell Hill
Treatment: Chlorination

SO4 Well No. 2 - Bell Hill
Treatment: Chlorination

SO5 Well No. 1 - Hoffman Hill
Treatment: Chlorination

SO6 Well No. 3 – Bell Hill
Treatment: Chlorination

SO7 Well No. 1 (emergency)
Treatment: None

SO8 Well No. 2 (emergency)
Treatment: None

SO9 Well No. 2 - Hoffman Hill
Treatment: Chlorination

Storage: Two Storage Tanks

Hoffman Hill (3,534,800 gallons)
Bell Hill (1,008,200 gallons)

Pressure Zones:

360 Zone – Historic Village Pressure Zone
400 Zone – Bell Hill Pressure Zone
530 Zone – Hoffman Hill Pressure Zone

Emergency Numbers:

- DOH, Drinking Water, Northwest Regional Office (253) 395-6750
- Carol Stuckey, Coliform Program Manager, (253) 395-6775
- John Ryding, ODW Regional Engineer, (253) 395-6757
- DOH Drinking Water after hours emergency line, 1-877-481-4901

B. Routine and Repeat Sample Locations

Location/Address for Routine Sample Sites	Location/Address for Repeat Sample Sites
1-A-1. Hoffman Hill Tank Sample Tap	
1-A-1. 1350 Foreman Road	1-A-1. 1350 Foreman Road
	1-A-2. (Upstream) 1352 Foreman Road
	1-A-3. (Downstream) 1348 Foreman Road
2-A-1. 118th and Center Drive Sample Station	
2-A-1. 1175 Center Drive	2-A-1. 1175 Center Drive
	2-A-2. (Upstream) 995 Center Drive
	2-A-3. (Downstream) 1225 Center Drive
3-A-1. Richmond Court Sample Station	
3-A-1. 1450 Richmond Court	3-A-1. 1450 Richmond Court
	3-A-2. (Upstream) 1490 Richmond Avenue
	3-A-3. (Downstream) 1224 Huggins Street
4-A-1. Glacier NW Sample Station	
4-A-1. At entrance to plant	4-A-1. At entrance to plant
	4-A-2. (Upstream) 4175 Pioneer Avenue
	4-A-3. (Downstream) 1350 Wharf Road
5-A-1. Manchester Place Sample Station	
5-A-1. 2500 Manchester Place	5-A-1. 2500 Manchester Place
	5-A-2. (Upstream) 2725 Williamson Place
	5-A-3. (Downstream) 2790 Center Drive
6-A-1. Bell Place Sample Station	

6-A-1. 1042 Bell Hill Place	6-A-1. 1042 Bell Hill Place 6-A-2. (Upstream) 1030 Bell Hill Place 6-A-3. (Downstream) 1074 Bell Hill Place
7-A-1. Center Drive at Intel Sample Station 7-A-1. 2800 Center Drive	7-A-1. 2800 Center Drive 7-A-2. (Upstream) M-3 Hamilton Avenue 7-A-3. (Downstream) 2790 Center Drive
8-A-1. Wallace Street at Bob's Hollow 8-A-1. 2299 Wallace Street	8-A-1. 2299 Wallace Street 8-A-2. (Upstream) 2301 Wallace Street 8-A-3. (Downstream) 2297 Wallace Loop
V1-A-1. 207 Barksdale Avenue Sample Station V1-A-1. 207 Barksdale Avenue (Village Pressure Zone)	V1-A-1. 207 Barksdale Avenue V1-A-2. (Upstream) 303 Barksdale Avenue V1-A-3. (Downstream) 200 Barksdale Avenue
U1-A-1. Packwood Avenue @ Hoffman Hill Blvd. U1-A-1. 1596 Packwood Avenue (Upper Pressure Zone)	U1-A-1. 1596 Packwood Avenue U1-A-2. (Upstream) 1578 Packwood Avenue U1-A-3. (Downstream) 3051 Hoffman Hill Blvd.
H1-A-1. Hoffman Hill Blvd. Sample Station H1-A-1. 3600 Swan Loop (Hoffman Hill Lower Pressure Zone)	H1-A-1. 3600 Swan Loop H1-A-2. (Upstream) 1143 Swan Loop H1-A-3. (Downstream) 1045 Hiton Circle
1-B-1. Jensen Ave North Sample Station 1-B-1. 2830 McNeil Street	1-B-1. 2830 McNeil Street 1-B-2. (Upstream) 2821 McNeil Street 1-B-3. (Downstream) 2849 McNeil Street

2-B-1. Clock Tower II Sample Station	
2-B-1. 1055 McDonald Avenue	2-B-1. 1055 McDonald Avenue
	2-B-2. (Upstream) 1431 McDonald Avenue
	2-B-3. (Downstream) #1 McDonald Avenue
3-B-1. Chloe Clark fountain main hall	
3-B-1. 1712 Palisade Blvd.	3-B-1. 1712 Palisade Blvd.
	3-B-2. (Upstream) 1613 Palisade Blvd.
	3-B-3. (Downstream) 1840 Palisade Blvd.
4-B-1. Wharf Road Sampling Station	
4-B-1. 1350 Wharf Road	4-B-1. 1350 Wharf Road
	4-B-2. (Upstream) 3775 Wharf Road
	4-B-3. (Downstream) Meter @ Hydrant H036
5-B-1. Williamson Place Sampling Station	
5-B-1. 2725 Williamson Place	5-B-1. 2725 Williamson Place
	5-B-2. (Upstream) 1000 Davis Place
	5-B-3. (Downstream) WM0005 International Pl.
6-B-1. Bell Hill Sample Tap	
6-B-1. 1101 Bell Hill Place	6-B-1. 1101 Bell Hill Place
	6-B-2. (Upstream) 1074 Bell Hill Place
	6-B-3. (Downstream) 1126 Bell Hill Place
7-B-1. Mitchell Street Sampling Station	
7-B-1. 2690 Mitchell Avenue	7-B-1. 2690 Mitchell Avenue
	7-B-2. (Upstream) 1152 Hudson Street
	7-B-3. (Downstream) 2502 Mitchell Avenue
8-B-1. Garry Oaks @ Fisher	
8-B-1. 1901 Garry Oaks Avenue	8-B-1. 1901 Garry Oaks Avenue
	8-B-2. (Upstream) 1198 Garry Oaks Avenue
	8-B-3. (Downstream) 2010 Garry Oaks Avenue

V1-B-1. Shop Kitchen Tap	
V1-B-1. 301 Louviers Avenue (Village Pressure Zone)	V1-B-1. 301 Louviers Avenue V1-B-2. (Upstream) 211 Louviers Avenue V1-B-3. (Downstream) 303 Louviers Avenue
U1-B-1. Ridge View Drive Sampling Station	
U1-B-1. 1865 Ridge View Drive (Upper Pressure Zone)	U1-B-1. 1865 Ridge View Drive U1-B-2. (Upstream) 1755 Ridge View Drive U1-B-3. (Downstream) 1798 Ridge View Drive
H1-B-1. #17 Lapsley Drive Sampling Station	
H1-B-1. #17 Lapsley Drive (Hoffman Hill Lower Pressure Zone)	H1-B-1. #17 Lapsley Drive H1-B-2. (Upstream) 3475 Hoffman Hill Blvd. H1-B-3. (Downstream) 1302 Hoffman Hill Blvd.
1-C-1. Jensen Avenue South Sampling Station	
1-C-1. 2502 Jensen Avenue	1-C-1. 2502 Jensen Avenue 1-C-2. (Upstream) 2402 MacArthur Street 1-C-3. (Downstream) 2702 Jensen Avenue
2-C-1. Wilmington Drive Sampling Station	
2-C-1. 1000 Wilmington Drive	2-C-1. 1000 Wilmington Drive 2-C-2. (Upstream) 700 Station Drive 2-C-3. (Downstream) 1500 Wilmington Drive
3-C-1. McDonald Avenue Sampling Station	
3-C-1. 1825 McDonald Avenue	3-C-1. 1825 McDonald Avenue 3-C-2. (Upstream) 1873 McDonald Avenue 3-C-3. (Downstream) 1737 McDonald Avenue
4-C-1. International Place Sampling Station	
4-C-1. 3400 International Place	4-C-1. 3400 International Place 4-C-2. (Upstream) WM0100 Utility Easement

	4-C-3. (Downstream) WM005 International Pl.
5-C-1. Davis Place Sampling Station	
5-C-1. 1000 Davis Place	5-C-1. 1000 Davis Place
	5-C-2. (Upstream) 1042 Bell Hill Place
	5-C-3. (Downstream) 700 Station Drive
6-C-1. Station Drive Sampling Station	
6-C-1. 1000 Station Drive	6-C-1. 1000 Station Drive
	6-C-2. (Upstream) 1280 Bell Hill Street
	6-C-3. (Downstream) 700 Station Drive
7-C-1. City Hall Kitchen Tap	
7-C-1. 1700 Civic Drive	7-C-1. 1700 Civic Drive
	7-C-2. (Upstream) WM0006 Powerline Road
	7-C-3. (Downstream) W04-0001 Center Drive
8-C-1. Wren Road @ Bobs Hollow	
8-C-1. 1808 Wren Road	8-C-1. 1808 Wren Road
	8-C-2. (Upstream) 1824 Bobs Hollow Lane
	8-C-3. (Downstream) 1750 Pioneer Middle Sch.
V1-C-1. 511 Barksdale Avenue Sampling Station	
V1-C-1. 511 Barksdale Avenue (Village Pressure Zone)	V1-C-1. 511 Barksdale Avenue
	V1-C-2. (Upstream) 509 Barksdale Avenue
	V1-C-3. (Downstream) 600 Hopewell Street
U1-C-1. Walker Street Sampling Station	
U1-C-1. 3147 Walker Road (Upper Pressure Zone)	U1-C-1. 3147 Walker Road
	U1-C-2. (Upstream) 3145 Walker Road
	U1-C-3. (Downstream) 3155 Walker Road
H1-C-1. #2 Lapsley Drive Sampling Station	
H1-C-1. #2 Lapsley Drive	H1-C-1. #2 Lapsley Drive
	H1-C-2. (Upstream) 3475 Hoffman Hill Blvd.

	H1-C-3. (Downstream) 1302 Hoffman Hill Blvd.

If the number of Routine samples needed to cover the distribution system requires more than three Routine sites, attach additional sheets as needed.

C. Routine Sample Rotation Schedule

Month	Routine Site(s)	Month	Routine Site(s)
January	All "A" samples	July	All "A" samples
February	All "B" samples	August	All "B" samples
March	All "C" samples	September	All "C" samples
April	All "A" samples	October	All "A" samples
May	All "B" samples	November	All "B" samples
June	All "C" samples	December	All "C" samples

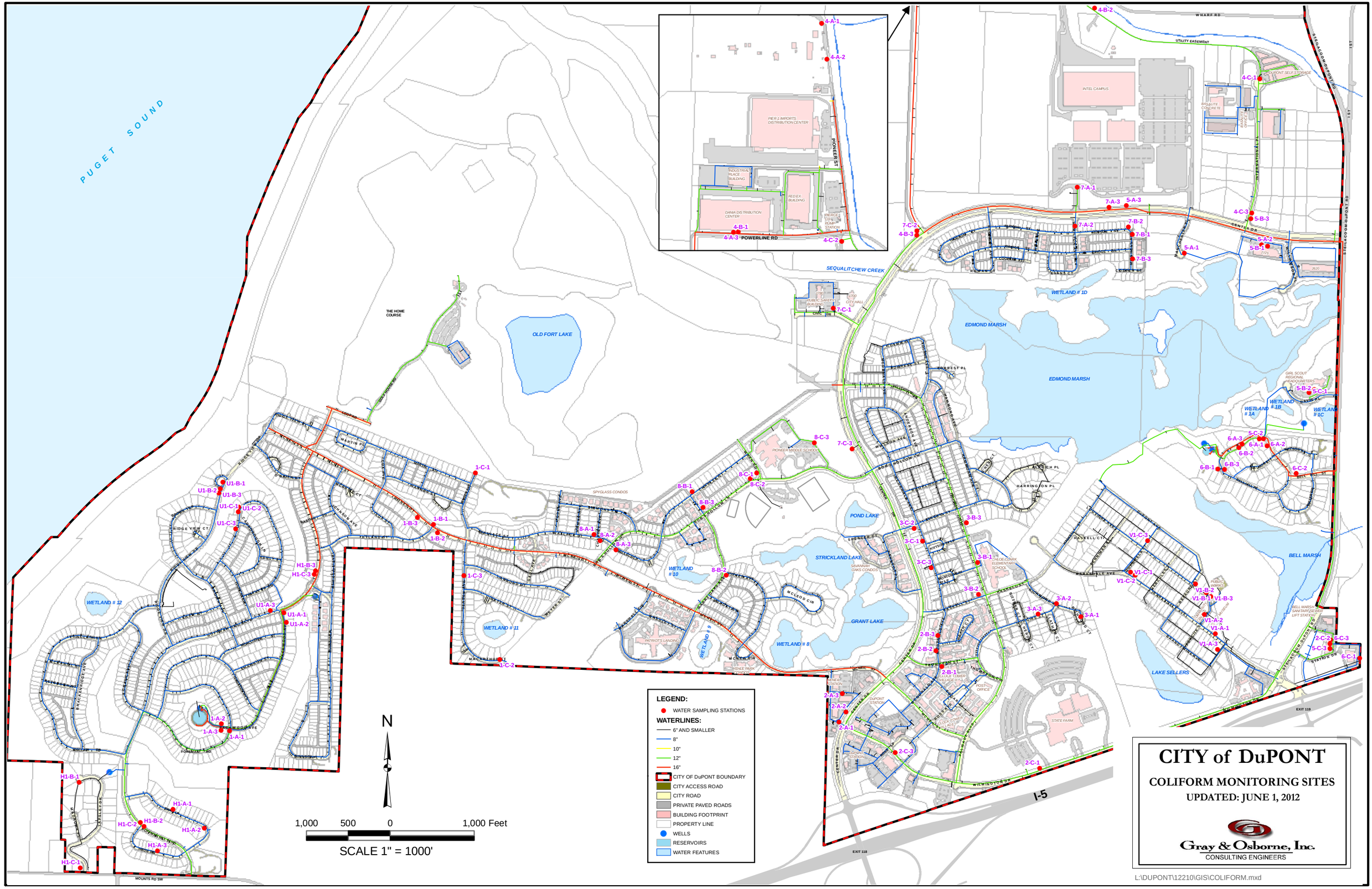
D. Month Following Unsatisfactory Samples

Description of Sample Collection Locations For Month Following Unsatisfactory Samples
For the five routine samples that are required after a positive sample, a combination of sites will be chosen from the routine sampling sites and repeat sampling sites. The exact locations will be dependent upon the location (focus area) of contamination. **Groundwater Rule sampling: Following Unsatisfactory Sample – collect *Triggered Source Water Sample* within 24 hours (prior to treatment). Each source that was in operation at the time of the unsatisfactory sample must be sampled. If positive, take corrective action dictated by DOH or take five additional source samples. A *Triggered Source Water Monitoring Plan* (if approved by DOH) may reduce the number of source samples required following an unsatisfactory sample.**

E. Preparation Information

System Name	Date Plan Completed	Dates Modified
City of DuPont	May 2012	
Name of Plan Preparer	**Position**	**Daytime Phone #**
Eric Noah	Environmental Planner	(360) 292-7481
State Reviewer	**Date Last Review**	

F. System Map



CITY of DuPONT

COLIFORM MONITORING SITES

UPDATED: JUNE 1, 2012

Gray & Osborne, Inc.
CONSULTING ENGINEERS

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

Water Quality Monitoring Report for the Year 2010

System: DUPONT WATER SYSTEM, CITY OF **PWSID:** 20500 P **Report Date:** 10/26/2010
Contact: FREDERICK D. FOREMAN **Group:** A - Comm **County:** PIERCE **Region:** NORTHWEST

Part 1: List of Active Sources with Water Quality Monitoring Requirements

DOH Source#	Name	Type	Use	Susceptibility Rating
S03	Well 1 Bell Hill CAN722	Well	Permanent	Low
S04	Well 2 Bell Hill CAN756	Well	Permanent	Low
S05	Well 1 Hoffman Hill AAD989	Well	Permanent	Low
S06	Well 3 Bell Hill AEF217	Well	Permanent	Low
S09	Well 2 Hoffman Hill AHM258	Well	Permanent	Low

Part 2: Sampling Schedule for the Year 2010

Coliform Sampling (Routine)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
	10	10	10	10	10	10	10	10	10	10	10	10

* Indicates the requirement is an exception from WAC 246-290.

- If the coliform (bacteriological) sampling schedule listed at the bottom of the current Water Facilities Inventory (WFI) form for your system is different from the schedule listed above, follow the schedule on the current WFI.
- Samples must be collected from representative points within the distribution system.
- Repeat samples are required following an unsatisfactory sample.
- A minimum of 5 routine samples are required the month following one or more unsatisfactory samples in accordance with your system's Coliform Monitoring Plan.

Lead and Copper Distribution Sampling

- Lead and copper samples must be collected from indoor faucets within the distribution system after the water has sat unused in the pipes for at least 6 hours but no more than 12 hours.
- Sample faucets should be flushed with cold water the evening prior to collecting the sample.
- Part 2 indicates the month in which samples should be collected. Part 4 indicates the total number of sample required.
- If you are required to sample Annually or once every 3 years, samples must be collected between June and September.

Chlorine Residual Sampling

- Systems that use continuous chlorination must take chlorine residual measurements daily (or at a reduced frequency approved by the department), and at the same time and location as routine and repeat coliform samples.

Disinfection Byproducts Sampling

- Systems that use continuous chlorination must collect a sample for total trihalomethanes (TTHM) and a sample for haloacetic acids (HAA5) for each chlorination treatment facility identified in your individual disinfection byproducts (DBP) monitoring plan. Collect the samples from the distribution system at the frequency and locations identified in your DBP monitoring plan.

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

Water Quality Monitoring Report for the Year 2010

DBP monitoring	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
							*					

*Follow the procedure below to determine if your DBP monitoring is due in 2010.

Please review each successive statement below to determine your appropriate monitoring requirement. Also keep in mind that a complete DBP sample set is one TTHM and one HAA5 sample.

DBP samples must be collected during a month that has the warmest water temperature and at a location in your distribution system representing the Maximum Residence Time of the water in the pipes.

(1) If you have not taken any TTHM or HAA5 samples after 2007, you must sample in 2010. You are done with your determination and do not need to continue.

(2) If your most recent TTHM or HAA5 (DBP) compliance samples were collected during a month that didn't have the warmest water temperature or at a location that wasn't the Maximum Residence Time of the water in the pipes, another set of samples is due in 2010. You are done with your determination and do not need to continue.

(3) . If your most recent TTHM and HAA5 (DBP) compliance samples for each treatment plant were collected during a month that had the warmest water temperature **and** at a location that represented the Maximum Residence Time of the water in the pipes, please continue.

Water Quality Monitoring Report for the Year 2010

Considering your DBP Sample Results:	Last Year Sampled	Next Sample Set Due
3 a) You monitored only one year **and** TTHM results averaged 20 ug/l or less **and** HAA5 results averaged 15 ug/l or less.	2008	2011
	2009	2012
3 b) You monitored **more than one year** and your most recent year's TTHM results averaged 20 ug/l or less **and** HAA5 results averaged 15 ug/l or less,	2008	2011
	2009	2012
3 c) You monitored **more than one year** and your first year TTHM results averaged 20 ug/l or less **and** HAA5 results averaged 15 ug /l or less, **and** later yearly TTHM results averaged 60 ug/l or less **and** HAA5 results averaged 45 ug/l or less each year.	2008	2011
	2009	2012
If not, were they:		
4 a) You monitored for two years and TTHM results averaged 40 ug/l or less **and** HAA5 results averaged 30 ug/l or less in each year.	2008	2011
	2009	2012
4 b) You monitored **for more than two years** and TTHM results averaged 40 ug/l or less **and** HAA5 results averaged 30 ug/l or less in each of the first two years **and** later yearly TTHM results averaged 60 ug/l or less **and** HAA5 results averaged 45 ug/l or less each year.	2008	2011
	2009	2012
4 c) You monitored for more than two years and TTHM results averaged 40 ug/l or less **and** HAA5 results averaged 30 ug/l or less in each of the most recent two years.	2008	2011
	2009	2012
If not, were they:		
5) TTHM results averaged 80 ug/l or less **and** HAA5 results averaged 60 ug/l or less each year, but did not meet the criteria above.	Any	2010
If not, were they:		
6 a) TTHM results for any quarter was more than 80 ug/l **or** HAA5 results for any quarter was more than 60 ug/l and you have not yet sampled for four consecutive quarters .	Any	Quarterly
6 b) TTHM results for any quarter averaged more than 80 ug/l **or** HAA5 results for any quarter averaged more than 60 ug/l **and** the running annual averages of the following four-consecutive -quarter period TTHM results averaged more than 60 ug/l **or** HAA5 results averaged more than 45 ug/l.	Any	Quarterly

If you are on a quarterly monitoring schedule due to a TTHM or HAA5 exceedance, you must continue to monitor quarterly until your annual average sample results of on-going four- consecutive-quarter periods are 60 µg/L or less for TTHM and 45 µg/L or less for HAA5. Then you may return to annual monitoring.

Chemical Sampling Requirements

- Source water chemical samples must be taken from a location as near to the source as possible, after any treatment.
- Nitrate, nitrite and arsenic are included as part of a complete IOC.

Month	Source	Monitoring Requirement	Test Panel
January		*No source chemical sampling required this month*	
February		*No source chemical sampling required this month*	

Water Quality Monitoring Report for the Year 2010

Month	Source	Monitoring Requirement	Test Panel
March		*No source chemical sampling required this month*	
April	S06	GROSS ALPHA	GROSS ALPHA
April	S06	RADIUM 228	RAD
May		*No source chemical sampling required this month*	
June		*No source chemical sampling required this month*	
July		*No source chemical sampling required this month*	
August		*No source chemical sampling required this month*	
September	S04	MANGANESE	IOC
September	S05	NITRATE	NITRATE
October		*No source chemical sampling required this month*	
November	S09	VOLATILE ORGANIC CONTAMINANTS	VOC1
December		*No source chemical sampling required this month*	

Part 3: State Waivers

- Automatically granted to all sources based on DOH assessment of conditions within the state.
- No waiver application, or fee required.
- State waivers granted for the 2008 - 2010 compliance period are listed in Part 4.

Part 4: Water Quality Monitoring Frequency

- Although waivers may be granted for your system, there may be some monitoring required as a condition of the waiver your system was granted.

Monitoring Group	Test Panel	Sample Location	Schedule/Status
Asbestos	ASB	Distribution	State Waiver Thru Dec 2010
Bacteriological	Coli	Distribution	See routine sample schedule in part 2
Dioxin	Dioxin	All sources	State Waiver Thru Dec 2010
Endothall	Endo	All sources	State Waiver Thru Dec 2010
EDB and other soil fumigants	Fumigant	S03	State Waiver Thru Dec 2010
EDB and other soil fumigants	Fumigant	S04	State Waiver Thru Dec 2010
EDB and other soil fumigants	Fumigant	S05	State Waiver Thru Dec 2010
EDB and other soil fumigants	Fumigant	S06	State Waiver Thru Dec 2010
EDB and other soil fumigants	Fumigant	S09	State Waiver Thru Dec 2010
Glyphosphate	Glyphs	All sources	State Waiver Thru Dec 2010
Gross Alpha	GROSS ALPHA	S03	1 sample(s) between Jan 2008 – Dec 2010
Gross Alpha	GROSS ALPHA	S04	1 sample(s) between Jan 2008 – Dec 2010

Water Quality Monitoring Report for the Year 2010

Monitoring Group	Test Panel	Sample Location	Schedule/Status
Gross Alpha	GROSS ALPHA	S05	1 sample(s) between Jan 2008 – Dec 2010
Gross Alpha	GROSS ALPHA	S06	1 sample(s) between Jan 2008 – Dec 2010
Herbicides	Herbs	S03	Waived thru Dec 2010
Herbicides	Herbs	S04	Waived thru Dec 2010
Herbicides	Herbs	S05	Waived thru Dec 2010
Herbicides	Herbs	S06	Waived thru Dec 2010
Herbicides	Herbs	S09	Waiver granted - No sampling required thru Dec 2010
Insecticides	Insect	S03	Waived thru Dec 2010
Insecticides	Insect	S04	Waived thru Dec 2010
Insecticides	Insect	S05	Waived thru Dec 2010
Insecticides	Insect	S06	Waived thru Dec 2010
Insecticides	Insect	S09	Waiver granted - No sampling required thru Dec 2010
Inorganic Contaminants	IOC	S03	1 complete IOC sample between Jan 2002 - Dec 2010
Inorganic Contaminants **	IOC	S04	1 complete IOC sample between Jan 2002 - Dec 2010
Inorganic Contaminants	IOC	S05	1 complete IOC sample between Jan 2002 - Dec 2010
Inorganic Contaminants	IOC	S06	1 complete IOC sample between Jan 2002 - Dec 2010
Inorganic Contaminants	IOC	S09	1 sample between Jan 2008 - Dec 2010
Lead/Copper *	LCR	Distribution	LCR 1 Set of 30 samples between Jan 2009 - Dec 2011
Nitrate *	NIT	S03	Collect 1 sample(s) every 1 year
Nitrate *	NIT	S04	Collect 1 sample(s) every 1 year
Nitrate *	NIT	S05	Collect 1 sample(s) every 1 year
Nitrate *	NIT	S06	Collect 1 sample(s) every 1 year
Nitrate *	NIT	S09	Collect 1 sample(s) every 1 year
General Pesticides	Pest1	S03	Waived thru Dec 2010
General Pesticides	Pest1	S04	Waived thru Dec 2010
General Pesticides	Pest1	S05	Waived thru Dec 2010
General Pesticides	Pest1	S06	Waived thru Dec 2010
General Pesticides	Pest1	S09	Waiver granted - No sampling required thru Dec 2010
Diquat	Diquat	All sources	State Waiver Thru Dec 2010
Radium 228	RAD 228	S03	1 sample(s) between Jan 2008 – Dec 2010
Radium 228	RAD 228	S04	1 sample(s) between Jan 2008 – Dec 2010
Radium 228	RAD 228	S05	1 sample(s) between Jan 2008 – Dec 2010
Radium 228	RAD 228	S06	1 sample(s) between Jan 2008 – Dec 2010
Volatile Organic Contaminants	VOC	S03	1 sample between Jan 2008 - Dec 2010
Volatile Organic Contaminants	VOC	S04	1 sample between Jan 2008 - Dec 2010
Volatile Organic Contaminants	VOC	S05	Waived thru Dec 2010

Water Quality Monitoring Report for the Year 2010

Monitoring Group	Test Panel	Sample Location	Schedule/Status
Volatile Organic Contaminants	VOC	S06	Waived thru Dec 2010
Volatile Organic Contaminants	VOC	S09	Waiver granted - 2 samples(s) every 3 years

** These contaminant monitoring groups do not have waiver options under the SDWA.*

*** Your IOC waiver also requires that you sample more frequently for some analytes. You are required to collect a sample for these analytes **ONLY** when they are scheduled in Part 2.*

Water Quality Monitoring Report for the Year 2010

Part 5: Regional Water Quality Monitoring Contact

Northwest Regional Office

For Further information call the Northwest Regional Office Steve Hulsman Phone: (253) 395-6777

For questions regarding Disinfection ByProducts (DBP) monitoring, contact: Jolyn Leslie (253) 395-6762

Special Note

For Group A Community Systems Only: Your Consumer Confidence Report, summarizing the results of your 2009 water quality monitoring requirements is due before July 1, 2010. For further information visit www.doh.wa.gov/ehp/dw/Our_Main_Pages/consumer.htm or contact the CCR Coordinator at your Regional Office.

FREDERICK D. FOREMAN
DUPONT WATER SYSTEM, CITY OF
1700 CIVIC DRIVE
DUPONT WA 98327

City of DuPont

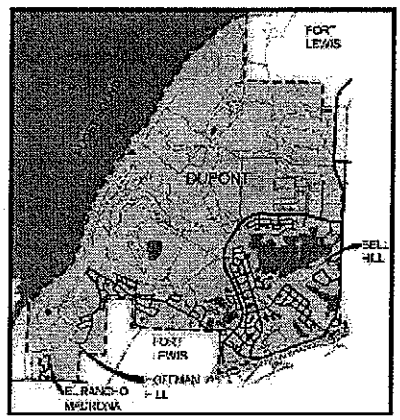
DuPont, WA . . . A Rich History and a Vibrant Future.

2009 Water Quality Report

Drinking Water Quality Annual Report

We are very pleased to present the 2009 Water Quality Report. Our constant goal is to provide you with a safe, dependable supply of drinking water. As part of our continued commitment to ensuring the quality of your water, we want to keep you informed about the excellent water and services we have delivered to you for the past year. We are proud that your drinking water meets or exceeds all Federal and State requirements.

Your City's Water System



The City of DuPont currently utilizes groundwater from six (6) wells for its public water supply. The City's water supply wells are located at Bell Hill, Hoffman Hill and El Rancho Madrona (see map). Bell Hill Wells No's. 1 and 3 draw water from the Red Salmon Springs Aquifer; Bell Hill Well No. 2 draws water from the deeper undifferentiated Outwash/Lakewood Glacier Aquifer. Bell Hill Wells 1 and 2 are equipped with an emergency generator for operation during power outages. Hoffman Hill Well No. 1 and 2 draw water from the Red Salmon Springs Aquifer. Additional booster pumps were placed in service 2003 to provide adequate pressure to the customers on Hoffman Hill. DuPont's sixth well is located in the El Rancho Madrona system and also draws water from the deep Red Salmon Springs aquifer. The El Rancho Madrona water system is operated as a satellite system and provides service only to El Rancho Madrona customers. All City wells access deep aquifers, making them less susceptible to contaminants.

The City has three storage reservoirs. A 3.0 million-gallon reservoir is located at Hoffman Hill, a 1.0 million-gallon reservoir at Bell Hill and a 38,000-gallon reservoir is at El Rancho Madrona. The only treatment used on DuPont's groundwater sources is the addition of small amounts of chlorine to provide disinfection.

Water Quality Protection Programs

The City of DuPont is committed to supplying its customers with high quality and aesthetically pleasing drinking water. The City has adopted the following practices to ensure that the drinking water supplied to its customers meets or exceeds all federal and state standards.

- 1995 Washington State Department of Health Water Source Assessment. Our water system sources have received a low susceptibility to potential sources of contamination. Additional information is on file at the Public Works Department.
- 2009 Washington State Department of Health Sanitary Survey. Overall operation and maintenance of the facilities is excellent. Improvements have been made to provide additional protection of the emergency wells and facilities. The full report is on file in the Public Works Department.
- 2003 Water System Comprehensive Plan. The City prepared a comprehensive analysis of all aspects of the water system identifying current and future plans to continue to provide high quality drinking water to its customers including a Water Conservation Program. This plan has been approved by the Washington State Department of Heath. A copy of the plan is on file at the Public Works Department.
- 2003 Wellhead Protection Program. The City is in the process of implementing a program that sets protective boundaries around the City's wells. This program will identify potential contamination sources around the wells and provides for notification of these sites to City residents.
- Cross Connection Control Program. The City of DuPont is aggressively protecting our water supply from contamination. This effort is called the "Cross Connection Control Program." It ensures that used or contaminated water does not re-enter the water system. This program assures that customers take the proper precaution to prevent this from happening, by means of inspection and testing of backflow devices as well as assuring plumbing codes are properly followed. For DuPont water customers that are regulated by this program, we will contact you when backflow assembly tests and inspections are due. More detailed information is available by contacting DuPont Public Works.

Definition of a Cross Connection

A cross-connection is any temporary or permanent connection between a public water system or consumer's potable (i.e., drinking) water system and any source or system containing non potable water or other substances. An example is the piping between a public water system or consumer's potable water system and an auxiliary water system, cooling system, or irrigation system.

The City welcomes input from its residents on methods to protect and conserve its water supply and can provide additional information on ways you can help protect groundwater. Residents with input on water issues or this report may contact the DuPont Public Works Department at City Hall, 912-5381.

Water Quality Monitoring Requirements

The City of DuPont routinely monitors for contaminates in your drinking water as required by Federal and State laws. Some of the monitoring and sampling frequencies are shown below. The City is currently in compliance with all existing water quality monitoring requirements. The second table below shows the results of our monitoring for the period of January 1 to December 31, 2009. **All** drinking water, including bottled drinking water, may be reasonably expected to contain at least small amounts of some contaminants. It is important to remember that the presence of these contaminants does not necessarily pose a health risk. More information about contaminates and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline at 1-800-426-4791.

We're proud that your drinking water exceeds all Federal and State requirements. Through our monitoring and testing the EPA has determined that your water is **SAFE**.

Contaminant Type	Monitoring Requirements (1)
Bacteriological Contaminants	10 samples per month in the distribution system
Inorganic Chemicals	1 sample every three years at each well
Lead and Copper	10 samples each year at selected residents' taps
Volatile Organic Chemicals	1 sample every three years at each well
Synthetic Organic Chemicals	The City currently has a monitoring waiver for synthetic organic chemicals because its previous sample recorded no detections. The normal monitoring period required is 1 sample every 3 years at each well.
Radionuclides	1 sample every 4 years at each well.
Trihalomethans	1 sample from each of our 3 water treatment facilities, collected at the far end of the distribution system.

(1) Increased monitoring is required for any chemicals detected above an "Action Level" or a "MCL."

Water Quality Data

Contaminant	Highest Level Allowed (MCL)	Highest Level Detected	Ideal Goal (MCLG)	Possible Sources of Contamination
Primary Contaminants				
Turbidity	1.0 NTU	0.3 NTU	N/A	Soil Erosion, iron or manganese particulates
Nitrate	10.0 ppm	1.0 ppm	10.0 ppm	Runoff from fertilizer, leaching from sepetic systems, natural deposits.
Arsenic*	50.0 ppb	.002 ppm		Natural deposits
Secondary Contaminants				
Iron	0.3 ppm	0.22 ppm	N/A	Natural deposits
Manganese**	0.05 ppm	0.25 ppm	N/A	Natural deposits

* While our drinking water meets EPA's standard for arsenic, it does contain low levels of naturally occurring arsenic. EPA's standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

** As manganese has regularly exceeded the secondary MCL in Bell Hill Well No. 2, the City remedies this problem by either not using the well, or by mixing the high manganese water with water from other wells to lower the concentration of manganese. Manganese is monitored for aesthetic reasons and has no ill health effects associated with it.

Reading the Table

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

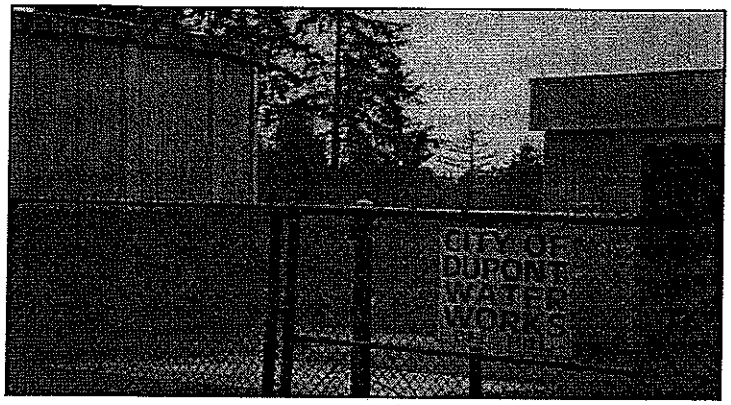
Secondary MCLs: MCLs based on factors other than health effects, such as taste and aestethics.

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

Nephelometric turbidity unit (NTU): The unit of measure for turbidity.

Part per million (ppm): One part per million, or one milligram per liter (mg/L) corresponds to one penny in $10,000, or one penny in one million pennies.

MCLs are set at very stringent levels. To understand the possible health effects described for many regulated contaminants, a person would generally have to drink 2 liters of water every day at the MCL level over their lifetime to have a one-in-a-million chance of having the described health effect.



General Health Effects Information

With groundwater-sourced drinking water, water travels through the ground dissolving naturally occurring minerals, and can pick up substances resulting from the presence of animals or human activity. To ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. Contaminants that may be present include microbes, inorganic and organic chemicals, pesticides and herbicides, and radioactive materials.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immune-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, persons with HIV/AIDs or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care provider. EPA and Centers for Disease Control guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

The City of DuPont's aquifer sources do not contain lead or copper. However, lead and copper can leach into residential water from building plumbing systems. Lead and copper monitoring is conducted at homes categorized as high risk. Compliance is determined on a regional basis. The City is in compliance with all State and Federal lead and copper monitoring requirements.

Thank you for allowing us to continue providing your household with clean, quality water. In order to maintain a safe and dependable water supply we are required to make periodic improvements that will benefit all of our customers. These improvements are sometimes reflected as rate structure adjustments. We thank you for your continued support and understanding.

We at the City of DuPont Public Works Department work around the clock to provide top quality water to every household. We ask that all our customers help us protect our water sources, through individual stewardship and conservation.

Please contact The City of DuPont Public Works Department at 912-5381 or visit our website at www.ci.dupont.wa.us, if you have additional questions.

We constantly monitor for various constituents in the water supply to meet all regulatory requirements.

♦ Where can I find out more information about my drinking water?

Additional questions or comments about the City's water supply, or other general drinking water issues, can be directed to the following contacts:

City of DuPont	1700 Civic Drive DuPont, WA 98327	(253) 912-5381
Environmental Protection Agency	Safe Drinking Water Act Hotline	(800) 426-4791
Washington State Department of Health	Suite 200, K17-12 20435 72nd Avenue South Kent, WA 98032	(253) 395-6750

♦ How can I get more involved in decisions affecting my drinking water?

The DuPont City Council regularly meets at 7:00 PM at the DuPont City Hall on the second and fourth Tuesday of each month.

♦ Is bottled water cleaner and safer than tap water?

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

♦ Who regulates bottled water?

The Federal Food and Drug Administration regulates contaminants in bottled water and is responsible for providing the same levels of public health protection.

♦ Why is chlorine added to my water?

Pursuant to state and federal laws, very small amounts of chlorine are added to your water as a disinfecting agent to protect you from disease-causing microorganisms. If you are bothered by the chlorine taste, keep a pitcher of tap water in the refrigerator. The chlorine will dissipate rapidly if the water is allowed to sit for a time.

♦ Is fluoride added to our drinking water?

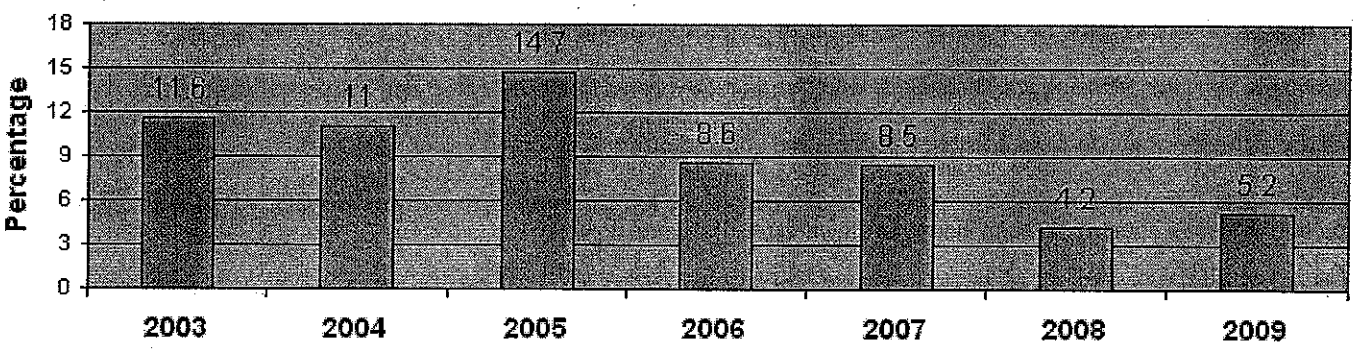
No, the City does not add fluoride to its drinking water supply.

Water Use Efficiency Performance Report

In 2003, the Washington State Legislature passed the Municipal Water Law to address the increasing demand on our state's water resources. The law established that all water suppliers must use water more efficiently to help them meet future demands. The State Department of Health has been directed to adopt an enforceable Water Use Efficiency (WUE) program intended to achieve a high level of stewardship among all water suppliers, contribute to long-term supply reliability and public health concerns, and ensure efficient operation and management of water systems. We are proud to report we have been implementing many of the new requirements. Below is a summary of our goals.

1. Water savings goals.
   - o Reduce unauthorized water use to below 10% of water production
   - o Leak detection & repair program
   - o Public education efforts
   - o Large area landscape management
2. Action steps for achieving goals.
   - o Unauthorized water use is aggressively sought out
   - o Repair leaks once detected
   - o Public education through newsletters, website, and pamphlets
   - o Landscape management through the use of a weather station and computer controlled irrigation timing has been in use for several years. As new parks come on line, they will be managed this way, also.

The table below shows percentage of unauthorized withdrawals or unaccounted for water. Achieving less than 10% unaccounted for water is our goal.



For information on water conervation, go to http://www.ci.dupont.wa.us/public-works/water/index.html on the City website.

PRSRT STD
US POSTAGE

City of DuPont

APPENDIX F

HYDRAULIC MODELING RESULTS

Gray & Osborne, Inc.
CONSULTING ENGINEERS

MEMORANDUM

TO:	Peter Zahn, Public Works Director City of DuPont
FROM:	Dominic Miller, P.E. Joe Plahuta
DATE:	March 18, 2011
SUBJECT:	DuPont Hydrant Testing and Hydraulic Model Calibration.

Background:

In order to calibrate the City's hydraulic model as part of the 2010 Water System Plan Update, hydrant flow testing was performed on March 17, 2011. Ten test locations were chosen in consultation with City staff to provide a sampling of the City's entire water distribution system while allowing for management of runoff resulting from flow testing. A map of the hydrant test locations is attached.

Test Procedure:

At each of the ten test locations, static and residual pressure was monitored at one hydrant while pitot pressure data was obtained on an adjacent hydrant. Pitot pressure was then related to flow in accordance with the orifice equation. The test data collected for each hydrant location is summarized in the attached hydrant testing report.

Each hydrant was flowed for a period of approximately 90 seconds to allow pressure readings to equilibrate. The steady state residual pressure and pitot pressure were recorded for each test.

Test Conditions:

During testing, the Hoffman Hill Reservoir remained at a level of 18.5 feet and system demand over the test period averaged 800 gallons per minute (per Mr. Fred Foreman, Water System Operator). Pressure was monitored on the discharge header at the Bell Hill Booster Station to determine whether any of the booster pumps were called on. None of the booster pumps were called on over the period from 8:30 am to 10:40 am, the period over which the hydrant testing occurred.

Hydraulic Modeling:

Hydraulic modeling of the City of DuPont's distribution system was performed using MWH's H_2ONet software. The City's existing hydraulic model was updated to include a recent extension of the distribution system to portions of the Hoffman Hill development. Nodal elevations were determined from regional topographic data (GIS) and as-built drawings.

Calibration

The hydraulic model was calibrated based on static pressure, flow, and residual pressure data collected on March 17, 2011. Model parameters were adjusted to best reflect field observed conditions. Static conditions in the model were calibrated to field (actual) conditions by changing nodal elevations. However, in addition to adjusting nodal elevations, hydraulic grade in the Hoffman Hill development was adjusted by setting the discharge pressure at the Hoffman Hill booster pump station equal to the actual discharge pressure measured by the City's SCADA system. Furthermore, in accordance with field data, the pressure reducing valves (PRVs) feeding the 360 HGL pressure zone were modeled as open to better approximate field (actual) conditions. By modeling these valves in the open position, there is no functional difference between the 360 HGL and 400 HGL pressure zones (insofar as the model is concerned). Dynamic conditions in the hydraulic model were calibrated using flow and residual pressure data. Pipe roughness was adjusted to calibrate the model to field (actual) conditions.

A hydrant testing report summarizing the static pressure, residual pressure, and flow at each of the hydrant test locations is attached.

Simulations

For both peak hour and fire flow simulations, the largest booster pump at both the Hoffman Hill booster pump station and the Bell Hill booster pump station was modeled as "Off." Reservoir levels for each simulation condition are presented in the table below:

Year	Reservoir Level (feet)	
	Hoffman Hill	Bell Hill
Peak Hour Conditions		
2011	13.57	18.32
2017	13.55	18.30
2031	13.00	17.64
Fire Flow Conditions		
2011	7.89	11.61
2017	6.05	9.44
2031	4.01	7.03

Peak Hour Demand Simulations

To model the impacts of peak hour demand on the distribution system, peak hour demand was applied uniformly to all service nodes within the distribution system and pressure was determined at each service node. In accordance with Department of Health (DOH) regulations, a minimum pressure of 35 psi must be maintained at each service connection under peak hour demand conditions. A complete list of nodal pressures under peak hour demand conditions is attached.

Fire Flow Conditions

To model distribution system conditions under high point-flow conditions, and to determine available fire flow throughout the distribution system, fire flow demands were simulated at every service node in the distribution system and residual pressure was monitored at every service node. Fire flow was assigned to each node according to the location of the node in the distribution system. Nodes within areas zoned for industrial, manufacturing, or research park were assigned a fire flow of 4,000 gpm. Nodes in areas zoned for commercial/multi-family and residential were assigned a fire flow of 2,500 gpm and 1,000 gpm, respectively. In accordance with Department of Health (DOH) regulations, a minimum residual pressure of 20 psi must be maintained at every service connection under fire flow demand conditions. A complete list of the fire flow available at every node in the distribution system is attached.

Results

No system deficiencies were discovered under peak hour demand conditions. The minimum system pressure of 40 psi was found in the El Rancho Madrona development. One deficiency was found under industrial fire flow conditions at 2620 Williamson Place (at the SW corner of Centre Drive and DuPont-Steilacoom Road). This deficiency is remedied by installing approximately 100 feet of 8-inch water line from the 16-inch water line under DuPont-Steilacoom Road to the 8-inch looped water line at 2620 Williamson Place. The hydraulic outcome of this capital improvement project is presented in the attached modeling results.

Hydrant Testing Report

Test			Pressure Hydrant Location	Flow Hydrant Location	Pressure Hydrant		Flow Hydrant		Flow (gpm)	Comments
1	Time	8:30	Hydrant #H480, City Hall parking lot	Hydrant #H479, City Hall parking lot	Static Pressure (psi)	80	Static Pressure (psi)		1,342	
	Duration (min : sec)	1:30			Residual Pressure (psi)	74	Pitot Pressure (psi)	64		
2	Time	8:44	Hydrant #H004, Second hydrant on Manchester Street	Hydrant #H335, End of Manchester Street	Static Pressure (psi)	80	Static Pressure (psi)		1,353	
	Duration (min : sec)	1:30			Residual Pressure (psi)	72	Pitot Pressure (psi)	65		
3	Time	8:59	Hydrant #H228, Second to last hydrant from the end of Powerline Road.	Hydrant #H227, End of Powerline Road at the southwest corner of the Dania Distribution Center	Static Pressure (psi)	85	Static Pressure (psi)		1,373	
	Duration (min : sec)	1:30			Residual Pressure (psi)	75	Pitot Pressure (psi)	67		
4	Time	9:17	Hydrant #H461, Intersection of Nelson Street and Bell Hill Place.	Hydrant #H462, end of Nelson Street.	Static Pressure (psi)	56	Static Pressure (psi)		1,186	
	Duration (min : sec)	1:30			Residual Pressure (psi)	50	Pitot Pressure (psi)	50		
5	Time	9:30	Hydrant #H118, Intersection of Hercules Street and Barksdale Avenue.	Hydrant #H117, Intersection of Hopewell Street and Barksdale Avenue.	Static Pressure (psi)	71	Static Pressure (psi)		1,186	
	Duration (min : sec)	1:30			Residual Pressure (psi)	55	Pitot Pressure (psi)	50		

Flow (gpm) = 29.83 * 0.9 (D^2) * (Pitot Pressure)^0.5
D = Orifice Diameter (inches), Typically = 2.5

Hydrant Testing Report

Test			Pressure Hydrant Location	Flow Hydrant Location	Pressure Hydrant		Flow Hydrant		Flow (gpm)	Comments
6	Time	9:43	Hydrant #H047, South hydrant across from Clocktower Park	Hydrant #H058, North hydrant across from Clocktower Park	Static Pressure (psi)	69	Static Pressure (psi)		1,300	
	Duration (min : sec)	1:30			Residual Pressure (psi)	64	Pitot Pressure (psi)	60		
7	Time	9:57	Hydrant #H358, Southwestern hydrant on Marshall Circle.	Hydrant #H357, West-most hydrant on Marshall Circle	Static Pressure (psi)	71	Static Pressure (psi)		1,321	
	Duration (min : sec)	1:30			Residual Pressure (psi)	68	Pitot Pressure (psi)	62		
8	Time	10:09	Hydrant #H401, Hydrant on east side of access road between McNeil Street and Loop Road.	Hydrant #H364, West-most hydrant on Loop Road.	Static Pressure (psi)	77	Static Pressure (psi)		1,424	
	Duration (min : sec)	1:30			Residual Pressure (psi)	74	Pitot Pressure (psi)	72		
9	Time	10:22	Hydrant #H391, Intersection of Ridgeview Drive and Hoffman Hill Blvd.	Hydrant #H390, Intersection of Rdigeview Drive and Sinclair Drive; in front of Chief Leschi Park.	Static Pressure (psi)	90	Static Pressure (psi)		1,472	The flow hydrant (#H390) was opened slowly to allow the Bell Hill booster pump station to start pumping and avoid low pressures at service connections.
	Duration (min : sec)	3:00			Residual Pressure (psi)	81	Pitot Pressure (psi)	77		
10	Time	10:34	Hydrant #H490, Hydrant between Hoffman Hill Blvd. and flow hydrant, on Swan Loop.	Hydrant #H491, East-most hydrant on Swan Loop.	Static Pressure (psi)	72	Static Pressure (psi)		1,414	
	Duration (min : sec)	1:30			Residual Pressure (psi)	69	Pitot Pressure (psi)	71		

Flow (gpm) = 29.83 * 0.9 (D^2) * (Pitot Pressure)^0.5
D = Orifice Diameter (Inches), Typically = 2.5

CITY of DuPONT

HYDRANT TESTING LOCATIONS

Gray & Osborne, Inc.
CONSULTING ENGINEERS

L:\DUPONT\GIS\FINAL_GDB\HYDRANTS-testing11x17.mxd

N

1,000 500 0 1,000 Feet

SCALE 1" = 1000'

LEGEND

- HYDRANTS
- CITY OF DuPONT BOUNDARY
- BUILDING
- PROPERTY LINE
- WETLANDS & LAKES

CITY ROADS

- CITY ACCESS ROAD
- CITY ROAD
- PRIVATE
- PRIVATE PAVED ROADS
- CITY PARK
- NEIGHBORHOOD GREEN
- OPEN SPACE, SENSITIVE AREAS, BUFFER

H227 H228 H479 H480 H004 H355 H364 H401 H390 H391 H352 H358 H490 H491 H461 H462 H117 H118 H058 H047

City of Dupont
Water System Plan
Hydraulic Modeling Results
March 23, 2011

Scenario: 2011 Available Industrial Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J-72	5.60	82.25	4,000	3,853
250	0.00	76.50	4,000	4,388
J-126	5.60	78.62	4,000	4,407
148	5.60	77.32	4,000	4,579
146	5.60	78.62	4,000	4,670
140	5.60	77.32	4,000	4,673
144	5.60	78.62	4,000	4,683
134	5.60	72.74	4,000	4,685
J-117	5.60	76.15	4,000	4,698
J-125	5.60	77.32	4,000	4,714
142	5.60	79.05	4,000	4,745
138	5.60	77.75	4,000	4,766
J-71	5.60	80.96	4,000	4,768
J-124	5.60	77.76	4,000	4,884
136	5.60	71.01	4,000	5,007
J-266	5.60	83.12	4,000	5,037
J-273	5.60	80.52	4,000	5,105
251	0.00	79.95	4,000	5,117
J-272	5.60	80.95	4,000	5,197
J-123	5.60	77.76	4,000	5,217
J-271	5.60	82.69	4,000	5,271
130	5.60	70.58	4,000	5,301
J-130	5.60	79.38	4,000	5,314
J-270	5.60	81.82	4,000	5,352
J-268	5.60	79.05	4,000	5,443
J-116	5.60	77.21	4,000	5,505
J-267	5.60	82.69	4,000	5,527
J-122	5.60	77.76	4,000	5,608
J-127	5.60	77.75	4,000	5,608
J-129	5.60	82.69	4,000	5,678
J-265	5.60	83.99	4,000	5,821
J-404	5.60	75.12	4,000	5,912
J-264	5.60	82.69	4,000	5,959
J-263	5.60	83.99	4,000	6,112
J-121	5.60	75.60	4,000	6,116
J-262	5.60	83.55	4,000	6,199
J-59	5.60	79.66	4,000	6,295
J-140	5.6	80.09	4,000	6,343
J-138	5.60	80.59	4,000	6,426
J-70	5.60	80.09	4,000	6,533
J-69	5.60	80.52	4,000	6,647
J-68	5.60	81.82	4,000	6,766
J-120	5.60	76.47	4,000	6,803
J-67	5.60	81.82	4,000	6,879
J-403	5.60	77.01	4,000	6,992
J-275	5.60	79.22	4,000	7,113
J-66	5.60	79.66	4,000	7,115
J-62	5.60	84.42	4,000	7,347
J-119	5.60	78.68	4,000	7,470

Reservoir	Level
Hoffman Hills	7.9
Bell Hill	11.6

Source	Capacity (gpm)	Status
Hoffman Hill #1	1,100	OFF
Hoffman Hill #2	1,100	OFF
Bell Hill #1	900	OFF
Bell Hill #2	1,000	OFF
Bell Hill #3	1,000	OFF

System Improvements

City of Dupont
Water System Plan
Hydraulic Modeling Results
March 23, 2011

Scenario: 2011 Available Industrial Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J-6	5.60	79.06	4,000	7,633
J-135	5.60	80.60	4,000	7,668
J-136	5.60	79.44	4,000	7,751
J-134	5.60	80.47	4,000	7,789
J-137	5.60	79.27	4,000	7,833
J-133	5.60	80.14	4,000	7,903
J-132	5.60	81.60	4,000	8,035
J-118	5.60	77.40	4,000	8,067
J1032	5.60	74.80	4,000	8,188
J-274	5.60	79.65	4,000	8,189
J-131	5.60	78.11	4,000	8,204
J-128	5.60	79.65	4,000	8,228
J1030	5.60	76.97	4,000	8,512
J-4	5.60	79.41	4,000	8,555

City of Dupont
Water System Plan
Hydraulic Modeling Results
March 23, 2011

Scenario: 2017 Available Industrial Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J1032	7.77	72.80	4,000	3,740
250	0.00	74.51	4,000	4,203
J-128	7.77	77.71	4,000	4,237
148	7.77	75.31	4,000	4,359
140	7.77	75.31	4,000	4,442
146	7.77	76.61	4,000	4,444
144	7.77	76.61	4,000	4,456
J-127	7.77	75.75	4,000	4,480
J-119	7.77	76.68	4,000	4,483
142	7.77	77.05	4,000	4,511
138	7.77	75.75	4,000	4,528
J1030	7.77	74.97	4,000	4,532
134	7.77	71.42	4,000	4,536
J-126	7.77	76.62	4,000	4,637
J-268	7.77	77.05	4,000	4,779
J-275	7.77	77.27	4,000	4,845
136	7.77	69.69	4,000	4,848
251	0.00	77.96	4,000	4,875
J-274	7.77	77.71	4,000	4,930
J-125	7.77	75.32	4,000	4,945
J-273	7.77	78.57	4,000	4,998
J-132	7.77	79.61	4,000	5,066
J-272	7.77	79.01	4,000	5,073
130	7.77	69.26	4,000	5,129
J-271	7.77	80.74	4,000	5,156
J-118	7.77	75.4	4,000	5,208
J-270	7.77	79.87	4,000	5,233
J-124	7.77	75.75	4,000	5,304
J-129	7.77	80.74	4,000	5,308
J-131	7.77	76.11	4,000	5,386
J-267	7.77	80.74	4,000	5,503
J-6	7.77	77.06	4,000	5,584
J-266	7.77	81.17	4,000	5,630
J-265	7.77	82.04	4,000	5,770
J-123	7.77	75.76	4,000	5,771
J-264	7.77	80.74	4,000	5,850
J-62	7.77	82.47	4,000	5,938
J-263	7.77	82.04	4,000	5,982
J-262	7.77	81.61	4,000	6,057
J-72	7.77	80.31	4,000	6,155
J-71	7.77	79.01	4,000	6,259
J-70	7.77	78.14	4,000	6,368
J-122	7.77	75.76	4,000	6,401
J-69	7.77	78.58	4,000	6,471
J-59	7.77	77.71	4,000	6,574
J-403	7.77	75.01	4,000	6,674
J-68	7.77	79.88	4,000	6,687
J-67	7.77	79.88	4,000	6,899
J-121	7.77	73.60	4,000	6,998

Reservoir	Level
Hoffman Hills	7.9
Bell Hill	11.6

Source	Capacity (gpm)	Status
Hoffman Hill #1	1,100	OFF
Hoffman Hill #2	1,100	OFF
Bell Hill #1	900	OFF
Bell Hill #2	1,000	OFF
Bell Hill #3	1,000	OFF

System Improvements

City of Dupont
Water System Plan
Hydraulic Modeling Results
March 23, 2011

Scenario: 2017 Available Industrial Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J-66	7.77	77.72	4,000	7,160
J-137	7.77	77.32	4,000	7,171
J-138	7.77	78.64	4,000	7,247
J-136	7.77	77.47	4,000	7,279
J-140	7.77	78.15	4,000	7,322
J-135	7.77	78.63	4,000	7,380
J-134	7.77	78.49	4,000	7,498
J-120	7.77	74.47	4,000	7,539
J-117	7.77	74.16	4,000	7,645
J-4	7.77	77.41	4,000	7,647
J-133	7.77	78.15	4,000	7,650
J-130	7.77	77.39	4,000	7,681
J-404	7.77	73.14	4,000	7,807
J-116	7.77	75.22	4,000	7,843

City of Dupont
Water System Plan
Hydraulic Modeling Results
March 23, 2011

Scenario: 2017 Available Industrial Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J-128	7.77	77.74	4,000	4,250
148	7.77	75.36	4,000	4,381
140	7.77	75.36	4,000	4,464
146	7.77	76.66	4,000	4,466
144	7.77	76.66	4,000	4,478
J-127	7.77	75.79	4,000	4,503
142	7.77	77.09	4,000	4,534
134	7.77	71.43	4,000	4,538
138	7.77	75.79	4,000	4,551
250	0.00	74.61	4,000	4,605
J-126	7.77	76.66	4,000	4,662
J-268	7.77	77.09	4,000	4,806
136	7.77	69.70	4,000	4,851
J-275	7.77	77.31	4,000	4,865
J-274	7.77	77.74	4,000	4,950
J-125	7.77	75.36	4,000	4,975
J-273	7.77	78.61	4,000	5,020
J-119	7.77	76.79	4,000	5,021
J-272	7.77	79.04	4,000	5,095
130	7.77	69.26	4,000	5,132
J-271	7.77	80.77	4,000	5,179
J-132	7.77	79.67	4,000	5,232
J-270	7.77	79.91	4,000	5,257
251	0.00	78.06	4,000	5,331
J-129	7.77	80.77	4,000	5,333
J-124	7.77	75.80	4,000	5,342
J-131	7.77	76.17	4,000	5,512
J-267	7.77	80.78	4,000	5,531
J-6	7.77	77.10	4,000	5,628
J-266	7.77	81.21	4,000	5,660
J-265	7.77	82.08	4,000	5,802
J-123	7.77	75.80	4,000	5,820
J-264	7.77	80.78	4,000	5,883
J-62	7.77	82.51	4,000	5,973
J-263	7.77	82.08	4,000	6,017
J-262	7.77	81.64	4,000	6,094
J-72	7.77	80.34	4,000	6,193
J-71	7.77	79.05	4,000	6,299
J-70	7.77	78.18	4,000	6,410
J1030	7.77	75.12	4,000	6,416
J-122	7.77	75.81	4,000	6,466
J1032	7.77	73.02	4,000	6,499
J-69	7.77	78.61	4,000	6,515
J-59	7.77	77.75	4,000	6,620
J-118	7.77	75.51	4,000	6,635
J-68	7.77	79.91	4,000	6,734
J-67	7.77	79.92	4,000	6,951
J-121	7.77	73.65	4,000	7,083
J-403	7.77	75.07	4,000	7,104

Reservoir	Level
Hoffman Hills	7.9
Bell Hill	11.6

Source	Capacity (gpm)	Status
Hoffman Hill #1	1,100	OFF
Hoffman Hill #2	1,100	OFF
Bell Hill #1	900	OFF
Bell Hill #2	1,000	OFF
Bell Hill #3	1,000	OFF

System Improvements

Tie into 16-inch water main under Dupont-Steilicoom Road at 2620 Williamson Place.

City of Dupont
Water System Plan
Hydraulic Modeling Results
March 23, 2011

Scenario: 2017 Available Industrial Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J-66	7.77	77.75	4,000	7,217
J-137	7.77	77.35	4,000	7,239
J-138	7.77	78.68	4,000	7,315
J-136	7.77	77.51	4,000	7,351
J-140	7.77	78.19	4,000	7,391
J-135	7.77	78.67	4,000	7,458
J-134	7.77	78.53	4,000	7,583
J-120	7.77	74.52	4,000	7,644
J-133	7.77	78.20	4,000	7,743
J-4	7.77	77.46	4,000	7,758
J-130	7.77	77.43	4,000	7,794
J-404	7.77	73.09	4,000	7,811
J-116	7.77	75.20	4,000	7,836
J-117	7.77	74.20	4,000	7,837

City of Dupont
Water System Plan
Hydraulic Modeling Results
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Scenario: 2031 Available Industrial Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J1032	8.86	71.02	4,000	3,627
250	0.00	72.72	4,000	4,073
J-128	8.86	75.93	4,000	4,106
148	8.86	73.52	4,000	4,219
140	8.86	73.52	4,000	4,297
146	8.86	74.82	4,000	4,303
144	8.86	74.82	4,000	4,315
J-127	8.86	73.96	4,000	4,334
J-119	8.86	74.90	4,000	4,347
142	8.86	75.26	4,000	4,363
138	8.86	73.96	4,000	4,379
J1030	8.86	73.18	4,000	4,383
134	8.86	70.01	4,000	4,446
J-126	8.86	74.82	4,000	4,483
J-268	8.86	75.26	4,000	4,618
J-275	8.86	75.49	4,000	4,684
251	0.00	76.17	4,000	4,722
136	8.86	68.27	4,000	4,746
J-274	8.86	75.93	4,000	4,765
J-125	8.86	73.53	4,000	4,777
J-273	8.86	76.79	4,000	4,830
J-272	8.86	77.23	4,000	4,900
J-132	8.86	77.82	4,000	4,912
J-271	8.86	78.96	4,000	4,979
130	8.86	67.84	4,000	5,017
J-118	8.86	73.62	4,000	5,024
J-270	8.86	78.09	4,000	5,053
J-124	8.86	73.96	4,000	5,118
J-129	8.86	78.96	4,000	5,124
J-131	8.86	74.33	4,000	5,206
J-267	8.86	78.96	4,000	5,310
J-6	8.86	75.27	4,000	5,384
J-266	8.86	79.39	4,000	5,430
J-123	8.86	73.97	4,000	5,561
J-265	8.86	80.26	4,000	5,563
J-264	8.86	78.96	4,000	5,639
J-62	8.86	80.70	4,000	5,722
J-263	8.86	80.26	4,000	5,763
J-262	8.86	79.83	4,000	5,835
J-72	8.86	78.53	4,000	5,927
J-71	8.86	77.23	4,000	6,026
J-70	8.86	76.37	4,000	6,130
J-122	8.86	73.97	4,000	6,157
J-69	8.86	76.80	4,000	6,227
J-59	8.86	75.93	4,000	6,324
J-403	8.86	73.23	4,000	6,407
J-68	8.86	78.10	4,000	6,431
J-67	8.86	78.10	4,000	6,632
J-121	8.86	71.81	4,000	6,712

Reservoir	Level
Hoffman Hills	7.9
Bell Hill	11.6

Source	Capacity (gpm)	Status
Hoffman Hill #1	1,100	OFF
Hoffman Hill #2	1,100	OFF
Bell Hill #1	900	OFF
Bell Hill #2	1,000	OFF
Bell Hill #3	1,000	OFF

System Improvements

City of Dupont
Water System Plan
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Scenario: 2031 Available Industrial Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J-137	8.86	75.54	4,000	6,877
J-66	8.86	75.94	4,000	6,879
J-138	8.86	76.86	4,000	6,948
J-136	8.86	75.69	4,000	6,977
J-140	8.86	76.38	4,000	7,018
J-135	8.86	76.84	4,000	7,071
J-134	8.86	76.71	4,000	7,181
J-120	8.86	72.68	4,000	7,222
J-117	8.86	72.38	4,000	7,320
J-4	8.86	75.63	4,000	7,322
J-133	8.86	76.37	4,000	7,322
J-404	8.86	71.37	4,000	7,343
J-130	8.86	75.60	4,000	7,353
J-116	8.86	73.45	4,000	7,375

City of Dupont
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Scenario: 2031 Available Industrial Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J-128	8.86	75.97	4,000	4,120
148	8.86	73.57	4,000	4,240
140	8.86	73.57	4,000	4,319
146	8.86	74.87	4,000	4,325
144	8.86	74.87	4,000	4,336
J-127	8.86	74.01	4,000	4,356
142	8.86	75.31	4,000	4,386
138	8.86	74.01	4,000	4,402
134	8.86	70.02	4,000	4,449
250	0.00	72.83	4,000	4,459
J-126	8.86	74.87	4,000	4,508
J-268	8.86	75.31	4,000	4,645
J-275	8.86	75.53	4,000	4,703
136	8.86	68.28	4,000	4,750
J-274	8.86	75.96	4,000	4,785
J-125	8.86	73.58	4,000	4,806
J-273	8.86	76.83	4,000	4,851
J-119	8.86	75.01	4,000	4,863
J-272	8.86	77.26	4,000	4,923
J-271	8.86	79.00	4,000	5,003
130	8.86	67.85	4,000	5,021
J-132	8.86	77.89	4,000	5,072
J-270	8.86	78.13	4,000	5,077
J-129	8.86	79.00	4,000	5,149
J-124	8.86	74.01	4,000	5,155
251	0.00	76.28	4,000	5,160
J-131	8.86	74.39	4,000	5,327
J-267	8.86	79.00	4,000	5,337
J-6	8.86	75.32	4,000	5,426
J-266	8.86	79.43	4,000	5,460
J-265	8.86	80.30	4,000	5,595
J-123	8.86	74.02	4,000	5,608
J-264	8.86	79.00	4,000	5,671
J-62	8.86	80.74	4,000	5,756
J-263	8.86	80.30	4,000	5,798
J-262	8.86	79.87	4,000	5,871
J-72	8.86	78.57	4,000	5,965
J-71	8.86	77.27	4,000	6,065
J-70	8.86	76.41	4,000	6,170
J1030	8.86	73.34	4,000	6,183
J-122	8.86	74.02	4,000	6,220
J1032	8.86	71.25	4,000	6,252
J-69	8.86	76.84	4,000	6,269
J-59	8.86	75.97	4,000	6,369
J-118	8.86	73.74	4,000	6,391
J-68	8.86	78.14	4,000	6,477
J-67	8.86	78.14	4,000	6,682
J-121	8.86	71.86	4,000	6,796
J-403	8.86	73.30	4,000	6,831
J-66	8.86	75.98	4,000	6,934

Reservoir	Level
Hoffman Hills	7.9
Bell Hill	11.6

Source	Capacity (gpm)	Status
Hoffman Hill #1	1,100	OFF
Hoffman Hill #2	1,100	OFF
Bell Hill #1	900	OFF
Bell Hill #2	1,000	OFF
Bell Hill #3	1,000	OFF

System Improvements

Tie into 16-inch water main under Dupont-Steilicoom Road at 2620 Williamson Place.

City of Dupont
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Scenario: 2031 Available Industrial Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J-137	8.86	75.58	4,000	6,941
J-138	8.86	76.90	4,000	7,014
J-136	8.86	75.73	4,000	7,046
J-140	8.86	76.42	4,000	7,085
J-135	8.86	76.89	4,000	7,145
J-134	8.86	76.75	4,000	7,262
J-120	8.86	72.73	4,000	7,323
J-404	8.86	71.32	4,000	7,347
J-116	8.86	73.43	4,000	7,368
J-133	8.86	76.42	4,000	7,411
J-117	8.86	72.43	4,000	7,411
J-4	8.86	75.68	4,000	7,430
J-130	8.86	75.65	4,000	7,463

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Scenario: 2011 Available Commercial Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J-79	5.60	62.46	2,500	2,780
J-166	5.60	69.40	2,500	2,936
J-294	5.60	65.12	2,500	2,943
SF1	5.60	74.60	2,500	3,049
J-313	5.60	62.46	2,500	3,325
J-165	5.60	71.07	2,500	3,421
J-353	5.60	72.82	2,500	3,425
196	5.60	70.64	2,500	3,520
106	5.60	61.91	2,500	3,658
132	5.60	69.75	2,500	3,759
J-190	5.60	61.16	2,500	3,908
J-168	5.60	69.73	2,500	3,943
J-186	5.60	61.07	2,500	3,953
J-206	5.60	70.64	2,500	3,968
J-352	5.60	65.12	2,500	4,113
SF2	5.60	61.59	2,500	4,130
J-171	5.60	61.16	2,500	4,131
J-173	5.60	69.70	2,500	4,208
J-187	5.60	66.73	2,500	4,221
210	5.60	61.94	2,500	4,314
J-205	5.60	80.82	2,500	4,408
174	5.60	69.69	2,500	4,450
J-188	5.60	81.11	2,500	4,486
168	5.60	61.16	2,500	4,524
J-169	5.60	62.89	2,500	4,531
J-167	5.60	81.41	2,500	4,593
40	5.60	62.46	2,500	4,637
J-164	5.60	60.29	2,500	4,751
J-170	5.60	62.47	2,500	4,802
J-88	5.60	62.90	2,500	4,820
J-78	5.60	75.99	2,500	4,823
J1028	5.60	60.73	2,500	4,896
J-172	5.60	75.99	2,500	4,906
J1026	5.60	66.73	2,500	4,944
158	5.60	66.73	2,500	4,949
160	5.60	76.85	2,500	5,187
J1024	5.60	69.84	2,500	5,201
J-292	5.60	63.33	2,500	5,227
J-316	5.60	74.60	2,500	5,237
J-312	5.60	69.84	2,500	5,255
J-293	5.60	74.95	2,500	5,267
192	5.60	76.85	2,500	5,274
J1022	5.60	70.64	2,500	5,276
J-349	5.60	72.82	2,500	5,308
194	5.60	68.42	2,500	5,324
36	5.60	79.77	2,500	5,436
172	5.60	69.84	2,500	5,463
J-291	5.60	75.03	2,500	5,466
J-311	5.60	70.71	2,500	5,488

Reservoir	Level
Hoffman Hills	7.9
Bell Hill	11.6

Source	Capacity (gpm)	Status
Hoffman Hill #1	1,100	OFF
Hoffman Hill #2	1,100	OFF
Bell Hill #1	900	OFF
Bell Hill #2	1,000	OFF
Bell Hill #3	1,000	OFF

System Improvements

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Scenario: 2011 Available Commercial Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J-250	5.60	80.68	2,500	5,491
170	5.60	83.58	2,500	5,543
38	5.60	61.60	2,500	5,544
J-87	5.60	62.03	2,500	5,596
J-89	5.60	62.89	2,500	5,598
J-315	5.60	62.90	2,500	5,604
J-77	5.60	62.90	2,500	5,632
J-80	5.60	81.41	2,500	5,776
42	5.60	79.24	2,500	5,932
44	5.60	74.60	2,500	5,944
J-314	5.60	61.94	2,500	5,958
J-207	5.60	77.08	2,500	5,958
48	5.60	61.94	2,500	5,967
J-204	5.60	72.00	2,500	5,999
J-240	5.60	61.95	2,500	6,001
J-203	5.60	81.19	2,500	6,048
J1012	5.60	81.19	2,500	6,048
J1020	5.60	64.46	2,500	6,050
J-182	5.60	64.67	2,500	6,058
J-139	5.60	80.07	2,500	6,088
164	5.60	62.80	2,500	6,091
J-208	5.60	79.65	2,500	6,094
166	5.60	64.25	2,500	6,102
J-183	5.60	81.19	2,500	6,109
J1010	5.60	64.12	2,500	6,148
J-202	5.60	62.03	2,500	6,159
J-163	5.60	77.08	2,500	6,163
46	5.60	66.13	2,500	6,207
J-105	5.60	64.97	2,500	6,256
J-184	5.60	68.42	2,500	6,257
J-209	5.60	69.32	2,500	6,267
J-200	5.60	68.90	2,500	6,269
J-185	5.60	70.67	2,500	6,345
J-100	5.60	70.09	2,500	6,370
J-189	5.60	64.83	2,500	6,382
J-225	5.60	71.07	2,500	6,409
188	5.60	78.59	2,500	6,417
J1006	5.60	68.46	2,500	6,461
J-198	5.60	72.02	2,500	6,484
J-251	5.60	67.16	2,500	6,486
156	5.60	78.59	2,500	6,496
J1004	5.60	68.14	2,500	6,520
J-201	5.60	63.33	2,500	6,534
J-86	5.60	67.17	2,500	6,540
154	5.60	65.57	2,500	6,624
J-181	5.60	72.81	2,500	6,627
114	5.60	62.90	2,500	6,641
J-76	5.60	62.47	2,500	6,651
J-90	5.60	71.58	2,500	6,666

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Scenario: 2011 Available Commercial Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J-343	5.60	64.68	2,500	6,675
J-400	5.60	77.08	2,500	6,772
50	5.60	63.66	2,500	6,824
J-180	5.60	77.08	2,500	6,855
52	5.60	72.78	2,500	6,886
32	5.60	69.35	2,500	6,894
J-346	5.60	72.87	2,500	6,942
J-284	5.60	60.32	2,500	7,038
J-300	5.60	61.18	2,500	7,132
J-399	5.60	65.06	2,500	7,176
J-160	5.60	62.03	2,500	7,182
J-174	5.60	67.66	2,500	7,200
J-161	5.60	61.60	2,500	7,226
J-162	5.60	61.70	2,500	7,245
J-401	5.60	61.17	2,500	7,308
J-83	5.60	62.04	2,500	7,310
J-176	5.60	61.70	2,500	7,345
J-402	5.60	61.71	2,500	7,364
J-179	5.60	62.03	2,500	7,402
J-81	5.60	62.93	2,500	7,423
J-177	5.60	64.68	2,500	7,429
162	5.60	62.90	2,500	7,456
J-84	5.60	64.20	2,500	7,500
J-175	5.60	62.90	2,500	7,554
J-82	5.60	66.27	2,500	7,579
34	5.60	77.08	2,500	7,585
56	5.60	69.42	2,500	7,602
J-249	5.60	70.28	2,500	7,607
J-149	5.60	79.25	2,500	7,616
J-137	5.60	63.79	2,500	7,617
J-74	5.60	62.91	2,500	7,621
J-75	5.60	62.90	2,500	7,631
J-85	5.60	63.37	2,500	7,689
J-73	5.60	65.12	2,500	7,694
J-178	5.60	80.57	2,500	7,699
J-138	5.60	77.29	2,500	7,711
J-142	5.60	79.41	2,500	7,734
J-136	5.60	77.87	2,500	7,740
J-37	5.60	77.08	2,500	7,770
54	5.60	80.07	2,500	7,781
J-140	5.60	72.87	2,500	7,803
J-150	5.60	80.58	2,500	7,843
J-135	5.60	74.06	2,500	7,866
J-143	5.60	70.34	2,500	7,881
J-145	5.60	67.67	2,500	7,886
J-297	5.60	71.11	2,500	7,889
186	5.60	61.91	2,500	7,896
J-45	5.60	66.68	2,500	7,896
HH132	5.60	65.07	2,500	7,897

City of Dupont
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Scenario: 2011 Available Commercial Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J-296	5.60	81.10	2,500	7,898
J-141	5.60	78.38	2,500	7,900
126	5.60	78.38	2,500	7,900
128	5.60	70.58	2,500	7,900
212	5.60	63.33	2,500	7,907
J-295	5.60	61.91	2,500	7,908
68	5.60	73.73	2,500	7,948
J-298	5.60	70.58	2,500	7,971
J-397	5.60	80.44	2,500	7,971
J-134	5.60	70.30	2,500	7,997
J-146	5.60	64.18	2,500	8,002
J-261	5.60	72.83	2,500	8,012
184	5.60	64.09	2,500	8,072
62	5.60	69.94	2,500	8,107
J-144	5.60	80.11	2,500	8,133
J-133	5.60	72.44	2,500	8,140
J-299	5.60	72.80	2,500	8,161
J-351	5.60	64.09	2,500	8,189
J-318	5.60	67.17	2,500	8,248
116	5.60	72.86	2,500	8,264
176	5.60	69.35	2,500	8,326
J-345	5.60	66.27	2,500	8,329
26	5.60	71.94	2,500	8,352
178	5.60	68.48	2,500	8,370
J-347	5.60	68.48	2,500	8,428
118	5.60	68.04	2,500	8,524
J-350	5.60	66.28	2,500	8,542
J-317	5.60	64.99	2,500	8,591
198	5.60	74.95	2,500	8,594
190	5.60	74.95	2,500	8,615
150	5.60	65.86	2,500	8,638
152	5.60	76.26	2,500	8,640
182	5.60	74.96	2,500	8,677
180				

City of Dupont
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Scenario: 2017 Available Commercial Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J-166	7.77	60.89	2,500	2,631
J-294	7.77	67.82	2,500	2,806
SF1	7.77	63.34	2,500	2,833
J-313	7.77	73.04	2,500	2,932
J-165	7.77	60.89	2,500	3,161
J-353	7.77	69.58	2,500	3,286
196	7.77	71.32	2,500	3,298
106	7.77	69.15	2,500	3,382
132	7.77	60.53	2,500	3,487
J-190	7.77	67.70	2,500	3,609
J-168	7.77	59.59	2,500	3,721
J-186	7.77	67.69	2,500	3,771
J-206	7.77	59.08	2,500	3,790
J-352	7.77	69.15	2,500	3,824
J-173	7.77	59.59	2,500	3,929
J-171	7.77	60.02	2,500	3,930
SF2	7.77	63.34	2,500	3,960
J-187	7.77	67.69	2,500	4,000
210	7.77	65.26	2,500	4,055
J-205	7.77	59.95	2,500	4,088
J-188	7.77	67.68	2,500	4,210
174	7.77	78.84	2,500	4,244
J-169	7.77	59.59	2,500	4,289
J-167	7.77	61.32	2,500	4,295
168	7.77	79.14	2,500	4,313
40	7.77	80.03	2,500	4,397
J-164	7.77	60.89	2,500	4,401
J-170	7.77	58.72	2,500	4,492
J-88	7.77	60.90	2,500	4,563
J-78	7.77	61.34	2,500	4,583
J1028	7.77	74.22	2,500	4,615
J-172	7.77	59.16	2,500	4,629
J1026	7.77	74.22	2,500	4,685
158	7.77	65.26	2,500	4,733
160	7.77	65.26	2,500	4,737
J1024	7.77	75.08	2,500	4,926
J-292	7.77	68.26	2,500	4,945
J-316	7.77	61.79	2,500	4,962
J-293	7.77	68.26	2,500	4,989
J1022	7.77	75.08	2,500	4,999
J-312	7.77	73.04	2,500	5,012
J-349	7.77	69.15	2,500	5,058
192	7.77	73.50	2,500	5,082
194	7.77	71.32	2,500	5,101
36	7.77	67.02	2,500	5,125
172	7.77	77.80	2,500	5,165
J-291	7.77	68.26	2,500	5,166
J-250	7.77	69.13	2,500	5,193
J-87	7.77	60.04	2,500	5,195

Reservoir	Level
Hoffman Hills	7.9
Bell Hill	11.6

Source	Capacity (gpm)	Status
Hoffman Hill #1	1,100	OFF
Hoffman Hill #2	1,100	OFF
Bell Hill #1	900	OFF
Bell Hill #2	1,000	OFF
Bell Hill #3	1,000	OFF

System Improvements

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Scenario: 2017 Available Commercial Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J-311	7.77	73.47	2,500	5,213
170	7.77	78.71	2,500	5,219
J-89	7.77	60.47	2,500	5,241
J-77	7.77	61.34	2,500	5,257
J-315	7.77	61.36	2,500	5,269
J-80	7.77	61.34	2,500	5,279
38	7.77	82.19	2,500	5,294
42	7.77	80.03	2,500	5,511
J-204	7.77	59.95	2,500	5,533
J-207	7.77	59.95	2,500	5,534
J-203	7.77	59.96	2,500	5,572
J-314	7.77	73.04	2,500	5,615
J-240	7.77	70.42	2,500	5,628
J-208	7.77	60.81	2,500	5,642
J-182	7.77	62.63	2,500	5,648
44	7.77	77.86	2,500	5,656
J-139	7.77	62.80	2,500	5,657
48	7.77	75.70	2,500	5,681
J-183	7.77	62.47	2,500	5,692
J-202	7.77	62.13	2,500	5,692
J-163	7.77	60.46	2,500	5,693
J1012	7.77	79.42	2,500	5,707
J1020	7.77	79.42	2,500	5,707
J1010	7.77	79.42	2,500	5,762
164	7.77	78.10	2,500	5,765
166	7.77	77.68	2,500	5,768
J-209	7.77	66.43	2,500	5,789
J-200	7.77	67.33	2,500	5,797
J-185	7.77	66.91	2,500	5,799
J-105	7.77	64.23	2,500	5,803
J-184	7.77	63.22	2,500	5,836
J-100	7.77	68.69	2,500	5,866
46	7.77	75.70	2,500	5,871
J-189	7.77	68.11	2,500	5,889
J-225	7.77	63.12	2,500	5,947
J1006	7.77	76.82	2,500	6,038
J-198	7.77	66.53	2,500	6,039
J-86	7.77	61.77	2,500	6,044
188	7.77	69.59	2,500	6,045
J-251	7.77	70.43	2,500	6,065
156	7.77	65.69	2,500	6,076
J-201	7.77	66.19	2,500	6,099
J1004	7.77	76.82	2,500	6,110
154	7.77	65.69	2,500	6,123
J-90	7.77	60.90	2,500	6,136
J-76	7.77	61.34	2,500	6,137
J-181	7.77	63.88	2,500	6,169
J-400	7.77	63.11	2,500	6,194
J-343	7.77	70.00	2,500	6,226

City of Dupont
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Scenario: 2017 Available Commercial Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
114	7.77	71.32	2,500	6,246
J-180	7.77	62.02	2,500	6,323
50	7.77	75.71	2,500	6,417
J-346	7.77	67.86	2,500	6,455
J-300	7.77	58.77	2,500	6,459
J-284	7.77	71.29	2,500	6,483
52	7.77	75.71	2,500	6,488
32	7.77	71.33	2,500	6,511
J-399	7.77	59.63	2,500	6,553
J-174	7.77	60.47	2,500	6,560
J-162	7.77	60.03	2,500	6,619
J-160	7.77	63.50	2,500	6,626
J-401	7.77	60.12	2,500	6,660
J-161	7.77	66.10	2,500	6,680
J-83	7.77	59.61	2,500	6,691
J-176	7.77	60.48	2,500	6,710
J-402	7.77	60.12	2,500	6,746
J-179	7.77	60.13	2,500	6,763
J-81	7.77	60.47	2,500	6,785
J-177	7.77	61.36	2,500	6,824
J-175	7.77	62.64	2,500	6,843
J-84	7.77	61.34	2,500	6,846
162	7.77	63.12	2,500	6,858
J-82	7.77	61.34	2,500	6,926
J-85	7.77	61.34	2,500	6,998
J-75	7.77	61.36	2,500	6,998
J-74	7.77	62.23	2,500	7,007
J-249	7.77	67.83	2,500	7,037
J-178	7.77	63.55	2,500	7,047
J-149	7.77	68.70	2,500	7,052
J-73	7.77	61.80	2,500	7,063
34	7.77	64.84	2,500	7,095
J-137	7.77	77.29	2,500	7,124
68	7.77	60.58	2,500	7,153
J-45	7.77	60.59	2,500	7,156
126	7.77	77.05	2,500	7,157
128	7.77	77.05	2,500	7,157
212	7.77	69.26	2,500	7,157
HH132	7.77	65.36	2,500	7,158
J-150	7.77	71.29	2,500	7,163
J-297	7.77	66.11	2,500	7,166
56	7.77	75.72	2,500	7,167
J-296	7.77	63.51	2,500	7,181
J-397	7.77	69.23	2,500	7,189
J-138	7.77	78.62	2,500	7,199
J-295	7.77	61.79	2,500	7,205
J-142	7.77	75.52	2,500	7,209
J-298	7.77	72.17	2,500	7,220
J-136	7.77	77.45	2,500	7,228

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Scenario: 2017 Available Commercial Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J-37	7.77	76.06	2,500	7,252
54	7.77	75.72	2,500	7,255
J-140	7.77	78.13	2,500	7,273
62	7.77	62.71	2,500	7,284
J-261	7.77	62.66	2,500	7,287
J-145	7.77	68.75	2,500	7,306
J-135	7.77	78.60	2,500	7,325
J-143	7.77	72.37	2,500	7,331
186	7.77	69.58	2,500	7,351
J-299	7.77	70.88	2,500	7,385
J-318	7.77	62.69	2,500	7,389
J-146	7.77	68.73	2,500	7,389
J-141	7.77	79.23	2,500	7,420
J-134	7.77	78.47	2,500	7,439
184	7.77	71.32	2,500	7,487
176	7.77	71.32	2,500	7,493
J-144	7.77	68.33	2,500	7,497
26	7.77	64.84	2,500	7,512
J-345	7.77	67.86	2,500	7,570
J-133	7.77	78.13	2,500	7,584
J-347	7.77	66.99	2,500	7,609
J-351	7.77	71.32	2,500	7,627
116	7.77	65.69	2,500	7,639
118	7.77	66.99	2,500	7,664
J-317	7.77	64.83	2,500	7,702
198	7.77	63.53	2,500	7,744
J-350	7.77	66.56	2,500	7,749
150	7.77	73.49	2,500	7,757
182	7.77	74.79	2,500	7,774
180	7.77	73.49	2,500	7,807
152	7.77	64.39	2,500	7,846
178	7.77	70.45	2,500	7,856
190	7.77	73.49	2,500	8,075

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Scenario: 2031 Available Commercial Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J-166	8.86	59.24	2,500	2,564
J-294	8.86	66.17	2,500	2,744
SF1	8.86	61.62	2,500	2,774
J-313	8.86	71.40	2,500	2,875
J-165	8.86	59.24	2,500	3,073
J-353	8.86	67.97	2,500	3,215
196	8.86	69.70	2,500	3,231
106	8.86	67.54	2,500	3,308
132	8.86	59.04	2,500	3,401
J-190	8.86	65.90	2,500	3,480
J-168	8.86	57.94	2,500	3,606
J-186	8.86	65.90	2,500	3,636
J-206	8.86	57.30	2,500	3,638
J-352	8.86	67.54	2,500	3,736
J-173	8.86	57.95	2,500	3,806
J-171	8.86	58.38	2,500	3,808
SF2	8.86	61.62	2,500	3,828
J-187	8.86	65.90	2,500	3,857
J-205	8.86	58.17	2,500	3,922
210	8.86	63.65	2,500	3,952
J-188	8.86	65.89	2,500	4,058
174	8.86	77.06	2,500	4,120
J-169	8.86	57.94	2,500	4,136
J-167	8.86	59.68	2,500	4,141
168	8.86	77.36	2,500	4,187
J-164	8.86	59.24	2,500	4,239
40	8.86	78.54	2,500	4,278
J-170	8.86	57.08	2,500	4,309
J-88	8.86	59.26	2,500	4,385
J-78	8.86	59.70	2,500	4,405
J-172	8.86	57.51	2,500	4,428
J1028	8.86	72.50	2,500	4,461
J1026	8.86	72.50	2,500	4,527
158	8.86	63.65	2,500	4,585
160	8.86	63.65	2,500	4,588
J-316	8.86	60.17	2,500	4,748
J-292	8.86	66.60	2,500	4,751
J1024	8.86	73.37	2,500	4,759
J-293	8.86	66.60	2,500	4,789
J1022	8.86	73.37	2,500	4,828
J-312	8.86	71.40	2,500	4,837
J-349	8.86	67.54	2,500	4,882
194	8.86	69.70	2,500	4,929
192	8.86	71.92	2,500	4,942
J-87	8.86	58.39	2,500	4,948
J-291	8.86	66.60	2,500	4,959
J-250	8.86	67.47	2,500	4,987
J-89	8.86	58.83	2,500	4,994
172	8.86	76.02	2,500	4,997

Reservoir	Level
Hoffman Hills	7.9
Bell Hill	11.6

Source	Capacity (gpm)	Status
Hoffman Hill #1	1,100	OFF
Hoffman Hill #2	1,100	OFF
Bell Hill #1	900	OFF
Bell Hill #2	1,000	OFF
Bell Hill #3	1,000	OFF

System Improvements

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Scenario: 2031 Available Commercial Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
36	8.86	65.51	2,500	4,999
J-77	8.86	59.70	2,500	5,015
J-311	8.86	71.83	2,500	5,030
J-315	8.86	59.73	2,500	5,033
J-80	8.86	59.70	2,500	5,035
170	8.86	76.93	2,500	5,051
38	8.86	80.70	2,500	5,136
J-204	8.86	58.17	2,500	5,265
J-207	8.86	58.17	2,500	5,273
J-203	8.86	58.18	2,500	5,308
42	8.86	78.54	2,500	5,331
J-208	8.86	59.03	2,500	5,367
J-182	8.86	60.90	2,500	5,399
J-240	8.86	68.77	2,500	5,402
J-314	8.86	71.40	2,500	5,408
J-139	8.86	61.06	2,500	5,409
J-163	8.86	58.82	2,500	5,410
J-202	8.86	60.35	2,500	5,412
J-183	8.86	60.76	2,500	5,439
44	8.86	76.38	2,500	5,461
48	8.86	74.22	2,500	5,484
J1012	8.86	77.70	2,500	5,499
J1020	8.86	77.70	2,500	5,499
J-209	8.86	64.65	2,500	5,502
J-200	8.86	65.55	2,500	5,510
J-185	8.86	65.13	2,500	5,511
J1010	8.86	77.70	2,500	5,551
J-105	8.86	62.48	2,500	5,553
164	8.86	76.32	2,500	5,568
166	8.86	75.89	2,500	5,569
J-100	8.86	66.91	2,500	5,572
J-184	8.86	61.52	2,500	5,578
J-189	8.86	66.33	2,500	5,596
46	8.86	74.22	2,500	5,653
J-225	8.86	61.43	2,500	5,680
J-86	8.86	60.13	2,500	5,748
J-198	8.86	64.77	2,500	5,773
J1006	8.86	75.10	2,500	5,808
J-251	8.86	68.77	2,500	5,812
J-201	8.86	64.42	2,500	5,815
188	8.86	67.98	2,500	5,815
156	8.86	64.09	2,500	5,823
J-90	8.86	59.26	2,500	5,825
J-76	8.86	59.71	2,500	5,833
154	8.86	64.08	2,500	5,866
J1004	8.86	75.10	2,500	5,877
J-181	8.86	62.21	2,500	5,891
J-400	8.86	61.48	2,500	5,903
J-343	8.86	68.34	2,500	5,962

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Scenario: 2031 Available Commercial Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
114	8.86	69.71	2,500	6,012
J-180	8.86	60.36	2,500	6,019
J-300	8.86	57.14	2,500	6,111
50	8.86	74.24	2,500	6,148
J-346	8.86	66.24	2,500	6,188
J-174	8.86	58.82	2,500	6,190
J-284	8.86	69.64	2,500	6,193
J-399	8.86	58.00	2,500	6,205
52	8.86	74.24	2,500	6,214
J-162	8.86	58.38	2,500	6,257
32	8.86	69.76	2,500	6,277
J-160	8.86	61.86	2,500	6,297
J-401	8.86	58.48	2,500	6,308
J-83	8.86	57.97	2,500	6,323
J-176	8.86	58.84	2,500	6,351
J-161	8.86	64.46	2,500	6,368
J-402	8.86	58.48	2,500	6,387
J-179	8.86	58.49	2,500	6,403
J-81	8.86	58.84	2,500	6,418
J-175	8.86	61.00	2,500	6,448
J-177	8.86	59.73	2,500	6,466
J-84	8.86	59.70	2,500	6,483
162	8.86	61.48	2,500	6,500
J-82	8.86	59.70	2,500	6,525
J-85	8.86	59.70	2,500	6,607
HH132	8.86	63.94	2,500	6,618
J-45	8.86	59.17	2,500	6,623
J-75	8.86	59.73	2,500	6,628
126	8.86	75.64	2,500	6,629
128	8.86	75.64	2,500	6,629
212	8.86	67.84	2,500	6,629
J-74	8.86	60.60	2,500	6,644
68	8.86	59.15	2,500	6,658
J-178	8.86	61.92	2,500	6,662
J-73	8.86	60.17	2,500	6,691
J-397	8.86	67.77	2,500	6,694
J-249	8.86	66.18	2,500	6,704
56	8.86	74.25	2,500	6,705
J-149	8.86	67.05	2,500	6,724
J-297	8.86	64.47	2,500	6,743
J-296	8.86	61.88	2,500	6,759
62	8.86	61.22	2,500	6,783
J-150	8.86	69.64	2,500	6,787
J-295	8.86	60.16	2,500	6,790
J-298	8.86	70.53	2,500	6,793
34	8.86	63.30	2,500	6,797
J-137	8.86	75.51	2,500	6,831
J-261	8.86	61.03	2,500	6,864
J-318	8.86	61.18	2,500	6,881

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Scenario: 2031 Available Commercial Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J-138	8.86	76.84	2,500	6,902
J-142	8.86	73.81	2,500	6,911
J-136	8.86	75.67	2,500	6,928
54	8.86	74.25	2,500	6,933
J-299	8.86	69.25	2,500	6,942
J-146	8.86	67.08	2,500	6,946
J-37	8.86	74.33	2,500	6,962
J-145	8.86	67.09	2,500	6,966
J-140	8.86	76.35	2,500	6,972
26	8.86	63.30	2,500	6,994
J-143	8.86	70.68	2,500	7,014
J-135	8.86	76.82	2,500	7,019
186	8.86	67.96	2,500	7,029
176	8.86	69.68	2,500	7,041
J-144	8.86	66.67	2,500	7,044
J-345	8.86	66.24	2,500	7,124
J-134	8.86	76.68	2,500	7,125
J-141	8.86	77.48	2,500	7,137
J-347	8.86	65.38	2,500	7,161
J-317	8.86	63.25	2,500	7,170
184	8.86	69.70	2,500	7,173
198	8.86	61.95	2,500	7,209
118	8.86	65.38	2,500	7,213
150	8.86	71.91	2,500	7,216
182	8.86	73.20	2,500	7,229
J-133	8.86	76.34	2,500	7,260
180	8.86	71.89	2,500	7,260
116	8.86	64.08	2,500	7,284
J-351	8.86	69.71	2,500	7,291
J-350	8.86	64.95	2,500	7,295
178	8.86	68.85	2,500	7,306
152	8.86	62.79	2,500	7,383
190	8.86	71.91	2,500	7,588

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Scenario: 2011 Available Residential Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
HH80	5.60	86.06	1,000	1,724
HH82	5.60	89.52	1,000	1,731
HH84	5.60	93.42	1,000	1,731
HH86	5.60	89.52	1,000	1,731
HH78	5.60	88.66	1,000	1,731
HH88	5.60	96.46	1,000	1,732
HH90	5.60	97.32	1,000	1,734
HH74	5.60	87.36	1,000	1,736
HH66	5.60	101.23	1,000	1,738
HH94	5.60	105.56	1,000	1,741
HH92	5.60	93.86	1,000	1,743
HH102	5.60	107.72	1,000	1,744
HH104	5.60	112.92	1,000	1,744
HH106	5.60	123.32	1,000	1,744
HH108	5.60	128.95	1,000	1,744
HH110	5.60	131.98	1,000	1,744
HH76	5.60	92.56	1,000	1,744
HH98	5.60	105.12	1,000	1,746
HH100	5.60	105.99	1,000	1,748
HH96	5.60	102.53	1,000	1,748
HH64	5.60	94.73	1,000	1,748
HH72	5.60	94.30	1,000	1,750
HH112	5.60	112.06	1,000	1,752
HH120	5.60	104.69	1,000	1,753
HH124	5.60	99.49	1,000	1,753
HH122	5.60	102.52	1,000	1,753
HH126	5.60	104.26	1,000	1,753
HH128	5.60	94.29	1,000	1,753
HH130	5.60	100.36	1,000	1,754
HH114	5.60	94.30	1,000	1,756
HH62	5.60	89.97	1,000	1,756
HH70	5.60	96.47	1,000	1,757
HH118	5.60	86.52	1,000	1,757
HH116	5.60	86.95	1,000	1,758
HH58	5.60	82.23	1,000	1,758
HH60	5.60	88.69	1,000	1,758
HH68	5.60	89.54	1,000	1,758
J-197	5.60	68.96	1,000	1,890
J-220	5.60	71.83	1,000	1,985
J-219	5.60	71.84	1,000	2,042
30	5.60	77.08	1,000	2,078
J-256	5.60	74.61	1,000	2,089
J-196	5.60	68.96	1,000	2,150
RM4	5.6	37.18	1,000	2,176
J-222	5.60	69.22	1,000	2,249
12	5.60	77.08	1,000	2,288
28	5.60	66.25	1,000	2,291
RM12	5.60	61.01	1,000	2,325
J-223	5.60	68.36	1,000	2,333

Reservoir	Level
Hoffman Hills	7.9
Bell Hill	11.6

Source	Capacity (gpm)	Status
Hoffman Hill #1	1,100	OFF
Hoffman Hill #2	1,100	OFF
Bell Hill #1	900	OFF
Bell Hill #2	1,000	OFF
Bell Hill #3	1,000	OFF

System Improvements

City of Dupont
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Scenario: 2011 Available Residential Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J-221	5.60	70.09	1,000	2,399
RM6	5.60	78.35	1,000	2,453
RM8	5.60	106.08	1,000	2,453
RM10	5.60	66.21	1,000	2,559
J-245	5.60	69.39	1,000	2,652
J-244	5.60	69.39	1,000	2,679
J-248	5.60	69.39	1,000	2,708
10	5.60	72.75	1,000	2,709
J-247	5.60	69.39	1,000	2,764
J-218	5.60	70.69	1,000	2,800
HH6	5.60	65.80	1,000	2,808
RM2	5.60	41.95	1,000	2,811
94	5.60	67.35	1,000	2,820
92	5.60	67.36	1,000	2,852
78	5.60	67.50	1,000	2,860
HH14	0.00	44.58	1,000	2,873
104	5.60	71.00	1,000	2,900
80	5.60	67.47	1,000	2,900
90	5.60	67.85	1,000	2,910
98	5.60	68.37	1,000	2,919
96	5.60	66.90	1,000	2,933
102	5.60	67.91	1,000	2,937
J-195	5.60	68.96	1,000	2,964
HH4	5.60	70.14	1,000	2,973
J-236	5.60	67.90	1,000	2,976
J-194	5.60	68.53	1,000	2,980
HH8	5.60	59.74	1,000	2,994
84	5.60	67.41	1,000	3,000
74	5.60	67.64	1,000	3,022
J-235	5.60	68.34	1,000	3,023
82	5.60	67.90	1,000	3,025
J-224	5.60	67.32	1,000	3,032
76	5.60	67.09	1,000	3,068
HH20	5.60	56.68	1,000	3,071
HH22	5.60	80.95	1,000	3,071
HH24	5.60	88.75	1,000	3,071
HH26	5.60	79.21	1,000	3,071
HH28	5.60	59.28	1,000	3,071
HH30	5.60	68.81	1,000	3,071
HH32	5.60	92.21	1,000	3,071
HH34	5.60	86.58	1,000	3,071
HH36	5.60	57.55	1,000	3,071
HH38	5.60	88.75	1,000	3,071
HH40	5.60	55.82	1,000	3,071
88	5.60	68.25	1,000	3,074
86	5.60	67.38	1,000	3,117
HH18	5.60	54.95	1,000	3,123
100	5.60	67.93	1,000	3,131
J-192	5.60	67.33	1,000	3,140

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Scenario: 2011 Available Residential Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J-191	5.60	67.32	1,000	3,183
HH10	5.60	64.07	1,000	3,202
J-290	5.60	68.56	1,000	3,249
HH2	5.60	64.94	1,000	3,286
J-199	5.60	68.53	1,000	3,345
J-239	5.60	69.96	1,000	3,358
J-158	5.60	73.30	1,000	3,367
J-319	5.60	68.42	1,000	3,437
16	5.60	64.09	1,000	3,858
14	5.60	64.09	1,000	3,879
J-287	5.60	74.62	1,000	3,883
18	5.60	64.09	1,000	3,908
22	5.60	64.09	1,000	4,151
J-97	5.60	72.00	1,000	4,154
J-246	5.60	65.93	1,000	4,264
J-243	5.60	66.79	1,000	4,293
J-393	5.60	44.58	1,000	4,721
J-242	5.60	70.26	1,000	4,753
J-254	5.60	70.71	1,000	4,891
J-241	5.60	71.13	1,000	4,972
J-112	5.60	58.01	1,000	5,108
20	5.60	66.25	1,000	5,193
HH12	5.60	44.58	1,000	5,206
J-305	5.60	71.57	1,000	5,210
J1034	5.60	76.31	1,000	5,217
J-258	5.60	69.41	1,000	5,277
J-115	5.60	74.17	1,000	5,418
64	5.60	44.58	1,000	5,439
J-99	5.60	71.13	1,000	5,449
J-286	5.60	74.19	1,000	5,462
J-306	5.60	70.70	1,000	5,501
J-98	5.60	72.86	1,000	5,525
J-111	5.60	67.69	1,000	5,529
HH134	5.60	58.01	1,000	5,567
J-308	5.60	68.98	1,000	5,582
J-285	5.60	72.89	1,000	5,632
HH136	5.60	58.44	1,000	5,716
J-283	5.60	74.18	1,000	5,735
J-114	5.60	73.16	1,000	5,795
24	5.60	64.10	1,000	5,820
J-288	5.60	69.86	1,000	5,849
66	5.60	42.41	1,000	5,879
J-307	5.60	70.28	1,000	5,941
J-238	5.60	77.33	1,000	5,968
J-252	5.60	74.18	1,000	6,007
J-257	5.60	72.01	1,000	6,071
J-289	5.60	69.86	1,000	6,100
J-259	5.60	69.41	1,000	6,169
HH142	5.60	65.16	1,000	6,182

City of Dupont
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Scenario: 2011 Available Residential Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J-255	5.60	69.85	1,000	6,285
J-155	5.60	65.06	1,000	6,408
70	5.60	51.08	1,000	6,541
J-237	5.60	81.73	1,000	6,557
J-110	5.60	67.86	1,000	6,627
J-156	5.60	67.66	1,000	6,660
58	5.60	66.25	1,000	6,690
J-309	5.60	71.14	1,000	6,757
60	5.60	60.61	1,000	6,789
J-157	5.60	73.30	1,000	6,795
J-159	5.60	69.40	1,000	6,823
J-301	5.60	72.00	1,000	7,018
J-91	5.60	72.86	1,000	7,061
J-92	5.60	73.73	1,000	7,062
J-96	5.60	72.43	1,000	7,087
J-304	5.60	72.43	1,000	7,108
J-303	5.60	74.60	1,000	7,114
J-302	5.60	74.60	1,000	7,175
J-93	5.60	74.60	1,000	7,255
J-154	5.60	65.06	1,000	7,515
72	5.60	44.58	1,000	7,621
110	5.60	58.44	1,000	7,626
J-260	5.60	71.14	1,000	7,633
J-153	5.60	68.10	1,000	7,669
112	5.60	48.91	1,000	7,675
J-152	5.60	71.57	1,000	7,685
J-94	5.60	71.56	1,000	7,720
J-226	5.60	81.82	1,000	7,731
J-148	5.60	72.46	1,000	7,733
J-147	5.60	71.17	1,000	7,781
HH138	5.60	55.41	1,000	7,796
J-103	5.60	55.26	1,000	7,807
J-151	5.60	71.57	1,000	7,812
J-104	5.60	55.34	1,000	7,857
J-95	5.60	73.73	1,000	7,880
108	5.60	58.44	1,000	7,895
J-102	5.60	62.94	1,000	7,917
J-253	5.60	69.91	1,000	7,929
J-322	5.60	44.58	1,000	7,996
J-101	5.60	73.61	1,000	8,030
J-106	5.60	57.64	1,000	8,038
J-113	5.60	75.60	1,000	8,232
J-107	5.60	59.13	1,000	8,234
J-108	5.60	63.54	1,000	8,317
J-109	5.60	62.31	1,000	8,389
J-26	5.60	64.59	1,000	8,527
J-25	0.00	65.01	1,000	8,902
J-19	0.00	65.19	1,000	9,134
J-20	0.00	65.20	1,000	9,216

City of Dupont
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Scenario: 2011 Available Residential Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J-21	0.00	65.21	1,000	9,282
J-22	0.00	65.21	1,000	9,327
J-23	0.00	65.21	1,000	9,353
J-24A	0.00	65.21	1,000	9,363

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Scenario: 2017 Available Residential Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
HH80	7.77	84.88	1,000	1,640
HH82	7.77	88.34	1,000	1,646
HH84	7.77	92.24	1,000	1,646
HH86	7.77	88.34	1,000	1,646
HH78	7.77	87.48	1,000	1,647
HH88	7.77	95.27	1,000	1,647
HH90	7.77	96.14	1,000	1,649
HH74	7.77	86.18	1,000	1,651
HH66	7.77	100.05	1,000	1,653
HH94	7.77	104.37	1,000	1,655
HH92	7.77	92.68	1,000	1,658
HH102	7.77	106.54	1,000	1,658
HH104	7.77	111.74	1,000	1,658
HH106	7.77	122.13	1,000	1,658
HH108	7.77	127.77	1,000	1,658
HH110	7.77	130.80	1,000	1,658
HH76	7.77	91.38	1,000	1,658
HH98	7.77	103.94	1,000	1,660
HH100	7.77	104.81	1,000	1,662
HH96	7.77	101.35	1,000	1,662
HH64	7.77	93.56	1,000	1,662
HH72	7.77	93.12	1,000	1,664
HH112	7.77	110.88	1,000	1,666
HH120	7.77	103.51	1,000	1,666
HH124	7.77	98.31	1,000	1,667
HH122	7.77	101.34	1,000	1,667
HH126	7.77	103.08	1,000	1,667
HH128	7.77	93.11	1,000	1,667
HH130	7.77	99.18	1,000	1,667
HH114	7.77	93.13	1,000	1,670
HH62	7.77	88.81	1,000	1,670
HH70	7.77	95.31	1,000	1,670
HH116	7.77	85.78	1,000	1,671
HH118	7.77	85.36	1,000	1,671
HH58	7.77	81.10	1,000	1,671
HH60	7.77	87.53	1,000	1,671
HH68	7.77	88.38	1,000	1,672
J-197	7.77	66.87	1,000	1,802
J-220	7.77	69.68	1,000	1,901
J-219	7.77	69.70	1,000	1,958
J-256	7.77	73.03	1,000	2,010
30	7.77	75.67	1,000	2,012
J-196	7.77	66.87	1,000	2,058
RM4	7.77	36.28	1,000	2,074
J-222	7.77	67.07	1,000	2,158
28	7.77	64.84	1,000	2,197
12	7.77	75.67	1,000	2,212
RM12	7.77	60.11	1,000	2,213
J-223	7.77	66.22	1,000	2,241

Reservoir	Level
Hoffman Hills	7.9
Bell Hill	11.6

Source	Capacity (gpm)	Status
Hoffman Hill #1	1,100	OFF
Hoffman Hill #2	1,100	OFF
Bell Hill #1	900	OFF
Bell Hill #2	1,000	OFF
Bell Hill #3	1,000	OFF

System Improvements

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Scenario: 2017 Available Residential Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J-221	7.77	67.94	1,000	2,309
RM6	7.77	77.44	1,000	2,333
RM8	7.77	105.17	1,000	2,333
RM10	7.77	65.31	1,000	2,431
J-245	7.77	67.81	1,000	2,525
J-244	7.77	67.81	1,000	2,551
J-248	7.77	67.81	1,000	2,579
10	7.77	71.34	1,000	2,605
J-247	7.77	67.81	1,000	2,633
RM2	7.77	41.04	1,000	2,669
J-218	7.77	68.57	1,000	2,710
HH6	7.77	64.58	1,000	2,712
94	7.77	65.22	1,000	2,717
92	7.77	65.23	1,000	2,746
78	7.77	65.36	1,000	2,755
80	7.77	65.33	1,000	2,792
104	7.77	68.86	1,000	2,802
90	7.77	65.71	1,000	2,802
98	7.77	66.23	1,000	2,813
HH14	0.00	43.77	1,000	2,820
96	7.77	64.77	1,000	2,821
102	7.77	65.77	1,000	2,829
J-195	7.77	66.87	1,000	2,860
J-236	7.77	65.75	1,000	2,864
HH8	7.77	58.51	1,000	2,874
J-194	7.77	66.44	1,000	2,875
HH4	7.77	68.91	1,000	2,878
84	7.77	65.27	1,000	2,886
J-235	7.77	66.20	1,000	2,910
82	7.77	65.76	1,000	2,910
HH20	7.77	55.78	1,000	2,912
HH22	7.77	80.04	1,000	2,912
HH24	7.77	87.84	1,000	2,912
HH26	7.77	78.31	1,000	2,912
HH28	7.77	58.37	1,000	2,912
HH30	7.77	67.91	1,000	2,912
HH32	7.77	91.30	1,000	2,912
HH34	7.77	85.67	1,000	2,912
HH36	7.77	56.64	1,000	2,912
HH38	7.77	87.84	1,000	2,912
HH40	7.77	54.91	1,000	2,912
74	7.77	65.52	1,000	2,914
J-224	7.77	65.20	1,000	2,916
76	7.77	64.96	1,000	2,951
88	7.77	66.12	1,000	2,957
HH18	7.77	54.05	1,000	2,961
86	7.77	65.25	1,000	2,995
100	7.77	65.78	1,000	3,011
J-192	7.77	65.21	1,000	3,018

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Scenario: 2017 Available Residential Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J-191	7.77	65.20	1,000	3,058
HH10	7.77	62.84	1,000	3,069
J-290	7.77	66.97	1,000	3,111
HH2	7.77	63.71	1,000	3,148
J-199	7.77	66.44	1,000	3,219
J-239	7.77	67.87	1,000	3,238
J-158	7.77	71.73	1,000	3,242
J-319	7.77	67.00	1,000	3,282
16	7.77	62.67	1,000	3,688
14	7.77	62.68	1,000	3,708
18	7.77	62.67	1,000	3,737
J-287	7.77	73.03	1,000	3,747
22	7.77	62.67	1,000	3,977
J-97	7.77	70.43	1,000	3,998
J-246	7.77	64.35	1,000	4,067
J-243	7.77	65.21	1,000	4,097
J-393	7.77	43.35	1,000	4,385
J-242	7.77	68.68	1,000	4,542
J-254	7.77	69.13	1,000	4,682
J-241	7.77	69.55	1,000	4,750
J-112	7.77	56.09	1,000	4,794
HH12	7.77	43.36	1,000	4,850
J1034	7.77	74.35	1,000	4,949
J-305	7.77	69.99	1,000	4,969
20	7.77	64.84	1,000	4,977
J-258	7.77	67.83	1,000	5,012
64	7.77	43.29	1,000	5,074
J-99	7.77	69.55	1,000	5,130
J-115	7.77	72.23	1,000	5,171
J-286	7.77	72.60	1,000	5,187
J-98	7.77	71.28	1,000	5,187
J-306	7.77	69.13	1,000	5,211
J-111	7.77	65.79	1,000	5,251
J-308	7.77	67.40	1,000	5,264
HH134	7.77	56.70	1,000	5,323
J-285	7.77	71.30	1,000	5,324
J-283	7.77	72.60	1,000	5,418
66	7.77	41.16	1,000	5,441
HH136	7.77	57.13	1,000	5,466
J-288	7.77	68.27	1,000	5,484
J-114	7.77	71.21	1,000	5,513
24	7.77	62.68	1,000	5,555
J-307	7.77	68.70	1,000	5,569
J-252	7.77	72.59	1,000	5,650
J-238	7.77	75.41	1,000	5,680
J-289	7.77	68.27	1,000	5,692
J-257	7.77	70.43	1,000	5,698
J-259	7.77	67.83	1,000	5,769
HH142	7.77	63.23	1,000	5,825

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Scenario: 2017 Available Residential Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J-255	7.77	68.27	1,000	5,873
J-155	7.77	63.49	1,000	5,945
70	7.77	49.79	1,000	6,165
J-156	7.77	66.09	1,000	6,193
J-237	7.77	79.82	1,000	6,230
J-110	7.77	65.97	1,000	6,266
J-309	7.77	69.57	1,000	6,307
J-159	7.77	67.83	1,000	6,356
J-157	7.77	71.73	1,000	6,364
58	7.77	64.89	1,000	6,405
60	7.77	59.26	1,000	6,469
J-301	7.77	70.43	1,000	6,550
J-91	7.77	71.29	1,000	6,598
J-92	7.77	72.16	1,000	6,606
J-96	7.77	70.86	1,000	6,616
J-304	7.77	70.86	1,000	6,633
J-303	7.77	73.03	1,000	6,658
J-302	7.77	73.03	1,000	6,713
J-93	7.77	73.03	1,000	6,787
J-154	7.77	63.49	1,000	6,872
72	7.77	43.33	1,000	6,960
J-153	7.77	66.53	1,000	6,978
110	7.77	57.13	1,000	6,988
112	7.77	47.64	1,000	7,012
J-94	7.77	69.99	1,000	7,021
J-152	7.77	69.99	1,000	7,062
J-260	7.77	69.57	1,000	7,089
J-103	7.77	53.34	1,000	7,145
J-148	7.77	70.87	1,000	7,152
J-95	7.77	72.16	1,000	7,160
108	7.77	57.13	1,000	7,161
HH138	7.77	54.11	1,000	7,172
J-151	7.77	69.99	1,000	7,176
J-226	7.77	79.93	1,000	7,178
J-147	7.77	69.58	1,000	7,184
J-104	7.77	53.42	1,000	7,194
J-102	7.77	61.00	1,000	7,246
J-322	7.77	43.38	1,000	7,326
J-253	7.77	68.31	1,000	7,338
J-101	7.77	71.67	1,000	7,348
J-106	7.77	55.73	1,000	7,351
J-107	7.77	57.24	1,000	7,526
J-113	7.77	73.65	1,000	7,529
J-108	7.77	61.65	1,000	7,603
J-109	7.77	60.42	1,000	7,668
J-26	7.77	62.72	1,000	7,794
J-25	0.00	63.19	1,000	8,142
J-24A	0.00	63.42	1,000	8,540
J-19	0.00	63.40	1,000	8,622

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Scenario: 2017 Available Residential Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J-20	0.00	63.41	1,000	8,697
J-21	0.00	63.42	1,000	8,757
J-22	0.00	63.42	1,000	8,797
J-23	0.00	63.42	1,000	8,824

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Scenario: 2031 Available Residential Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
HH80	8.86	83.77	1,000	1,593
HH82	8.86	87.23	1,000	1,599
HH84	8.86	91.13	1,000	1,599
HH86	8.86	87.23	1,000	1,599
HH78	8.86	86.37	1,000	1,599
HH88	8.86	94.16	1,000	1,600
HH90	8.86	95.03	1,000	1,602
HH74	8.86	85.07	1,000	1,604
HH66	8.86	98.94	1,000	1,606
HH94	8.86	103.26	1,000	1,608
HH92	8.86	91.57	1,000	1,610
HH102	8.86	105.43	1,000	1,610
HH104	8.86	110.62	1,000	1,610
HH106	8.86	121.02	1,000	1,610
HH108	8.86	126.65	1,000	1,610
HH110	8.86	129.69	1,000	1,610
HH76	8.86	90.27	1,000	1,610
HH98	8.86	102.83	1,000	1,613
HH100	8.86	103.70	1,000	1,614
HH96	8.86	100.24	1,000	1,614
HH64	8.86	92.45	1,000	1,615
HH72	8.86	92.02	1,000	1,616
HH112	8.86	109.77	1,000	1,617
HH120	8.86	102.40	1,000	1,618
HH124	8.86	97.20	1,000	1,618
HH122	8.86	100.23	1,000	1,618
HH126	8.86	101.97	1,000	1,619
HH128	8.86	92.00	1,000	1,619
HH130	8.86	98.07	1,000	1,619
HH114	8.86	92.02	1,000	1,621
HH62	8.86	87.71	1,000	1,622
HH70	8.86	94.20	1,000	1,622
HH116	8.86	84.69	1,000	1,623
HH118	8.86	84.26	1,000	1,623
HH58	8.86	80.03	1,000	1,623
HH60	8.86	86.44	1,000	1,623
HH68	8.86	87.27	1,000	1,623
J-197	8.86	65.05	1,000	1,770
J-220	8.86	67.84	1,000	1,869
J-219	8.86	67.86	1,000	1,925
J-256	8.86	71.37	1,000	1,964
30	8.86	74.14	1,000	1,965
RM4	8.86	35.3	1,000	1,985
J-196	8.86	65.06	1,000	2,020
J-222	8.86	65.24	1,000	2,116
RM12	8.86	59.13	1,000	2,117
28	8.86	63.31	1,000	2,135
12	8.86	74.14	1,000	2,163
J-223	8.86	64.38	1,000	2,197

Reservoir	Level
Hoffman Hills	7.9
Bell Hill	11.6

Source	Capacity (gpm)	Status
Hoffman Hill #1	1,100	OFF
Hoffman Hill #2	1,100	OFF
Bell Hill #1	900	OFF
Bell Hill #2	1,000	OFF
Bell Hill #3	1,000	OFF

System Improvements

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Scenario: 2031 Available Residential Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
RM6	8.86	76.46	1,000	2,230
RM8	8.86	104.19	1,000	2,230
J-221	8.86	66.10	1,000	2,264
RM10	8.86	64.33	1,000	2,323
J-245	8.86	66.15	1,000	2,468
J-244	8.86	66.15	1,000	2,494
J-248	8.86	66.15	1,000	2,521
10	8.86	69.81	1,000	2,547
RM2	8.86	40.07	1,000	2,549
J-247	8.86	66.15	1,000	2,573
HH6	8.86	63.27	1,000	2,643
94	8.86	63.39	1,000	2,656
J-218	8.86	66.75	1,000	2,657
92	8.86	63.40	1,000	2,685
78	8.86	63.53	1,000	2,695
80	8.86	63.50	1,000	2,730
90	8.86	63.88	1,000	2,740
104	8.86	67.03	1,000	2,744
98	8.86	64.40	1,000	2,751
96	8.86	62.94	1,000	2,757
HH14	0.00	42.88	1,000	2,761
102	8.86	63.93	1,000	2,764
HH20	8.86	54.80	1,000	2,780
HH22	8.86	79.06	1,000	2,780
HH24	8.86	86.86	1,000	2,780
HH26	8.86	77.33	1,000	2,780
HH28	8.86	57.40	1,000	2,780
HH30	8.86	66.93	1,000	2,780
HH32	8.86	90.33	1,000	2,780
HH34	8.86	84.70	1,000	2,780
HH36	8.86	55.67	1,000	2,780
HH38	8.86	86.86	1,000	2,780
HH40	8.86	53.93	1,000	2,780
HH8	8.86	57.20	1,000	2,788
J-236	8.86	63.92	1,000	2,796
J-195	8.86	65.06	1,000	2,799
HH4	8.86	67.60	1,000	2,811
J-194	8.86	64.63	1,000	2,813
84	8.86	63.44	1,000	2,815
HH18	8.86	53.07	1,000	2,827
J-235	8.86	64.37	1,000	2,836
82	8.86	63.92	1,000	2,836
74	8.86	63.70	1,000	2,839
J-224	8.86	63.37	1,000	2,843
76	8.86	63.12	1,000	2,871
88	8.86	64.28	1,000	2,879
86	8.86	63.42	1,000	2,911
100	8.86	63.95	1,000	2,923
J-192	8.86	63.38	1,000	2,932

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Scenario: 2031 Available Residential Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J-191	8.86	63.37	1,000	2,968
HH10	8.86	61.54	1,000	2,980
J-290	8.86	65.31	1,000	3,038
HH2	8.86	62.40	1,000	3,057
J-199	8.86	64.63	1,000	3,115
J-239	8.86	66.06	1,000	3,118
J-158	8.86	70.08	1,000	3,174
J-319	8.86	65.48	1,000	3,205
16	8.86	61.14	1,000	3,596
14	8.86	61.14	1,000	3,615
18	8.86	61.14	1,000	3,643
J-287	8.86	71.38	1,000	3,663
22	8.86	61.13	1,000	3,875
J-97	8.86	68.78	1,000	3,903
J-246	8.86	62.69	1,000	3,949
J-243	8.86	63.56	1,000	3,980
J-393	8.86	42.04	1,000	4,199
J-242	8.86	67.03	1,000	4,385
J-254	8.86	67.48	1,000	4,513
J-241	8.86	67.89	1,000	4,556
J-112	8.86	54.38	1,000	4,585
HH12	8.86	42.06	1,000	4,636
J1034	8.86	72.57	1,000	4,782
J-305	8.86	68.34	1,000	4,783
J-258	8.86	66.18	1,000	4,814
64	8.86	41.90	1,000	4,835
20	8.86	63.32	1,000	4,838
J-99	8.86	67.90	1,000	4,906
J-98	8.86	69.63	1,000	4,955
J-286	8.86	70.94	1,000	4,995
J-306	8.86	67.48	1,000	5,007
J-115	8.86	70.50	1,000	5,010
J-308	8.86	65.75	1,000	5,049
J-111	8.86	64.09	1,000	5,069
J-285	8.86	69.64	1,000	5,120
66	8.86	39.83	1,000	5,153
HH134	8.86	55.29	1,000	5,165
J-283	8.86	70.94	1,000	5,214
J-288	8.86	66.61	1,000	5,257
HH136	8.86	55.73	1,000	5,304
J-114	8.86	69.47	1,000	5,332
J-307	8.86	67.05	1,000	5,341
24	8.86	61.14	1,000	5,342
J-252	8.86	70.94	1,000	5,433
J-289	8.86	66.61	1,000	5,444
J-257	8.86	68.78	1,000	5,471
J-238	8.86	73.70	1,000	5,492
J-259	8.86	66.18	1,000	5,525
HH142	8.86	61.50	1,000	5,595

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Scenario: 2031 Available Residential Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J-255	8.86	66.62	1,000	5,624
J-155	8.86	61.85	1,000	5,664
70	8.86	48.40	1,000	5,902
J-156	8.86	64.45	1,000	5,912
J-237	8.86	78.12	1,000	5,943
J-110	8.86	64.27	1,000	6,034
J-309	8.86	67.92	1,000	6,037
J-159	8.86	66.18	1,000	6,071
J-157	8.86	70.08	1,000	6,104
60	8.86	57.81	1,000	6,166
58	8.86	63.44	1,000	6,175
J-301	8.86	68.78	1,000	6,270
J-91	8.86	69.65	1,000	6,321
J-92	8.86	70.51	1,000	6,334
J-96	8.86	69.21	1,000	6,334
J-304	8.86	69.21	1,000	6,350
J-303	8.86	71.38	1,000	6,385
J-302	8.86	71.38	1,000	6,437
72	8.86	42.00	1,000	6,468
J-154	8.86	61.85	1,000	6,474
110	8.86	55.72	1,000	6,497
J-93	8.86	71.38	1,000	6,508
112	8.86	46.27	1,000	6,508
J-153	8.86	64.88	1,000	6,570
J-94	8.86	68.34	1,000	6,609
108	8.86	55.72	1,000	6,662
HH138	8.86	52.71	1,000	6,673
J-152	8.86	68.34	1,000	6,696
J-103	8.86	51.62	1,000	6,731
J-95	8.86	70.51	1,000	6,736
J-151	8.86	68.34	1,000	6,752
J-260	8.86	67.92	1,000	6,767
J-104	8.86	51.70	1,000	6,779
J-148	8.86	69.22	1,000	6,810
J-102	8.86	59.27	1,000	6,826
J-147	8.86	67.92	1,000	6,832
J-322	8.86	42.10	1,000	6,833
J-226	8.86	78.24	1,000	6,844
J-106	8.86	54.02	1,000	6,923
J-101	8.86	69.93	1,000	6,924
J-253	8.86	66.65	1,000	6,978
J-107	8.86	55.54	1,000	7,086
J-113	8.86	71.90	1,000	7,093
J-108	8.86	59.96	1,000	7,158
J-109	8.86	58.74	1,000	7,220
J-26	8.86	61.04	1,000	7,339
J-25	0.00	61.54	1,000	7,670
J-24A	0.00	61.80	1,000	8,034
J-23	0.00	61.80	1,000	8,286

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Scenario: 2031 Available Residential Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
J-22	0.00	61.80	1,000	8,299
J-21	0.00	61.80	1,000	8,308
J-19	0.00	61.78	1,000	8,312
J-20	0.00	61.79	1,000	8,312

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Scenario: 2011 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
RM4	9.16	302	393	39.43
HH42	9.16	300	394	40.53
66	9.16	290	391	43.91
RM2	9.16	291	393	44.20
64	9.16	285	391	45.98
72	9.16	285	391	46.09
J-393	9.16	285	391	46.13
HH12	9.16	285	392	46.15
J-322	9.16	285	392	46.19
HH14	0.00	285	394	47.02
122	0.00	285	398	48.98
112	9.16	275	391	50.35
70	9.16	270	391	52.48
J-103	9.16	268	397	55.85
J-104	9.16	268	397	55.94
HH138	9.16	260	391	56.79
HH18	9.16	261	393	57.20
HH40	9.16	259	393	58.06
J-106	9.16	263	397	58.27
J-112	9.16	262	397	58.62
HH20	9.16	257	393	58.93
HH134	9.16	254	391	59.37
110	9.16	253	391	59.79
HH36	9.16	255	393	59.79
108	9.16	253	391	59.80
HH136	9.16	253	391	59.80
J-107	9.16	260	398	59.81
J-170	9.16	249	390	61.13
J-300	9.16	249	390	61.20
HH8	9.16	250	391	61.29
J-206	9.16	252	394	61.45
HH28	9.16	251	393	61.53
J-172	9.16	248	390	61.57
60	9.16	248	391	61.88
J-173	9.16	247	390	62.00
J-169	9.16	247	390	62.00
J-168	9.16	247	390	62.00
J-83	9.16	247	390	62.02
J-399	9.16	247	390	62.06
J-207	9.16	250	394	62.32
J-204	9.16	250	394	62.32
J-205	9.16	250	394	62.32
J-203	9.16	250	394	62.33
J-171	9.16	246	390	62.43
J-162	9.16	246	390	62.44
J-87	9.16	246	390	62.45
J-401	9.16	246	390	62.54
J-402	9.16	246	390	62.54
J-179	9.16	246	390	62.55

Reservoir	Level
Hoffman Hills	13.6
Bell Hill	18.3

Source	Capacity (gpm)	Status
Hoffman Hill #1	1,100	OFF
Hoffman Hill #2	1,100	OFF
Bell Hill #1	900	OFF
Bell Hill #2	1,000	OFF
Bell Hill #3	1,000	OFF

System Improvements

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Scenario: 2011 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-163	9.16	245	390	62.87
J-174	9.16	245	390	62.88
J-89	9.16	245	390	62.88
J-81	9.16	245	390	62.89
J-176	9.16	245	390	62.90
J-109	9.16	253	398	63.01
132	9.16	245	391	63.10
J-208	9.16	248	394	63.18
68	9.16	245	391	63.22
J-45	9.16	245	391	63.25
RM12	9.16	247	393	63.26
J-166	9.16	244	390	63.29
J-165	9.16	244	390	63.30
J-164	9.16	244	390	63.30
J-90	9.16	244	390	63.32
J-88	9.16	244	390	63.32
J-102	9.16	250	397	63.50
J-167	9.16	243	390	63.73
J-76	9.16	243	390	63.76
J-85	9.16	243	390	63.76
J-78	9.16	243	390	63.76
J-82	9.16	243	390	63.76
J-80	9.16	243	390	63.76
J-79	9.16	243	390	63.76
J-77	9.16	243	390	63.76
J-84	9.16	243	390	63.76
J-177	9.16	243	390	63.78
J-75	9.16	243	390	63.79
J-315	9.16	243	390	63.79
J-86	9.16	242	390	64.18
J-295	9.16	242	390	64.22
J-73	9.16	242	390	64.23
J-108	9.16	250	398	64.23
J-316	9.16	242	390	64.23
J-180	9.16	242	391	64.43
J-202	9.16	245	394	64.51
J-74	9.16	241	390	64.66
J-183	9.16	242	392	64.85
J-182	9.16	242	392	65.01
J-175	9.16	240	390	65.05
J-261	9.16	240	390	65.09
J-139	9.16	242	392	65.17
14	9.16	240	390	65.20
16	9.16	240	390	65.20
18	9.16	240	390	65.20
22	9.16	240	390	65.20
24	9.16	240	390	65.20
J-318	9.16	240	391	65.24
62	9.16	240	391	65.29

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Scenario: 2011 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-26	9.16	248	399	65.32
J-225	9.16	240	391	65.51
J-400	9.16	239	390	65.54
162	9.16	239	390	65.54
J-184	9.16	240	391	65.61
HH10	9.16	240	391	65.63
SF1	9.16	240	392	65.72
SF2	9.16	240	392	65.72
HH142	9.16	245	397	65.73
J-25	0.00	248	400	65.86
J-155	9.16	238	390	65.90
J-154	9.16	238	390	65.90
J-160	9.16	238	390	65.91
J-296	9.16	238	390	65.93
J-178	9.16	238	390	65.98
198	9.16	238	390	66.01
J-19	0.00	248	401	66.12
J-20	0.00	248	401	66.13
J-21	0.00	248	401	66.14
J-22	0.00	248	401	66.14
J-23	0.00	248	401	66.14
J-24A	0.00	248	401	66.14
J-181	9.16	238	391	66.28
HH2	9.16	238	391	66.49
J-105	9.16	239	393	66.60
J-246	9.16	236	390	66.75
152	9.16	236	390	66.85
96	9.16	239	394	67.10
76	9.16	239	394	67.29
J-317	9.16	235	390	67.31
34	9.16	235	390	67.36
HH6	9.16	236	391	67.36
26	9.16	235	390	67.37
28	9.16	235	390	67.37
20	9.16	235	391	67.38
58	9.16	235	391	67.51
J-191	9.16	238	394	67.52
J-224	9.16	238	394	67.53
J-192	9.16	238	394	67.53
94	9.16	238	394	67.54
92	9.16	238	394	67.55
86	9.16	238	394	67.57
84	9.16	238	394	67.60
J-243	9.16	234	390	67.61
80	9.16	238	394	67.66
78	9.16	238	394	67.69
158	9.16	234	390	67.71
160	9.16	234	390	67.71
210	9.16	234	390	67.71

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Scenario: 2011 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
74	9.16	238	395	67.87
J-193	9.16	237	394	67.91
HH132	9.16	234	391	68.02
90	9.16	237	394	68.04
J-236	9.16	237	394	68.08
82	9.16	237	394	68.08
102	9.16	237	394	68.09
100	9.16	237	394	68.11
116	9.16	233	390	68.14
154	9.16	233	390	68.14
156	9.16	233	390	68.14
J-111	9.16	240	398	68.34
88	9.16	236	394	68.44
RM10	9.16	235	393	68.46
J-156	9.16	232	390	68.50
J-297	9.16	232	390	68.52
J-161	9.16	232	390	68.52
J-235	9.16	236	394	68.53
J-223	9.16	236	394	68.54
J-110	9.16	240	398	68.54
J-201	9.16	235	393	68.56
98	9.16	236	394	68.56
J-199	9.16	235	394	68.77
J-194	9.16	235	394	68.77
J-209	9.16	235	394	68.80
J-198	9.16	234	393	68.90
J-153	9.16	231	390	68.93
J-350	9.16	231	390	69.01
J-196	9.16	234	394	69.20
J-197	9.16	234	394	69.20
J-195	9.16	234	394	69.21
J-185	9.16	234	394	69.29
J-290	9.16	230	390	69.36
J-222	9.16	234	394	69.40
J-347	9.16	230	390	69.43
118	9.16	230	390	69.44
J-319	9.16	230	390	69.54
36	9.16	230	391	69.57
J-200	9.16	233	394	69.71
J-308	9.16	229	390	69.80
J-187	9.16	232	394	70.04
J-188	9.16	232	394	70.04
J-186	9.16	232	394	70.05
J-190	9.16	232	394	70.05
J-244	9.16	228	390	70.20
J-245	9.16	228	390	70.20
J-248	9.16	228	390	70.20
J-247	9.16	228	390	70.21
J-294	9.16	228	390	70.22

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Scenario: 2011 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-159	9.16	228	390	70.23
J-249	9.16	228	390	70.23
J-259	9.16	228	390	70.23
J-239	9.16	233	395	70.24
J-258	9.16	228	390	70.24
J-221	9.16	232	394	70.26
J-345	9.16	228	390	70.30
J-346	9.16	228	390	70.30
J-189	9.16	231	394	70.47
J-291	9.16	227	390	70.66
J-293	9.16	227	390	70.66
J-292	9.16	227	390	70.66
J-289	9.16	227	390	70.67
J-288	9.16	227	390	70.67
J-255	9.16	227	390	70.67
J-253	9.16	227	390	70.71
J-144	9.16	227	390	70.73
J-218	9.16	231	395	70.92
J-100	9.16	230	394	71.06
HH30	9.16	229	393	71.06
J-242	9.16	226	390	71.08
J-149	9.16	226	390	71.10
J-307	9.16	226	390	71.10
J-146	9.16	226	390	71.14
J-145	9.16	226	390	71.15
104	9.16	230	394	71.19
J-250	9.16	225	390	71.52
J-306	9.16	225	390	71.53
J-254	9.16	225	390	71.54
J-349	9.16	225	390	71.60
J-352	9.16	225	390	71.60
106	9.16	225	390	71.60
HH4	9.16	226	391	71.69
J-397	9.16	225	391	71.84
130	9.16	225	391	71.91
212	9.16	225	391	71.91
J-99	9.16	224	390	71.95
J-241	9.16	224	390	71.95
J-260	9.16	224	390	71.97
J-309	9.16	224	390	71.97
J-147	9.16	224	390	71.98
J-220	9.16	228	394	72.00
186	9.16	224	390	72.01
J-219	9.16	228	394	72.02
J-353	9.16	224	390	72.03
188	9.16	224	390	72.04
136	9.16	224	391	72.35
J-343	9.16	223	390	72.40
J-94	9.16	223	390	72.40

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Scenario: 2011 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-152	9.16	223	390	72.40
J-305	9.16	223	390	72.40
J-151	9.16	223	390	72.40
J-240	9.16	222	390	72.82
J-301	9.16	222	390	72.83
J-251	9.16	222	390	72.83
J-97	9.16	222	390	72.83
J-257	9.16	222	390	72.84
178	9.16	222	390	72.91
J-304	9.16	221	390	73.26
J-96	9.16	221	390	73.27
J-148	9.16	221	390	73.27
J-299	9.16	221	390	73.30
J-98	9.16	220	390	73.68
J-114	9.16	226	396	73.68
J-284	9.16	220	390	73.69
J-91	9.16	220	390	73.70
J-150	9.16	220	390	73.70
J-285	9.16	220	390	73.70
176	9.16	220	390	73.74
184	9.16	220	390	73.75
194	9.16	220	390	73.76
196	9.16	220	390	73.76
J-351	9.16	220	390	73.77
114	9.16	220	390	73.77
32	9.16	220	390	73.82
10	9.16	220	390	73.87
134	9.16	220	391	74.08
J-158	9.16	219	390	74.13
J-157	9.16	219	390	74.13
J-101	9.16	225	396	74.15
J-92	9.16	218	390	74.57
J-95	9.16	218	390	74.57
J-298	9.16	218	390	74.59
J-115	9.16	224	396	74.72
J-143	9.16	218	391	74.74
J-283	9.16	217	390	74.99
J-252	9.16	217	390	74.99
J-286	9.16	217	390	75.00
J1032	9.16	220	394	75.25
J-256	9.16	216	390	75.42
J-287	9.16	216	390	75.43
J-303	9.16	216	390	75.43
J-302	9.16	216	390	75.43
J-93	9.16	216	390	75.43
J-312	9.16	216	390	75.45
J-314	9.16	216	390	75.45
J-313	9.16	216	390	75.45
J-404	9.16	220	394	75.57

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Scenario: 2011 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-311	9.16	215	390	75.89
J-121	9.16	218	393	75.95
180	9.16	215	390	75.95
150	9.16	215	390	75.97
190	9.16	215	390	75.97
192	9.16	215	390	75.98
J-113	9.16	220	396	76.10
J-117	9.16	217	394	76.56
J1026	9.16	214	391	76.57
J1028	9.16	214	391	76.57
J1034	9.16	215	392	76.67
J-120	9.16	216	393	76.83
182	9.16	212	390	77.26
J-403	9.16	215	394	77.42
J1030	9.16	215	394	77.42
J1022	9.16	212	391	77.44
J1024	9.16	212	391	77.44
J-116	9.16	215	394	77.64
140	9.16	214	393	77.66
148	9.16	214	393	77.66
J-125	9.16	214	393	77.67
J-118	9.16	214	394	77.85
J-142	9.16	211	391	77.88
J-238	9.16	218	398	77.96
J-127	9.16	213	393	78.10
J-124	9.16	213	393	78.10
138	9.16	213	393	78.10
J-123	9.16	213	393	78.11
J-122	9.16	213	393	78.12
12	9.16	210	390	78.20
30	9.16	210	390	78.20
46	9.16	210	391	78.29
48	9.16	210	391	78.29
50	9.16	210	391	78.31
52	9.16	210	391	78.31
54	9.16	210	391	78.32
56	9.16	210	391	78.32
J-131	9.16	212	393	78.40
J-37	9.16	210	391	78.41
J-126	9.16	211	393	78.96
144	9.16	211	393	78.96
146	9.16	211	393	78.96
J-119	9.16	211	394	79.15
J1006	9.16	208	391	79.17
J1004	9.16	208	391	79.18
J-268	9.16	210	393	79.40
142	9.16	210	393	79.40
J-6	9.16	210	393	79.41
J-275	9.16	208	392	79.56

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Scenario: 2011 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-137	9.16	208	392	79.62
126	9.16	207	391	79.71
128	9.16	207	391	79.71
J-4	9.16	209	393	79.74
J-136	9.16	208	392	79.77
J-128	9.16	207	392	80.00
J-274	9.16	207	392	80.00
166	9.16	207.5	392	80.00
J-59	9.16	207	392	80.01
J-66	9.16	207	392	80.01
172	9.16	207.2	392	80.12
164	9.16	206.4	392	80.42
J-70	9.16	206	392	80.44
44	9.16	205	391	80.44
J-140	9.16	206	392	80.45
J-133	9.16	207	393	80.46
RM6	9.16	207	393	80.59
J-134	9.16	206	392	80.80
J-273	9.16	205	392	80.86
J-69	9.16	205	392	80.87
J-135	9.16	205.5	392	80.93
J-138	9.16	205	392	80.94
170	9.16	205	392	81.03
174	9.16	205	392	81.17
J-272	9.16	204	392	81.30
J-71	9.16	204	392	81.30
HH26	9.16	205	393	81.46
168	9.16	204	392	81.47
J-141	9.16	203	391	81.57
J1010	9.16	202	391	81.77
J1012	9.16	202	391	81.77
J1020	9.16	202	391	81.77
J-132	9.16	204	393	81.87
J-270	9.16	202	392	82.16
J-68	9.16	202	392	82.18
J-67	9.16	202	392	82.18
J-237	9.16	208	398	82.39
J-226	9.16	208	398	82.51
J-72	9.16	201	392	82.60
40	9.16	200	391	82.60
42	9.16	200	391	82.60
J-267	9.16	200	392	83.03
J-129	9.16	200	392	83.03
J-271	9.16	200	392	83.03
J-264	9.16	200	392	83.03
HH22	9.16	201	393	83.19
J-266	9.16	199	392	83.47
J-262	9.16	198	392	83.90
HH58	9.16	362	556	84.12

City of Dupont
Water System Plan
Hydraulic Modeling Results
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Scenario: 2011 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-265	9.16	197	392	84.33
J-263	9.16	197	392	84.34
38	9.16	195	391	84.76
J-62	9.16	196	392	84.77
HH80	9.16	353	556	87.85
HH118	9.16	352	556	88.34
HH116	9.16	351	556	88.77
HH34	9.16	188	393	88.82
HH74	9.16	350	556	89.15
HH78	9.16	347	556	90.44
HH60	9.16	347	556	90.52
HH24	9.16	183	393	90.99
HH38	9.16	183	393	90.99
HH82	9.16	345	556	91.31
HH86	9.16	345	556	91.31
HH68	9.16	345	556	91.35
HH62	9.16	344	556	91.79
HH76	9.16	338	556	94.35
HH32	9.16	175	393	94.46
HH84	9.16	336	556	95.21
HH92	9.16	335	556	95.65
HH128	9.16	334	556	96.08
HH72	9.16	334	556	96.10
HH114	9.16	334	556	96.10
HH64	9.16	333	556	96.53
HH88	9.16	329	556	98.24
HH70	9.16	329	556	98.28
HH90	9.16	327	556	99.11
HH124	9.16	322	556	101.28
HH130	9.16	320	556	102.15
HH66	9.16	318	556	103.02
HH122	9.16	315	556	104.31
HH96	9.16	315	556	104.32
HH126	9.16	311	556	106.04
HH120	9.16	310	556	106.48
HH98	9.16	309	556	106.91
HH94	9.16	308	556	107.34
HH100	9.16	307	556	107.78
RM8	9.16	143	393	108.32
HH102	9.16	303	556	109.51
HH112	9.16	293	556	113.84
HH104	9.16	291	556	114.70
HH106	9.16	267	556	125.10
HH108	9.16	254	556	130.73
HH110	9.16	247	556	133.76

City of Dupont
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Scenario: 2017 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
RM4	12.61	302	392	39.02
HH42	12.61	300	393	40.49
66	12.61	290	387	41.89
64	12.61	285	386	43.74
RM2	12.61	291	392	43.79
72	12.61	285	387	44.09
J-393	12.61	285	387	44.24
HH12	12.61	285	387	44.30
J-322	12.61	285	387	44.40
HH14	0.00	285	393	46.99
112	12.61	275	386	48.20
122	0.00	285	398	48.98
70	12.61	270	386	50.24
J-103	12.61	268	389	52.52
J-104	12.61	268	389	52.64
HH138	12.61	260	386	54.48
J-106	12.61	263	390	55.02
J-112	12.61	262	390	55.34
J-107	12.61	260	391	56.63
HH18	12.61	261	392	56.80
HH134	12.61	254	386	57.02
110	12.61	253	386	57.43
108	12.61	253	386	57.45
HH136	12.61	253	386	57.46
J-170	12.61	249	382	57.52
HH40	12.61	259	392	57.66
J-300	12.61	249	382	57.67
J-206	12.61	252	385	57.75
J-172	12.61	248	382	57.96
J-168	12.61	247	382	58.38
J-169	12.61	247	382	58.38
J-173	12.61	247	382	58.39
J-83	12.61	247	382	58.44
HH20	12.61	257	392	58.52
J-399	12.61	247	382	58.53
J-205	12.61	250	385	58.61
J-204	12.61	250	385	58.62
J-207	12.61	250	385	58.62
J-203	12.61	250	385	58.63
J-171	12.61	246	382	58.82
J-162	12.61	246	382	58.83
J-87	12.61	246	382	58.86
J-402	12.61	246	382	58.98
J-179	12.61	246	382	58.99
J-401	12.61	246	382	58.99
J-163	12.61	245	382	59.26
J-174	12.61	245	382	59.28
J-89	12.61	245	382	59.29
60	12.61	248	385	59.31

Reservoir	Level
Hoffman Hills	13.6
Bell Hill	18.3

Source	Capacity (gpm)	Status
Hoffman Hill #1	1,100	OFF
Hoffman Hill #2	1,100	OFF
Bell Hill #1	900	OFF
Bell Hill #2	1,000	OFF
Bell Hill #3	1,000	OFF

System Improvements

City of Dupont
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Scenario: 2017 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-81	12.61	245	382	59.31
J-176	12.61	245	382	59.32
HH36	12.61	255	392	59.39
HH8	12.61	250	387	59.41
J-208	12.61	248	385	59.47
J-164	12.61	244	382	59.68
J-165	12.61	244	382	59.68
J-166	12.61	244	382	59.68
J-88	12.61	244	382	59.72
J-90	12.61	244	382	59.72
J-109	12.61	253	391	59.88
J-167	12.61	243	382	60.12
J-102	12.61	250	389	60.13
J-79	12.61	243	382	60.17
J-77	12.61	243	382	60.18
J-78	12.61	243	382	60.18
J-80	12.61	243	382	60.18
J-82	12.61	243	382	60.18
J-84	12.61	243	382	60.18
J-85	12.61	243	382	60.18
J-76	12.61	243	382	60.19
J-177	12.61	243	382	60.23
J-75	12.61	243	382	60.25
J-315	12.61	243	382	60.28
132	12.61	245	384	60.37
J-86	12.61	242	382	60.59
J-73	12.61	242	382	60.68
J-295	12.61	242	382	60.69
J-316	12.61	242	382	60.71
68	12.61	245	385	60.77
J-202	12.61	245	385	60.81
J-180	12.61	242	382	60.84
J-45	12.61	245	385	60.86
J-108	12.61	250	391	61.08
J-74	12.61	241	382	61.11
HH28	12.61	251	392	61.12
J-183	12.61	242	383	61.20
J-182	12.61	242	384	61.34
J-175	12.61	240	382	61.47
J-139	12.61	242	384	61.49
J-261	12.61	240	382	61.59
J-225	12.61	240	383	61.88
J-184	12.61	240	383	61.97
J-400	12.61	239	382	61.99
162	12.61	239	382	62.00
SF1	12.61	240	383	62.06
SF2	12.61	240	383	62.06
22	12.61	240	384	62.19
24	12.61	240	384	62.19

City of Dupont
Water System Plan
Hydraulic Modeling Results
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Scenario: 2017 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
18	12.61	240	384	62.20
16	12.61	240	384	62.21
14	12.61	240	384	62.23
J-26	12.61	248	392	62.24
J-154	12.61	238	382	62.28
J-155	12.61	238	382	62.28
J-160	12.61	238	382	62.31
J-296	12.61	238	382	62.36
J-318	12.61	240	384	62.37
HH142	12.61	245	389	62.38
J-178	12.61	238	382	62.42
62	12.61	240	384	62.54
J-181	12.61	238	383	62.67
198	12.61	238	383	62.78
RM12	12.61	247	392	62.85
J-105	12.61	239	384	62.91
J-25	0.00	248	393	62.94
J-246	12.61	236	382	63.10
96	12.61	239	385	63.31
J-19	0.00	248	394	63.35
J-20	0.00	248	394	63.36
J-24A	0.00	248	394	63.36
J-21	0.00	248	394	63.37
J-22	0.00	248	394	63.37
J-23	0.00	248	394	63.37
76	12.61	239	386	63.51
152	12.61	236	383	63.53
HH10	12.61	240	387	63.74
J-191	12.61	238	385	63.74
J-224	12.61	238	385	63.74
94	12.61	238	385	63.75
J-192	12.61	238	385	63.75
92	12.61	238	385	63.76
86	12.61	238	385	63.78
84	12.61	238	385	63.80
80	12.61	238	385	63.87
78	12.61	238	385	63.90
J-243	12.61	234	382	63.97
J-317	12.61	235	383	64.11
J-193	12.61	237	385	64.14
74	12.61	238	386	64.15
90	12.61	237	385	64.24
J-236	12.61	237	385	64.28
82	12.61	237	385	64.29
102	12.61	237	385	64.30
100	12.61	237	385	64.32
158	12.61	234	383	64.35
26	12.61	235	384	64.35
34	12.61	235	384	64.35

City of Dupont
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Scenario: 2017 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
160	12.61	234	383	64.36
210	12.61	234	383	64.36
28	12.61	235	384	64.43
20	12.61	235	384	64.45
HH2	12.61	238	387	64.61
88	12.61	236	385	64.65
J-235	12.61	236	385	64.74
J-223	12.61	236	385	64.75
116	12.61	233	382	64.77
98	12.61	236	385	64.77
154	12.61	233	383	64.78
156	12.61	233	383	64.80
J-201	12.61	235	385	64.85
J-156	12.61	232	382	64.88
58	12.61	235	385	64.92
J-161	12.61	232	382	64.92
J-297	12.61	232	382	64.93
J-194	12.61	235	385	65.02
J-199	12.61	235	385	65.02
J-209	12.61	235	385	65.09
J-111	12.61	240	390	65.12
J-198	12.61	234	384	65.19
J-153	12.61	231	382	65.31
J-110	12.61	240	391	65.38
J-196	12.61	234	385	65.44
J-197	12.61	234	385	65.44
J-195	12.61	234	385	65.45
HH6	12.61	236	387	65.47
J-185	12.61	234	385	65.59
J-222	12.61	234	385	65.60
HH132	12.61	234	385	65.63
J-350	12.61	231	383	65.64
J-290	12.61	230	382	65.73
J-200	12.61	233	385	66.01
J-347	12.61	230	382	66.02
118	12.61	230	382	66.04
J-308	12.61	229	382	66.18
J-186	12.61	232	385	66.32
J-187	12.61	232	385	66.32
J-188	12.61	232	385	66.32
J-190	12.61	232	385	66.32
J-221	12.61	232	385	66.46
J-245	12.61	228	382	66.55
J-244	12.61	228	382	66.56
J-247	12.61	228	382	66.56
J-248	12.61	228	382	66.56
J-239	12.61	233	387	66.58
J-294	12.61	228	382	66.58
J-249	12.61	228	382	66.60

City of Dupont
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Scenario: 2017 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-259	12.61	228	382	66.60
J-319	12.61	230	384	66.60
J-258	12.61	228	382	66.61
J-159	12.61	228	382	66.62
36	12.61	230	384	66.73
J-189	12.61	231	385	66.75
J-345	12.61	228	382	66.88
J-346	12.61	228	382	66.88
J-291	12.61	227	382	67.02
J-292	12.61	227	382	67.02
J-293	12.61	227	382	67.02
J-288	12.61	227	382	67.03
J-289	12.61	227	382	67.03
J-255	12.61	227	382	67.04
J-253	12.61	227	382	67.08
J-144	12.61	227	382	67.11
J-218	12.61	231	386	67.20
J-100	12.61	230	386	67.38
104	12.61	230	386	67.41
J-242	12.61	226	382	67.44
J-149	12.61	226	382	67.47
J-307	12.61	226	382	67.48
J-145	12.61	226	382	67.54
J-146	12.61	226	382	67.54
J-250	12.61	225	382	67.89
J-306	12.61	225	382	67.90
J-254	12.61	225	382	67.91
RM10	12.61	235	392	68.05
106	12.61	225	382	68.19
J-349	12.61	225	382	68.19
J-352	12.61	225	382	68.19
J-220	12.61	228	385	68.21
J-219	12.61	228	385	68.23
J-241	12.61	224	382	68.31
J-99	12.61	224	382	68.31
J-309	12.61	224	382	68.34
J-147	12.61	224	382	68.35
J-260	12.61	224	382	68.35
186	12.61	224	382	68.50
J-353	12.61	224	382	68.62
188	12.61	224	382	68.67
J-343	12.61	223	382	68.76
J-151	12.61	223	382	68.77
J-152	12.61	223	382	68.77
J-305	12.61	223	382	68.77
J-94	12.61	223	382	68.78
J-240	12.61	222	382	69.18
J-251	12.61	222	382	69.19
J-97	12.61	222	382	69.20

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Scenario: 2017 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-257	12.61	222	382	69.21
J-301	12.61	222	382	69.21
J-397	12.61	225	385	69.25
130	12.61	225	385	69.52
212	12.61	225	385	69.52
178	12.61	222	382	69.54
J-148	12.61	221	382	69.64
J-304	12.61	221	382	69.64
J-96	12.61	221	382	69.64
J-299	12.61	221	382	69.71
HH4	12.61	226	387	69.80
136	12.61	224	385	69.95
J-284	12.61	220	382	70.05
J-98	12.61	220	382	70.05
J-285	12.61	220	382	70.06
J-150	12.61	220	382	70.07
J-91	12.61	220	382	70.08
176	12.61	220	382	70.17
J-114	12.61	226	388	70.25
184	12.61	220	382	70.29
194	12.61	220	382	70.31
196	12.61	220	382	70.31
114	12.61	220	382	70.39
J-351	12.61	220	382	70.40
J-157	12.61	219	382	70.51
J-158	12.61	219	382	70.51
32	12.61	220	383	70.65
HH30	12.61	229	392	70.65
J-101	12.61	225	388	70.73
10	12.61	220	384	70.93
J-92	12.61	218	382	70.94
J-95	12.61	218	382	70.95
J-298	12.61	218	382	70.99
J-143	12.61	218	382	71.07
J-115	12.61	224	389	71.34
J-252	12.61	217	382	71.35
J-283	12.61	217	382	71.36
J-286	12.61	217	382	71.36
J1032	12.61	220	385	71.55
134	12.61	220	385	71.69
J-256	12.61	216	382	71.78
J-287	12.61	216	382	71.79
J-303	12.61	216	382	71.80
J-302	12.61	216	382	71.81
J-93	12.61	216	382	71.81
J-312	12.61	216	382	71.86
J-313	12.61	216	382	71.86
J-314	12.61	216	382	71.86
J-404	12.61	220	386	71.95

City of Dupont
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Scenario: 2017 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-121	12.61	218	385	72.21
J-311	12.61	215	382	72.29
J-113	12.61	220	388	72.62
180	12.61	215	383	72.64
150	12.61	215	383	72.72
190	12.61	215	383	72.75
192	12.61	215	383	72.78
J1026	12.61	214	382	72.85
J1028	12.61	214	382	72.85
J1034	12.61	215	383	72.86
J-117	12.61	217	385	72.86
J-120	12.61	216	385	73.09
J1022	12.61	212	382	73.72
J1024	12.61	212	382	73.72
J1030	12.61	215	385	73.72
J-403	12.61	215	385	73.73
140	12.61	214	385	73.90
148	12.61	214	385	73.90
J-125	12.61	214	385	73.91
182	12.61	212	383	73.99
J-116	12.61	215	386	74.00
J-118	12.61	214	385	74.15
J-142	12.61	211	382	74.16
138	12.61	213	385	74.33
J-127	12.61	213	385	74.33
J-124	12.61	213	385	74.35
J-123	12.61	213	385	74.36
J-122	12.61	213	385	74.37
J-131	12.61	212	384	74.64
J-37	12.61	210	382	74.67
J-238	12.61	218	391	74.75
144	12.61	211	385	75.20
146	12.61	211	385	75.20
J-126	12.61	211	385	75.20
30	12.61	210	384	75.26
12	12.61	210	384	75.27
J-119	12.61	211	385	75.45
J1004	12.61	208	382	75.46
J1006	12.61	208	382	75.46
46	12.61	210	384	75.60
48	12.61	210	384	75.60
142	12.61	210	385	75.63
J-268	12.61	210	385	75.64
J-6	12.61	210	385	75.65
50	12.61	210	385	75.66
52	12.61	210	385	75.66
54	12.61	210	385	75.71
56	12.61	210	385	75.72
J-275	12.61	208	383	75.73

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Scenario: 2017 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-137	12.61	208	383	75.81
J-136	12.61	208	383	75.97
J-4	12.61	209	384	75.98
J-128	12.61	207	383	76.17
J-274	12.61	207	383	76.17
J-59	12.61	207	383	76.19
166	12.61	207.5	383	76.20
J-66	12.61	207	383	76.20
172	12.61	207.2	383	76.32
164	12.61	206.4	383	76.61
J-70	12.61	206	383	76.62
J-140	12.61	206	383	76.64
J-133	12.61	207	384	76.69
J-134	12.61	206	384	77.01
J-273	12.61	205	383	77.03
J-69	12.61	205	383	77.05
J-138	12.61	205	383	77.13
J-135	12.61	205.5	384	77.14
170	12.61	205	383	77.22
126	12.61	207	385	77.32
128	12.61	207	385	77.32
174	12.61	204.8	383	77.36
J-272	12.61	204	383	77.47
J-71	12.61	204	383	77.48
168	12.61	204	383	77.65
44	12.61	205	384	77.73
J-141	12.61	203	383	77.80
J1010	12.61	202	382	78.05
J1012	12.61	202	382	78.05
J1020	12.61	202	382	78.05
J-132	12.61	204	384	78.10
J-270	12.61	202	383	78.33
J-67	12.61	202	383	78.36
J-68	12.61	202	383	78.36
J-72	12.61	201	383	78.78
J-129	12.61	200	383	79.20
J-267	12.61	200	383	79.20
J-271	12.61	200	383	79.20
J-237	12.61	208	391	79.21
J-264	12.61	200	383	79.21
J-226	12.61	208	391	79.38
J-266	12.61	199	383	79.64
40	12.61	200	384	79.87
42	12.61	200	384	79.87
J-262	12.61	198	383	80.08
RM6	12.61	207	392	80.18
J-263	12.61	197	383	80.51
J-265	12.61	197	383	80.51
HH58	12.61	362	548	80.70

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Scenario: 2017 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-62	12.61	196	383	80.94
HH26	12.61	205	392	81.05
38	12.61	195	384	82.01
HH22	12.61	201	392	82.79
HH80	12.61	353	548	84.29
HH118	12.61	352	548	84.83
HH116	12.61	351	548	85.25
HH74	12.61	350	548	85.59
HH78	12.61	347	548	86.89
HH60	12.61	347	548	87.02
HH82	12.61	345	548	87.75
HH86	12.61	345	548	87.75
HH68	12.61	345	548	87.83
HH62	12.61	344	548	88.26
HH34	12.61	188	392	88.42
HH24	12.61	183	392	90.58
HH38	12.61	183	392	90.58
HH76	12.61	338	548	90.80
HH84	12.61	336	548	91.65
HH92	12.61	335	548	92.09
HH128	12.61	334	548	92.52
HH114	12.61	334	548	92.56
HH72	12.61	334	548	92.56
HH64	12.61	333	548	92.99
HH32	12.61	175	392	94.05
HH88	12.61	329	548	94.68
HH70	12.61	329	548	94.76
HH90	12.61	327	548	95.55
HH124	12.61	322	548	97.72
HH130	12.61	320	548	98.59
HH66	12.61	318	548	99.46
HH122	12.61	315	548	100.75
HH96	12.61	315	548	100.76
HH126	12.61	311	548	102.49
HH120	12.61	310	548	102.92
HH98	12.61	309	548	103.36
HH94	12.61	308	548	103.78
HH100	12.61	307	548	104.22
HH102	12.61	303	548	105.94
RM8	12.61	143	392	107.91
HH112	12.61	293	548	110.29
HH104	12.61	291	547	111.14
HH106	12.61	267	547	121.54
HH108	12.61	254	547	127.17
HH110	12.61	247	547	130.20

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Scenario: 2031 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
RM4	14.34	302	391	38.53
HH42	14.34	300	393	40.23
66	14.34	290	383	40.37
64	14.34	285	382	42.08
72	14.34	285	383	42.58
J-393	14.34	285	384	42.81
HH12	14.34	285	384	42.89
J-322	14.34	285	384	43.03
RM2	14.34	291	391	43.31
112	14.34	275	383	46.60
HH14	0.00	285	393	46.73
70	14.34	270	382	48.58
122	0.00	285	398	48.98
J-103	14.34	268	384	50.23
J-104	14.34	268	384	50.37
HH138	14.34	260	382	52.78
J-106	14.34	263	385	52.78
J-112	14.34	262	385	53.08
J-107	14.34	260	386	54.43
J-170	14.34	249	376	54.94
J-300	14.34	249	376	55.13
J-206	14.34	252	379	55.20
HH134	14.34	254	382	55.29
J-172	14.34	248	376	55.38
110	14.34	253	382	55.69
108	14.34	253	382	55.72
HH136	14.34	253	382	55.74
J-168	14.34	247	376	55.80
J-169	14.34	247	376	55.80
J-173	14.34	247	376	55.81
J-83	14.34	247	376	55.88
J-399	14.34	247	376	56.00
J-205	14.34	250	379	56.07
J-204	14.34	250	379	56.08
J-207	14.34	250	379	56.08
J-203	14.34	250	379	56.09
J-171	14.34	246	376	56.24
J-162	14.34	246	376	56.25
J-87	14.34	246	376	56.29
HH18	14.34	261	391	56.31
J-402	14.34	246	376	56.44
J-179	14.34	246	376	56.45
J-401	14.34	246	376	56.45
J-163	14.34	245	376	56.68
J-174	14.34	245	376	56.70
J-89	14.34	245	376	56.72
J-81	14.34	245	376	56.75
J-176	14.34	245	376	56.77
J-208	14.34	248	379	56.93

Reservoir	Level
Hoffman Hills	13.0
Bell Hill	17.6

Source	Capacity (gpm)	Status
Hoffman Hill #1	1,100	OFF
Hoffman Hill #2	1,100	OFF
Bell Hill #1	900	OFF
Bell Hill #2	1,000	OFF
Bell Hill #3	1,000	OFF

System Improvements

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Scenario: 2031 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-164	14.34	244	376	57.10
J-165	14.34	244	376	57.10
J-166	14.34	244	376	57.10
J-88	14.34	244	376	57.15
J-90	14.34	244	376	57.15
HH40	14.34	259	391	57.18
60	14.34	248	381	57.44
J-167	14.34	243	376	57.53
J-79	14.34	243	376	57.61
J-82	14.34	243	376	57.61
J-77	14.34	243	376	57.62
J-78	14.34	243	376	57.62
J-80	14.34	243	376	57.62
J-84	14.34	243	376	57.62
J-85	14.34	243	376	57.62
J-76	14.34	243	376	57.63
J-177	14.34	243	376	57.68
J-75	14.34	243	376	57.71
J-109	14.34	253	386	57.72
J-315	14.34	243	376	57.77
J-102	14.34	250	383	57.81
HH8	14.34	250	384	57.97
J-86	14.34	242	376	58.02
HH20	14.34	257	391	58.04
J-73	14.34	242	376	58.14
J-295	14.34	242	376	58.16
J-316	14.34	242	376	58.19
J-202	14.34	245	379	58.27
J-180	14.34	242	377	58.29
132	14.34	245	380	58.39
J-74	14.34	241	376	58.57
J-183	14.34	242	377	58.64
J-182	14.34	242	378	58.77
HH36	14.34	255	391	58.90
J-108	14.34	250	386	58.90
J-175	14.34	240	376	58.90
J-139	14.34	242	378	58.92
68	14.34	245	381	58.97
J-261	14.34	240	376	59.09
J-45	14.34	245	381	59.11
J-225	14.34	240	377	59.33
J-184	14.34	240	377	59.41
J-400	14.34	239	376	59.45
162	14.34	239	376	59.47
SF1	14.34	240	377	59.50
SF2	14.34	240	377	59.50
J-154	14.34	238	376	59.70
J-155	14.34	238	376	59.70
J-160	14.34	238	376	59.73

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Scenario: 2031 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-296	14.34	238	376	59.81
J-178	14.34	238	376	59.88
24	14.34	240	379	60.02
22	14.34	240	379	60.03
18	14.34	240	379	60.05
16	14.34	240	379	60.06
HH142	14.34	245	384	60.08
14	14.34	240	379	60.09
J-26	14.34	248	387	60.11
J-181	14.34	238	377	60.12
J-318	14.34	240	379	60.29
J-105	14.34	239	378	60.35
198	14.34	238	378	60.46
J-246	14.34	236	376	60.50
62	14.34	240	380	60.55
HH28	14.34	251	391	60.63
96	14.34	239	379	60.73
J-25	0.00	248	389	60.92
76	14.34	239	380	60.94
152	14.34	236	377	61.16
J-191	14.34	238	379	61.16
J-224	14.34	238	379	61.16
94	14.34	238	379	61.17
J-192	14.34	238	379	61.17
92	14.34	238	379	61.18
86	14.34	238	379	61.20
84	14.34	238	379	61.22
80	14.34	238	379	61.29
78	14.34	238	380	61.33
J-243	14.34	234	376	61.37
J-19	0.00	248	390	61.43
J-24A	0.00	248	390	61.43
J-20	0.00	248	390	61.44
J-21	0.00	248	390	61.45
J-22	0.00	248	390	61.45
J-23	0.00	248	390	61.45
J-193	14.34	237	379	61.55
74	14.34	238	380	61.61
90	14.34	237	379	61.66
82	14.34	237	379	61.71
J-236	14.34	237	379	61.71
102	14.34	237	379	61.73
100	14.34	237	380	61.75
J-317	14.34	235	378	61.81
158	14.34	234	377	61.95
160	14.34	234	377	61.96
210	14.34	234	377	61.96
88	14.34	236	379	62.07
J-235	14.34	236	379	62.16

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Scenario: 2031 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-223	14.34	236	379	62.17
26	14.34	235	379	62.18
34	14.34	235	379	62.18
98	14.34	236	380	62.19
J-201	14.34	235	379	62.29
J-156	14.34	232	376	62.30
HH10	14.34	240	384	62.31
28	14.34	235	379	62.32
20	14.34	235	379	62.35
J-161	14.34	232	376	62.35
116	14.34	233	377	62.36
RM12	14.34	247	391	62.36
J-297	14.34	232	376	62.37
154	14.34	233	377	62.38
156	14.34	233	377	62.41
J-194	14.34	235	379	62.44
J-199	14.34	235	379	62.44
J-209	14.34	235	379	62.55
J-198	14.34	234	379	62.64
J-153	14.34	231	376	62.73
J-195	14.34	234	379	62.87
J-196	14.34	234	379	62.87
J-197	14.34	234	379	62.87
J-111	14.34	240	385	62.89
J-222	14.34	234	379	63.02
58	14.34	235	380	63.04
J-185	14.34	234	380	63.06
J-290	14.34	230	376	63.13
HH2	14.34	238	384	63.17
J-110	14.34	240	386	63.20
J-350	14.34	231	377	63.24
J-200	14.34	233	379	63.48
J-308	14.34	229	376	63.58
J-347	14.34	230	377	63.58
118	14.34	230	377	63.61
J-186	14.34	232	379	63.75
J-187	14.34	232	379	63.75
J-190	14.34	232	379	63.75
J-188	14.34	232	379	63.76
HH132	14.34	234	381	63.87
J-221	14.34	232	379	63.88
J-244	14.34	228	376	63.95
J-245	14.34	228	376	63.95
J-247	14.34	228	376	63.95
J-248	14.34	228	376	63.95
J-294	14.34	228	376	63.99
J-249	14.34	228	376	64.01
J-259	14.34	228	376	64.01
J-258	14.34	228	376	64.02

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Scenario: 2031 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
HH6	14.34	236	384	64.04
J-159	14.34	228	376	64.04
J-239	14.34	233	381	64.08
J-189	14.34	231	379	64.20
J-291	14.34	227	376	64.42
J-292	14.34	227	376	64.42
J-293	14.34	227	376	64.42
J-288	14.34	227	376	64.43
J-345	14.34	228	377	64.43
J-346	14.34	228	377	64.43
J-289	14.34	227	376	64.44
J-255	14.34	227	376	64.45
J-319	14.34	230	379	64.49
J-253	14.34	227	376	64.50
J-144	14.34	227	376	64.52
J-218	14.34	231	380	64.66
36	14.34	230	379	64.67
104	14.34	230	380	64.84
J-242	14.34	226	376	64.84
J-100	14.34	230	380	64.86
J-149	14.34	226	376	64.88
J-307	14.34	226	376	64.88
J-145	14.34	226	376	64.96
J-146	14.34	226	376	64.97
J-250	14.34	225	376	65.29
J-306	14.34	225	376	65.31
J-254	14.34	225	376	65.32
J-220	14.34	228	379	65.63
J-219	14.34	228	380	65.65
J-241	14.34	224	376	65.71
J-99	14.34	224	376	65.71
106	14.34	225	377	65.75
J-309	14.34	224	376	65.75
J-352	14.34	225	377	65.75
J-147	14.34	224	376	65.76
J-260	14.34	224	376	65.76
J-349	14.34	225	377	65.76
186	14.34	224	376	65.99
J-343	14.34	223	376	66.17
J-151	14.34	223	376	66.18
J-152	14.34	223	376	66.18
J-305	14.34	223	376	66.18
J-353	14.34	224	377	66.18
J-94	14.34	223	376	66.19
188	14.34	224	377	66.26
J-240	14.34	222	376	66.59
J-251	14.34	222	376	66.59
J-97	14.34	222	376	66.61
J-257	14.34	222	376	66.62

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Scenario: 2031 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J-301	14.34	222	376	66.62
J-148	14.34	221	376	67.05
J-304	14.34	221	376	67.05
J-96	14.34	221	376	67.05
178	14.34	222	377	67.13
J-299	14.34	221	376	67.14
J-397	14.34	225	380	67.36
J-98	14.34	220	376	67.45
J-284	14.34	220	376	67.46
J-285	14.34	220	376	67.46
J-150	14.34	220	376	67.48
J-91	14.34	220	376	67.49
RM10	14.34	235	391	67.56
176	14.34	220	376	67.62
130	14.34	225	381	67.76
212	14.34	225	381	67.77
184	14.34	220	377	67.82
194	14.34	220	377	67.85
196	14.34	220	377	67.85
J-114	14.34	226	383	67.89
J-157	14.34	219	376	67.93
J-158	14.34	219	376	67.93
114	14.34	220	377	67.97
J-351	14.34	220	377	67.99
136	14.34	224	381	68.19
J-92	14.34	218	376	68.36
J-95	14.34	218	376	68.36
HH4	14.34	226	384	68.37
J-101	14.34	225	383	68.37
32	14.34	220	378	68.38
J-298	14.34	218	376	68.42
J-143	14.34	218	376	68.47
J-252	14.34	217	376	68.76
J-283	14.34	217	376	68.76
J-286	14.34	217	376	68.76
10	14.34	220	379	68.82
J1032	14.34	220	379	69.01
J-115	14.34	224	383	69.01
J-256	14.34	216	376	69.19
J-287	14.34	216	376	69.19
J-303	14.34	216	376	69.21
J-302	14.34	216	376	69.22
J-93	14.34	216	376	69.23
J-313	14.34	216	376	69.28
J-312	14.34	216	376	69.29
J-314	14.34	216	376	69.29
J-404	14.34	220	380	69.46
J-121	14.34	218	379	69.65
J-311	14.34	215	376	69.72

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Scenario: 2031 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
134	14.34	220	381	69.93
HH30	14.34	229	391	70.17
J-113	14.34	220	382	70.23
J1026	14.34	214	376	70.24
J1028	14.34	214	376	70.24
J1034	14.34	215	377	70.24
180	14.34	215	377	70.28
J-117	14.34	217	379	70.32
150	14.34	215	377	70.40
190	14.34	215	378	70.43
192	14.34	215	378	70.48
J-120	14.34	216	379	70.52
J1022	14.34	212	376	71.11
J1024	14.34	212	376	71.11
J1030	14.34	215	379	71.18
J-403	14.34	215	379	71.18
140	14.34	214	379	71.32
148	14.34	214	379	71.32
J-125	14.34	214	379	71.33
J-116	14.34	215	380	71.50
J-142	14.34	211	376	71.55
J-118	14.34	214	379	71.61
182	14.34	212	377	71.65
138	14.34	213	379	71.75
J-127	14.34	213	379	71.75
J-124	14.34	213	379	71.77
J-123	14.34	213	379	71.78
J-122	14.34	213	379	71.80
J-131	14.34	212	378	72.05
J-37	14.34	210	376	72.05
J-238	14.34	218	385	72.54
144	14.34	211	379	72.62
146	14.34	211	379	72.62
J-126	14.34	211	379	72.62
J1004	14.34	208	376	72.84
J1006	14.34	208	376	72.84
J-119	14.34	211	379	72.91
142	14.34	210	379	73.05
J-268	14.34	210	379	73.06
J-6	14.34	210	379	73.08
J-275	14.34	208	377	73.09
12	14.34	210	379	73.15
30	14.34	210	379	73.15
J-137	14.34	208	377	73.18
J-136	14.34	208	377	73.35
J-4	14.34	209	378	73.40
J-128	14.34	207	377	73.52
J-274	14.34	207	377	73.52
J-59	14.34	207	377	73.55

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Scenario: 2031 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
166	14.34	207.5	377	73.57
J-66	14.34	207	377	73.57
46	14.34	210	380	73.65
48	14.34	210	380	73.66
172	14.34	207.2	377	73.69
50	14.34	210	380	73.74
52	14.34	210	380	73.74
54	14.34	210	380	73.81
56	14.34	210	380	73.82
J-70	14.34	206	377	73.98
164	14.34	206.4	377	73.99
J-140	14.34	206	377	74.01
J-133	14.34	207	378	74.10
J-273	14.34	205	377	74.39
J-134	14.34	206	378	74.41
J-69	14.34	205	377	74.41
J-138	14.34	205	377	74.50
J-135	14.34	205.5	377	74.52
170	14.34	205	377	74.60
174	14.34	204.8	377	74.73
J-272	14.34	204	377	74.82
J-71	14.34	204	377	74.84
168	14.34	204	377	75.03
J-141	14.34	203	376	75.17
J1010	14.34	202	376	75.44
J1012	14.34	202	376	75.44
J1020	14.34	202	376	75.44
J-132	14.34	204	378	75.52
126	14.34	207	381	75.56
128	14.34	207	381	75.56
J-270	14.34	202	377	75.69
J-68	14.34	202	377	75.72
J-67	14.34	202	377	75.73
44	14.34	205	380	75.76
J-72	14.34	201	377	76.14
J-271	14.34	200	377	76.55
J-129	14.34	200	377	76.56
J-264	14.34	200	377	76.56
J-267	14.34	200	377	76.56
J-266	14.34	199	377	76.99
J-237	14.34	208	386	77.02
J-226	14.34	208	386	77.21
J-262	14.34	198	377	77.43
J-265	14.34	197	377	77.86
J-263	14.34	197	377	77.87
40	14.34	200	380	77.89
42	14.34	200	380	77.89
HH58	14.34	362	542	77.94
J-62	14.34	196	377	78.30

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Scenario: 2031 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
RM6	14.34	207	391	79.69
38	14.34	195	380	80.02
HH26	14.34	205	391	80.56
HH80	14.34	353	541	81.44
HH118	14.34	352	541	82.02
HH22	14.34	201	391	82.30
HH116	14.34	351	541	82.43
HH74	14.34	350	541	82.75
HH78	14.34	347	541	84.04
HH60	14.34	347	541	84.21
HH82	14.34	345	541	84.90
HH86	14.34	345	541	84.90
HH68	14.34	345	541	85.01
HH62	14.34	344	541	85.43
HH34	14.34	188	391	87.93
HH76	14.34	338	541	87.95
HH84	14.34	336	541	88.80
HH92	14.34	335	541	89.24
HH128	14.34	334	541	89.67
HH72	14.34	334	541	89.72
HH114	14.34	334	541	89.73
HH24	14.34	183	391	90.10
HH38	14.34	183	391	90.10
HH64	14.34	333	541	90.15
HH88	14.34	329	541	91.83
HH70	14.34	329	541	91.93
HH90	14.34	327	541	92.70
HH32	14.34	175	391	93.56
HH124	14.34	322	541	94.87
HH130	14.34	320	541	95.75
HH66	14.34	318	541	96.62
HH122	14.34	315	541	97.91
HH96	14.34	315	541	97.92
HH126	14.34	311	541	99.64
HH120	14.34	310	541	100.07
HH98	14.34	309	541	100.51
HH94	14.34	308	541	100.93
HH100	14.34	307	541	101.37
HH102	14.34	303	541	103.10
RM8	14.34	143	391	107.42
HH112	14.34	293	541	107.44
HH104	14.34	291	541	108.29
HH106	14.34	267	541	118.69
HH108	14.34	254	541	124.32
HH110	14.34	247	541	127.35

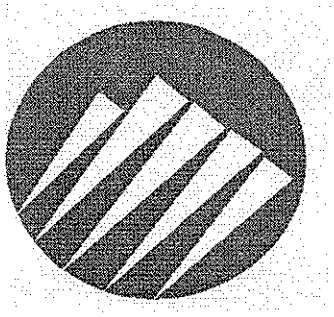
APPENDIX G

TACOMA PIERCE COUNTY HAZARDOUS MATERIALS RESPONSE PLAN

SAMPLE WELLHEAD PROTECTION LETTER

TACOMA-PIERCE COUNTY

LOCAL EMERGENCY PLANNING COMMITTEE
and
PIERCE COUNTY DEPARTMENT OF EMERGENCY MANAGEMENT



HAZARDOUS MATERIALS RESPONSE PLAN (ESF-10)

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 _____

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. Pierce County DEM Duty Officer (253.798.7470)		
B. Other as Necessary		
23. Health Dept.		
24. Appropriate Law Enforcement		
25. State EMD Duty Officer		
26. County Fire Marshal		
27. Public Works		
28. TIMAP (253.596.8992)		
29. CHEMTREC (1.800.424.8802)		
30. National Response Center (1.800.424-8802)		
31. Other		

WORKSHEET COMPLETED BY_____ **DATE**_____

PROMULGATION DOCUMENT:

The Tacoma-Pierce County Local Emergency Planning Committee (LEPC) has approved this plan and it is intended to meet the requirements of the Superfund Amendments and Reauthorization Act of 1986. It is the intention of the LEPC that this material be part of the overall emergency management plan of Pierce County rather than constituting a separate program. 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.

Steven C. Bailey
Director, Pierce County Department of Emergency Management

Jeff Jensen
Assistant Chief, Tacoma Fire Department
Chairperson
Local Emergency Planning Committee

RECORDS OF REVISIONS

Revision Number	Nature of Change	Date of Change

All revisions to the Tacoma-Pierce County Hazardous Materials Emergency Plan will originate from the Local Emergency Planning Committee. Before any revisions are finalized, the chairperson or co-chairpersons will approve the revisions recommended by the LEPC or its subcommittee.

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Emergency Support Function 10: Hazardous Materials	Effective Date:	Supersedes: Pierce County CEMP ESF 10, June 1998
Page:	Approved by:	

PRIMARY AGENCIES:

- Pierce County Fire Districts and other fire service agencies
- Washington State Patrol (WSP)

SUPPORT AGENCIES

- Pierce County Department of Emergency Management
- Central Pierce Fire and Rescue, Graham Fire Department, Puyallup Fire Department, Tacoma Fire Department , Boeing/Fredrickson Fire Department, McChord Fire Department and Fort Lewis Fire Department Hazardous Materials Teams (HMT)
- Other fire agencies through mutual aid agreements
- Tacoma-Pierce County Local Emergency Planning Committee
- County and city public works and roads departments
- Pierce County Sheriff's Department, Tacoma Police Department, and other local law enforcement agencies
- Washington State Department of Ecology
- Washington State Department of Fish and Wildlife
- Washington State Department of Natural Resources
- Washington State Department of Social and Health Services
- Washington State Military Department-Emergency Management Division
- Washington State Department of Transportation
- Environmental Protection Agency (EPA)
- Federal Emergency Management Agency (FEMA)
- National Atmospheric and Oceanic Administration (NOAA)
- National Marine Fisheries Service (NMFS)
- United States Coast Guard (USCG)
- United States Department of Energy (DOE)
- United States Department of Transportation (DOT)

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.
4. This plan shall be used in conjunction with the Pierce County Comprehensive Emergency Management Plan (CEMP) and federal emergency plans.

B. SCOPE:

1. This Emergency Support Function (ESF 10) 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 supercede those procedures; instead it is designed to coordinate the efforts of the various agencies responding to the same incident.

C. LEGAL AUTHORITY:

1. SARA Title III (Public Law 99-499)
2. RCW 70.136 Hazardous Materials Incidents
3. WAC Chapter 118.40
4. OSHA 1910.120
5. NFPA 1500, 1081, 1982, 471, 472, 473
6. RCW 38.52 (Emergency Management)

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 for associated regulations.

III. AGENCY RESPONSIBILITIES

A. 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 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.

B. PIERCE COUNTY HAZARDOUS MATERIALS RESPONSE TEAMS

(Responsibilities include but are not limited to):

- 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.
- Establish exclusionary zones.
- Determine the proper level of personal protective equipment, emergency medical treatment, decontamination techniques, and additional authorities requiring notification.

- Perform duties as directed by the Incident Commander.
- Coordinate with Pierce County Department of Emergency Management duty officer or EOC when indicated.

C. PIERCE COUNTY DEPARTMENT OF EMERGENCY MANAGEMENT (PC DEM)

(Responsibilities include but are not limited to):

- 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 County EOC when necessary.
- Support the Incident Commander on scene as requested.
- Provide resource coordination as requested.

IV. SITUATION:

A. EMERGENCY/DISASTER HAZARDS AND CONDITIONS

1. Hazardous materials or oil spill incidents can occur anywhere at any time throughout Pierce County. The Pierce County Hazard Identification and Vulnerability Analysis (published separately), addresses the potential for hazardous materials releases within the County.
2. The emergency response operations of a hazardous materials incident may require multi-disciplinary response. Responders 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 material incidents have some different characteristics:

    a) The major threat presented by oil spills is damage to the environment. Oil spills can occur on water or on land.
    b) The major threat presented by hazardous material 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 material 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. Implementing prevention programs can reduce the number and severity of hazardous materials incidents.
5. Coordination of responding agencies is critical to the successful recapture of spilled materials and subsequent cleanup.

6. The Incident Management System (IMS) will be used in all Pierce County HAZMAT incidents from start to finish, in accordance with federal, state and local laws.

V. CONCEPT OF OPERATIONS:

A. GENERAL

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.

Depending on the nature of the incident 9-1-1 will notify the appropriate fire agency (public or private) and/or the Washington State Patrol (WSP).

1. Currently there are no medical facilities within Pierce County capable of receiving contaminated patients. Efforts are being taken to correct this deficiency.
2. When the Pierce County Emergency Operations Center (EOC) is activated, the designated Fire Service Representative is responsible for coordinating all hazardous materials response. During the rare possibility of his/her absence, the Pierce County EOC Manager will assume this responsibility.
3. The Washington State Department of Ecology (DOE), Washington State Department of Natural Resources (DNR) and the Tacoma-Pierce County Health Department are assigned to protect water supplies and sewage systems from the effects of a hazardous materials incident.

    a. PC DEM notifies Washington State Military Department-Emergency Management Division (EMD) who then contacts state DOE and/or DNR.
    b. PC 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.

4. Hazardous materials response operations shall be conducted using IMS in accordance with state and federal laws.

B. ORGANIZATION

1. PRIMARY AGENCIES:

   a) Pierce County Fire Districts and other fire service agencies
   b) Washington State Patrol (WSP)

2. SECONDARY AGENCIES (LOCAL):

   a) Pierce County Department of Emergency Management
   b) Central Pierce Fire and Rescue, Graham Fire Department, Puyallup Fire Department, Tacoma Fire Department and Boeing/Fredrickson Fire Department Hazardous Materials Teams (HMT)
   c) Other fire agencies through mutual aid agreements
   d) Tacoma-Pierce County Local Emergency Planning Committee
   e) County and city public works and roads departments
   f) Pierce County Sheriff's Department, Tacoma Police Department, and other local law enforcement agencies

3. SECONDARY AGENCIES (STATE):

   a) Washington State Department of Ecology
   b) Washington State Department of Fish and Wildlife
   c) Washington State Department of Natural Resources
   d) Washington State Department of Social and Health Services
   e) Washington State Military Department-Emergency Management Division
   f) Washington State Department of Transportation

4. SECONDARY AGENCIES (FEDERAL):

   a) Environmental Protection Agency (EPA)
   b) Federal Emergency Management Agency (FEMA)
   c) National Atmospheric and Oceanic Administration (NOAA)
   d) National Marine Fisheries Service (NMFS)
   e) United States Coast Guard (USCG)
   f) United States Department of Energy (DOE)
   g) United States Department of Transportation (DOT)

C. PROCEDURES:

1. Fire services, hazardous materials response teams and Pierce County DEM will respond in accordance with federal, state, local and agency plans and regulations and will function under the Incident Management System (IMS).
2. The Washington State Patrol (WSP) will respond to hazardous materials incidents in accordance with federal, state, local and agency plans and regulations, and will function under the IMS.
3. Washington State Department of Ecology will act in accordance with the Ecology Spill Response Operations Manual and the Northwest Area Contingency Plan.
4. It is the obligation of the Responsible Party to arrange cleanup of a release site. If the site is abandoned, or the Responsible Party is unable to pay for clean up or if the Responsible Party cannot be identified, the DOE and/or the US Environmental Protection Agency (US EPA) take the lead.

D. MITIGATION ACTIVITIES:

1. FIRE AGENCIES:

   Pierce County Fire Districts, the Pierce County Fire Marshal, and Hazardous Materials Response Teams conduct building and facility fire safety inspections. Fire department personnel make recommendations as needed. However, fire districts do not have the authority to enforce codes.

2. WASHINGTON STATE PATROL:

   Washington State Patrol conducts safety inspections on vehicles transporting hazardous materials / waste, and enforces state and federal transportation regulations, per RCW Chapter 46.48. They provide technical assistance to shippers and carriers and also enforce rules and regulations pertaining to the transportation of hazardous materials. They investigate all transportation accidents involving hazardous materials, on state highways or when requested by the incident commander to determine the cause.

3. PIERCE COUNTY DEM:

   PC DEM and the Tacoma-Pierce County LEPC 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. Coordination with county and city planning agencies is vital, 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. Emergency management also coordinates with other counties regarding hazards in their jurisdictions that could impact Pierce County.

4. WASHINGTON STATE DEPARTMENT OF LABOR & INDUSTRIES (L&I):

Department of Labor and Industries conducts inspections of facilities where hazardous materials are generated, used, stored, disposed of or destroyed.

5. WASHINGTON STATE DEPARTMENT OF ECOLOGY-SPILL PREVENTION, PREPAREDNESS AND RESPONSE PROGRAM:

DOE Prevention Section identifies high-risk vessels which may pose a threat to people, property and the environment.

6. WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES:

Washington State DNR manages state-owned aquatic lands and associated habitat to reduce or eliminate the effects of hazardous materials.

7. WASHINGTON STATE DEPARTMENT OF TRANSPORTATION:

Assists first responders by providing supporting information on shippers and handlers of hazardous materials statewide. Provides personnel and equipment to support response operations on highways and lands under state and federal jurisdiction.

8. UNITED STATES COAST GUARD (Vessel Inspection)

Primary responsibility for management of and response to hazardous materials spills on coastal and inland waterways.

9. ENVIRONMENTAL PROTECTION AGENCY (monitoring, RMP's, etc.)

Responds with advice and technical resources to protect the environment from all types of hazardous substances. Responsible for enforcement of applicable federal hazardous materials statutes.

E. PREPAREDNESS ACTIVITIES:

1. FIRE SERVICES:

a) Develop, test and maintain standard operations procedures (SOPs) for responding to hazardous materials incidents in coordination with this plan.
b) Train personnel 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 services, and other vendors.

c) Train all personnel to understand and use the Incident Management System.

d) EMS personnel should additionally be trained in proper initial medical care for patients exposed to hazardous materials.

2. WASHINGTON STATE PATROL:

a) Develop guidance and emergency procedures for HAZMAT responders.
b) Develop and conduct hazardous materials training for all levels of local and state responders.
c) Equip the Washington State Patrol Regional Communication Center with Computer Aided Management for Emergency Operations (CAMEO) computer software.
d) Participate on the state Emergency Management Council and State Emergency Response Commission, a sub-committee of the Emergency Management Council, to address hazardous materials issues.

3. PIERCE COUNTY DEM (in conjunction with the Tacoma-Pierce County LEPC):

a) Maintain and coordinate the updating of this plan, and develop interagency agreements for response to hazardous materials incidents when indicated.
b) Coordinate training of non-uniform personnel for HAZMAT response/recovery support functions when requested.
c) Sponsor exercises and drills, and plans for evacuation and shelter.
d) Develop lists of specialized resources available through the Rapid Access to Resources database.
e) Participate in LEPC meetings.

4. LOCAL LAW ENFORCEMENT AGENCIES:

a) Develop, test, and update their SOPs for response to hazardous materials incidents in coordination with this plan.
b) Assure that personnel are familiar with the SOPs and this plan, and that all personnel are trained to identify potential hazardous materials incidents. Training for identification of hazardous material includes how to use the North American Emergency Response Guidebook (Awareness Level, Minimum).
c) Train personnel in the Incident Management System.
d) Maintain lists of available resources.
e) Coordinate with other responding agencies in the event a criminal element is present in a HAZMAT incident.

5. WASHINGTON STATE DEPARTMENT OF ECOLOGY:

   a) Conduct 24-hour HAZMAT response activities as provided in the State DOE Spill Response Operation Manual.
   b) Train staff to use the 24-hour response procedures, and conduct exercises to evaluate those procedures.
   c) Coordinate Natural Resources Damage Assessment (NRDA) activities for the state.

6. OTHER STATE SUPPORT AGENCIES involved in preparedness include the Washington State Department of Agriculture, State Office of the Attorney General, State Office of Marine Safety, State Department of Transportation, State Military Department Emergency Management Division, State Department of Health and Human Services, State Department of Labor and Industries, and the State Fish and Game Department.

F. RESPONSE ACTIVITIES:

1. FIRE RESPONSE:

   a) Identify the type or types 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.
   b) The first emergency responder on-scene should report and size-up the incident, request assistance as needed, and begin establishing the Incident Management System. 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.
   c) As other responders are enroute, it is imperative to identify a safe route of entry and an area for staging.
   d) Depending upon the size and nature of the incident, initial notifications should be made by the first responding agency to the National Response Center, Pierce County DEM, and Washington State Emergency Management Division (EMD).

e) Incident management staff and other personnel should try to identify the Responsible Party, so they can be contacted for further information and assistance.

2. WASHINGTON STATE PATROL:

a) Provide 24-hour response to all hazardous material or oil spill incidents in areas under their jurisdiction, or when requested by local authorities.
b) Assume the role of Incident Commander on highways and other specified jurisdictions, unless local MOUs provide for local assumption of incident command.
c) Assist local jurisdictions when requested.
d) When acting in the role of Incident Management, initiate proper notification procedures as discussed above.
e) Coordinate and maintain liaison with other state agencies involved with an incident, and assist in receiving and disseminating warning information.
f) Provide communications and technical support to the incident, when requested.
g) Provide, when requested and practical, aerial reconnaissance of the impacted area.
h) Coordinate with fire responders when Emergency Mobilization is authorized for a hazardous materials incident.

3. WASHINGTON STATE DEPARTMENT OF ECOLOGY:

a) Act, within the Unified Management System, as the State On-Scene Coordinator for hazardous material and oil spill incidents.
b) Provide 24-hour response to oil spills or hazardous material incidents. DOE spill response personnel will make necessary emergency notifications, and determine the source and course of the incident.
c) Identify the Responsible Party for the incident. Assume responsibility for incident management and clean-up (in conjunction with EPA), if the Responsible Party is unavailable, unresponsive, or unidentified.
d) Set clean-up standards for the incident in accordance with Federal and State laws, and ensure that source control, containment, clean-up, and disposal are accomplished.
e) Assist in monitoring and ensuring the safety of first responders and other personnel.
f) Initiate enforcement actions as appropriate.

g) Coordinate spill response with other state and federal agencies and local jurisdictions using the Incident Management System (IMS).

h) As required by the size and/or duration of the incident, establish a Joint Information Center (JIC) with involved agencies and the Responsible Party to provide current and accurate information to the community.

i) Activate and coordinate the activities of the Natural Resource Damage Assessment Team.

j) Participate in the activities of the Washington Wildlife Rescue Coalition, and notify the appropriate resource trustee agency of injury to fish, shellfish, habitat, or other wildlife.

4. PIERCE COUNTY DEM (acting for the Pierce County LEPC):

a) Support first response agencies and the Incident Commander with information and resource coordination as required.

b) Activate the county Joint Information Center (JIC), when indicated.

c) Assist with federal, state, and other notifications.

d) Assist Incident Commander in determining need for evacuation or shelter-in-place.

5. DRUG LAB RESPONSE

This section provides information and procedures for responses directly relating to drug lab clean up.

Agency responders will work with law enforcement personnel when requested to dispose of drug lab chemicals from the sites of illicit methamphetamine 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, clean-up, 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 Dept. of Ecology's responsibilities for drug lab response are found in:

- RCW 69.50.511, Uniform Controlled Substance Act
- RCW 70.105D, Model Toxics Control Act
- RCW 90.48, Water Pollution Control Act

"Drug 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:

1) Controlled substance: a drug, substance, or immediate precursor.
2) Immediate precursor: a substance or principle compound that is primarily used in the manufacturing process of a controlled substance (RCW 69.43.010).
3) Hazardous chemicals: hazardous substances used in the manufacturing of illegal drugs.

G. RECOVERY ACTIVITIES:

1. The Responsible Party must pay for any cleanup. If the Responsible Party is unable to pay for cleanup or cannot be identified, funding may be available from the State DOE or the US EPA.

2. 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.

VI. RESPONSIBILITIES:

A. FIRE SERVICES:

Central Pierce Fire and Rescue, Graham Fire Department, Puyallup Fire Department, Tacoma Fire Department, and/or Boeing/Fredrickson Fire Department HAZMAT Teams, will respond throughout Pierce County in support of hazardous materials incidents, if requested.

B. WASHINGTON STATE PATROL:

1. The Washington State Patrol (WSP) is the designated State Incident Management Agency for HAZMAT incidents on interstate and state highways.
2. Within Pierce County, if the local jurisdiction does not designate an Incident Management agency, the Washington State Patrol assumes Incident Command for that jurisdiction (RCW 70.136.030).
3. The WSP is the State Incident Commander (IC), overseeing all HAZMAT response operations. The WSP will establish a Unified Management System with fire departments, emergency medical services, and other state and federal agencies.

C. PIERCE COUNTY DEPARTMENT OF EMERGENCY MANAGEMENT (DEM):

The Pierce County Emergency Operations Center and/or emergency management staff will provide support and other functions, as requested by the Incident Commander.

D. WASHINGTON STATE MILITARY DEPARTMENT EMERGENCY MANAGEMENT DIVISION:

The Washington State Military Department Emergency Management Division's 24-hour duty officer will provide support, as requested by the State On-Scene Coordinator or Incident Commander.

E. WASHINGTON STATE DEPARTMENT OF ECOLOGY:

The State DOE has overall responsibility for 24-hour environmental pollution prevention, preparedness and response within the state of Washington. The State DOE acts as the pre-designated State agency for incidents which occur on marine and fresh waters, and for inland spills where the WSP or local Incident Commander (IC) has curtailed emergency response operations. In these cases, the State DOE provides the

State OSC (On-Scene Coordinator) to continue management of the response. The State DOE will act as the lead agency for spill containment, clean-up and the natural resources damage assessment activities.

F. RESPONSIBLE PARTY:

The Responsible Party (owner or shipper) has ultimate accountability for assuring effective and expeditious abatement of a release or threatened release of oil or hazardous materials (WAC 4.24.314) to include clean-up costs and reimbursement for the local responders.

G. LOCAL EMERGENCY PLANNING COMMITTEE:

The Tacoma-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.

VII. RESOURCE REQUIREMENTS:

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 Department of Emergency Management. Each HAZMAT team maintains a list of hazardous materials response equipment and trained personnel available from their respective agencies. Departments where personnel and equipment are available include but are not limited to:

- Central Pierce Fire and Rescue
- Graham Fire Department
- Puyallup Fire Department
- Tacoma Fire Department
- Boeing/Fredrickson Fire Department

A. FIRE DEPARTMENTS:

- Act as Incident Commander (except on state, interstate highways or in undesignated areas where the Washington State Patrol will assume incident command).
- Effectively deploy all 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.
- Other operations which may be appropriate in accordance with training.

B. LAW ENFORCEMENT:

- Provide coordination of resources during a hazardous materials emergency.
- Provide for traffic control and maintenance of evacuation during a hazardous material 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.

C. PUBLIC WORKS:

- Provide equipment and manpower to assist in the containment of a hazardous material release.
- Provide equipment and manpower to repair essential city 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.

D. PUBLIC SAFETY ANSWERING POINTS (9-1-1 Dispatch Centers:

Upon receiving a request for a HAZMAT response:

- Call out the appropriate HAZMAT team.
- Notify Pierce County DEM, as appropriate.

VIII. 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) telephones, (2) cellular telephones, (3) public safety and tactical channels, (4) OSCCR, (5) amateur radio systems, (6) REDNET, and/or (7) 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.

IX. ALERTS, WARNINGS AND EMERGENCY PUBLIC NOTIFICATION:

A. **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.

B. **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.
- Public announcements through the use of public address systems on radio equipped city vehicles.
- Emergency Alert System (activated by Law Enforcement Support Agency (LESA), Tacoma or PC DEM).
- Telephone notification of vulnerable populations and facilities.
- Joint Information Center (JIC) activation.
- News media releases.

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:

- Incident Commander
- Pierce County Fire District Chief or designee
- Pierce County Sheriff or Deputy
- City Police Chief

- Public Works Director (city or county)
- Mayor or City Manager
- 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
- City or County Fire Chiefs
- City Police Chief or County Sheriff
- Public Works Director or County Engineer
- Mayor or 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 shall designate in their Emergency Operations Plan specific individuals who are responsible for alerting the public, PC DEM and coordinating evacuation operations. These individuals should be accessible on short notice 24-hours a day and have designated alternates.

C. WARNING MESSAGES:

The following are some recommended components of an effective public warning message:

1. **MESSAGES SHOULD BE SHORT AND UNCOMPLICATED.** 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.

2. **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.

3. **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.).

4. **GIVE THE PUBLIC THE IMPRESSION SOMEONE IS "IN CHARGE".** Use the name of the 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.

5. **READ IMPORTANT INSTRUCTIONS.** Have the messages repeated immediately a second time and then repeated again each 5-10 minutes.

Sample Shelter-in-Place Public Warning Message:
(Substitute specific local information at underlining)

ATTENTION! (PCSD/TPD, Mayor/City Manager of _____, and the _____ Fire Department 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 on the north, _____ Street on the east, _____ Avenue on the south and _____ Avenue 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 _____ Avenue to the north and _____ Street 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 county EOC coordinator will provide the County Executive, Mayor, or City Manager with an evacuation order for signature as soon as possible.

X. REFERENCES:

A. CODE OF FEDERAL REGULATIONS (CFR): http://www.access.gpogov/nara/cfr/cfr-table-search.html)

1. 29 CFR 1910.120 (q), Hazardous Waste Operations and Emergency Response Planning Requirements
2. 40 CFR 300, National Contingency Plan, SARA, Title III, Local Emergency Planning and Preparedness Requirements
3. 40 CFR Part 355, Extremely Hazardous Substance Emergency Planning and Notification Requirements
4. 44 CFR Part 302.2 (p), Federal Emergency Management Agency Planning Requirements

B. REVISED CODE OF WASHINGTON (RCW): (http://www.leg.wa.gov/rcw/index.cfm)

1. RCW 4.24.480, Civil Immunity for Members of the State Emergency Response Commission, Local Emergency Planning Committees and their Members
2. RCW 24.310, Shipper's Responsibility for Clean-Up of Spills
3. RCW 49.70, Worker and Community Right-to-Know
4. RCW 70.136, Hazardous Materials Incident "Good Samaritan Act"
5. RCW 70.136.030, Incident Command Agencies Designation
6. RCW 90.48, Water Pollution
7. RCW 90.56, Oil and Hazardous Substance Spill Prevention and Response Act

C. WASHINGTON ADMINISTRATIVE CODE (WAC): (http://www.mrsc.org/wac.htm)

1. WAC 118.040, Hazardous Chemical Emergency Response Planning and Community Right-to-Know Reporting

2. WAC 173.180D, Facility Oil Spill Prevention Plan

3. WAC 173.181, Facility Contingency Plan and Response Contractor Standards

4. WAC 296.62 (p), Hazardous Waste Operations and Emergency Response

5. Chapter 173.30 WAC: Dangerous Waste Regulations

D. OTHER:

1. Northwest Area Contingency Plan, 1998, as amended

2. Department of Ecology, Spill Response Operations Manual

3. Pierce County Hazard Identification and Vulnerability Analysis

4. Tacoma-Pierce County LEPC Commodity Flow Studies

CITY OF DuPONT
Post Office Box 455
DuPont, Washington 98327
(206) 964-8121 - FAX 964-3554

October 14, 1997

Mr. David Lundstrom
Department of Ecology
P.O. Box 47600
Olympia, Washington 98504-7600

SUBJECT: INVENTORY OF POTENTIAL GROUND WATER CONTAMINATION SOURCES, CITY OF DUPONT WELLHEAD PROTECTION PROGRAM

Dear Mr. Lundstrom:

The City of DuPont relies upon groundwater wells as its sole source of drinking water. Past episodes of ground water contamination in and around the Puget Sound area have demonstrated the fragile nature of this important resource. In an effort to reduce the likelihood of contamination to its drinking water supply, the City of DuPont has recently completed an inventory of potential sources of contamination for its two existing water supply wells. This inventory has been completed as part of our wellhead protection program, required by the Washington State Department of Health under WAC 246-290-135, Source Protection.

As part of our wellhead protection program, we have completed the enclosed map of wellhead protection zones around the most sensitive areas for our existing well sources. The map identifies wellhead protection areas for the 1, 5, and 10 year zones of contribution to the City's existing wells. The primary areas of concern for the protection of the City's drinking water well sources are those within the ten year zone of contribution. By providing you with this map, the City hopes to familiarize you with its areas of concern with regard to groundwater contamination and asks for your cooperation in protecting this important resource.

Sincerely,

Mayor Willard Shenkel

MWS/96673/tme
cc: Mr. Stan Norman, Department of Ecology
Mr. Steve Hunter, Department of Ecology
Mr. Fred Foreman, City of DuPont
Ms Stacy Patterson, Washington State Department of Health

APPENDIX H

EXAMPLE MAINTENANCE AND MONITORING FORMS

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_____ WK. 1	WK. 2	WK. 3	WK.4	Month_____ Year_____ 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 coolent 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 lubrcant								
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 ___/___/___

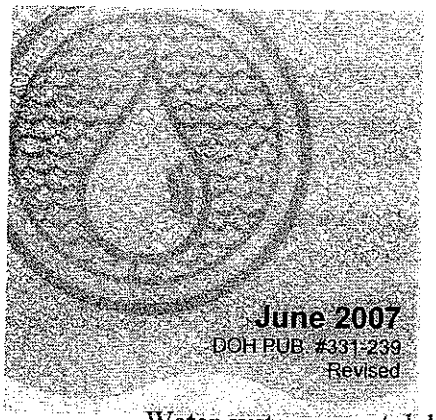
_____ By: _____ Date ___/___/___

Inspection/Maintenance Completed by: _____ Date ___/___/___

marks on back of page _____ Yes _____ No

APPENDIX I

SUGGESTED BOIL WATER NOTICE



June 2007
DOH PUB. #331-239
Revised

Fact Sheet

Public notification helps to protect public health

Water systems must deliver safe and reliable drinking water to their customers 24 hours a day, 365 days a year. If the drinking water supply becomes contaminated, many people could get seriously ill or die. Therefore, state and federal laws require water systems to notify their customers any time a problem with drinking water poses a health risk.

The Office of Drinking Water's (ODW) highest priority is responding to drinking water emergencies. We work hand-in-hand with water systems to resolve problems. Notifying water system customers when their water may not be safe to drink, gives them time to protect themselves and their families.

Public notification rules

Public notification requirements help ensure customers know – as soon as possible – if a situation poses a public health risk. The rules apply to all Group A public water systems. (Group A systems serve more than 14 connections or more than 24 people).

Group A public water systems must notify their customers whenever they:

- Violate drinking water quality or monitoring requirements.
- Operate under a variance or exemption.
- Have any situation that poses a public health risk, such as a disruption in service.
- Receive an order from the Office of Drinking Water.
- Fail to comply with an ODW order.
- Receive a red operating permit.

Public notification requirements also give water systems an opportunity to educate their customers about drinking water quality, and build trust by sharing information openly. Notices used in this positive way can help customers understand the basis for rate increases necessary for additional drinking water treatment and protection.

Public notification timing and distribution requirements

Notifying customers in a timely manner about actual or potential threats related to their drinking water allows them to make informed decisions affecting their health. Public notification timing and distribution requirements depend on the level of threat associated with the violation or event.

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.

You must send a copy of all public notifications and the appropriate *Public Notice Certification* to ODW.

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

HELPING TO ENSURE SAFE AND RELIABLE DRINKING WATER

Other aspects of the public notification rules:

Water systems may combine notices for individual violations into their annual Consumer Confidence Reports, as long as they meet the public notification timing requirements.

The rules, including the following, are online at http://apps.leg.wa.gov/WAC/default.aspx?cite=246-290 (See Part 7, Reporting, Subpart A.)

- A list of violations and situations that require 24-hour notification.
- Simplified health effects language.
- Standard language for monitoring violations.

Technical assistance

The U.S. Environmental Protection Agency and the Association of State Drinking Water Administrators developed a ***Public Notification Handbook***. It includes sample public notices and is online at http://www.doh.wa.gov/ehp/dw/Publications/PNhandbook.pdf

You can access public notification forms and links to ODW publications online at http://www.doh.wa.gov/ehp/dw/fact_sheets/public_notification.htm

You can also call your ODW Regional Office for technical assistance. We are open 8 a.m. to 5 p.m. Monday through Friday. If you have an after-hours emergency, call (877) 481-4901.

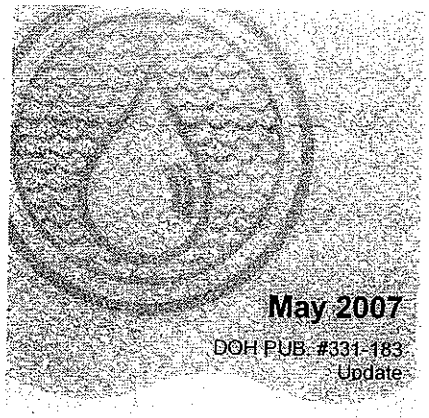
Eastern Region (509) 456-3115
Serving Adams, Asotin, Benton, Chelan, Columbia, Douglas, Ferry, Franklin, Garfield, Grant, Kittitas, Klickitat, Lincoln, Okanogan, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman, and Yakima counties.

Northwest Region (253) 395-6750
Serving Island, King, Pierce, San Juan, Skagit, Snohomish, and Whatcom counties.

Southwest Region (360) 236-3030
Serving Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Kitsap, Lewis, Mason, Pacific, Skamania, Thurston, and Wahkiakum counties.

More detailed contact information is online at http://www.doh.wa.gov/ehp/dw/Staff_Lists/dwnames.htm

The Department of Health is an equal opportunity agency. For persons with disabilities, this document is available on request in other formats. To submit a request, please call (800) 525-0127 (TTY 1-800-833-6388). For additional copies of this publication, call (800) 521-0323. This and other publications are available at http://www.doh.wa.gov/ehp/dw



Fact Sheet

Responding to a threat against a water system

Guidance for Office of Drinking Water staff and water systems to use when responding to suspected vandalism or terrorism

These guidelines appear in sequential order, but the steps and actions may be adjusted to meet the needs of each situation. Office of Drinking Water staff and utility personnel must work closely and collaboratively when determining specific actions appropriate to any incident.

Identify the threat

- Take any suspicious activity or evidence of vandalism or sabotage seriously.
- Notify your chain of command immediately.
- Designate a response coordinator.
- Document what you see and keep notes as you go.

Immediately notify officials

- Contact local law enforcement.
- Call your Department of Health (DOH) Office of Drinking Water Regional Office at the numbers listed on page 2. Use the after-hours number (877) 481-4901, if necessary.
- Alert other officials needed to protect public health, such as the local health jurisdiction.

Assess and respond to the threat

- Inspect facilities, but do not disturb any evidence.
- Consult with local law enforcement to determine whether the threat is credible. If there is strong evidence of sabotage or terrorist activity, call the FBI at (206) 622-0460.
- Pull together a response team with expertise in the areas needed to resolve the situation.
- Determine whether there is biological or chemical contamination, or damage that disrupts supply.
- Consult with DOH to determine immediate actions needed to protect public health. Examples include notifying customers, isolating affected areas, shutting down critical facilities, and issuing "boil water" or "do not drink" advisories.
- If you suspect contamination, sample for coliform, chlorine residual, and nitrate or nitrite. See page 2 for a list of water tests.
- Collect samples for future analysis and store them appropriately (for example, refrigerate).
- Conduct a full assessment of the situation, facilities and water quality.
- Develop a communication strategy and communicate with affected people regularly.
- If necessary, determine alternative sources of water supply for your customers.
- If appropriate, drain, clean, repair and disinfect the system. Get professional help if necessary.

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

HELPING TO ENSURE SAFE AND RELIABLE DRINKING WATER

Communicate with others

- Designate one public spokesperson that is able to control his or her emotions, remain calm, stay in control, and be firm but polite.
- Identify key messages and keep them current.
- Anticipate possible questions and prepare answers ahead of time.
- Never assume that what you say will be "off the record."
- Avoid conjecture and blame.
- Keep your communications succinct and to the point.

Consider additional water testing

Intentional contamination of drinking water falls into four general categories: 1) Inorganic, such as metals or cyanide, 2) Organic, such as pesticides or volatile compounds, 3) Radionuclide, and 4) Pathogenic microbiological organisms.

Even if you suspect contamination, it is unlikely the evidence will point to a particular contaminant. Instead, you may have to decide what tests to run for contaminants. Below are possible tests and the information they can give you about contaminants that may cause acute health effects.

Coliform Bacteria: This test indicates whether microbial contamination has been introduced into the system, especially from fecal origins.

Heterotrophic Plate Count (HPC): This test provides the number of bacteria that may have been introduced into the water. HPC counts greater than 500 signal the need to be wary. Very high levels (1,000 to 10,000 and greater) suggest a problem that needs immediate evaluation.

Chlorine Residual: In chlorinated systems, this test indicates whether materials introduced into the water have created a demand for chlorine. Lower-than-normal or no residual signals the need for further evaluation.

Chlorine Demand: For systems that do not routinely chlorinate, this test reveals unusual demands on the oxidizing capability of the added chlorine. Unusual demand indicates the presence of a contaminant that warrants further investigation.

Nitrate or Nitrite: This test is easy to perform and will tell you if either nitrate or nitrite is present at a level that could harm infants.

Total Organic Carbon (TOC): This test is relatively simple to perform. Normal expected levels of TOC for surface water are 0.2 to 4 mg/L, and for groundwater 0.01 to 2.0 mg/L. Higher levels may indicate the presence of organic materials that pose a health concern.

Total Halogenated Organic Carbon (TOX): This relatively simple test measures halogenated organic substances, including disinfection by-products such as trihalomethanes and haloacetic acids. High levels suggest contamination has occurred or that precursor organic materials have been added to enable formation of disinfection byproducts.

Cyanide: Although not simple to perform, do this test immediately if you suspect cyanide contamination. Cyanide is very toxic, causing rapid death upon ingestion.

Office of Drinking Water Regional Offices

Southwest Region (360) 236-3030
Northwest Region (253) 395-6750
Eastern Region (509) 456-3115
After-hours (877) 481-4901

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DRINKING WATER WARNING

The _____ Water System, ID_____, located in _____County is contaminated with fecal coliform/ *E. coli* bacteria.

Fecal coliform/ *E. coli* bacteria were detected/confirmed in the water supply on _____. These bacteria can make you sick and are a particular concern for people with weakened immune systems.

DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST. Bring all water to a rolling boil for one minute. Let it cool before using. 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.

Fecal coliforms and E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes 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. 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 have consulted with the Washington State Department of Health about this incident. We will notify you when you no longer need to boil the water. We anticipate resolving the problem by _____.

For more information, please contact _____ at ( )___-_____ or at _____.
(owner or operator) (phone number) (address)

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 distribution copies by hand or mail.

This notice is sent to you by _____ Water System on ___/___/____

10/17/08

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

PUBLIC NOTICE CERTIFICATION
Acute Coliform MCL

Within 10 days of notifying your customers, you must send a copy of each type of notice you distribute (hand-delivered notices, press releases, newspaper articles, etc.) to your Regional Office of Drinking Water. Also complete and send this form, which certifies that you have met all the public notification requirements. If the boil water advisory remains in effect more than three months, you must notify your water users again and provide another Public Notice Certification to the Department of Health. *With this certification, you are also stating that you will meet future requirements for notifying new billing units of the violation or situation.*

Water System:_____ ID #_____ County:_____

Violation Date:_____ / _____ / _____ Violation Type:_____

This public water system certifies that public notice has been given to water users, following state and federal requirements for delivery, content, and deadlines.

Complete the following items:

Yes No

☐ ☐ Distribution was completed on ___ / ___ /____. Check all that apply:
- ☐ Hand delivery,
- ☐ Press release (TV, radio, newspaper, etc.),
- ☐ Posting at_____ (by DOH approval only),
- ☐ Other _____ (by DOH approval only).

☐ ☐ Were the water users notified within 24 hours?

_____ _____ _____
Signature of owner or operator | Position | Date

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Northwest Regional Office:
20435 72nd Ave. S.
Suite 200
Kent WA 98032
(253) 395-6775
Fax: (253) 395-6760

Southwest Regional Office:
243 Israel Road SE
Town Center 3
Tumwater, WA 98501
(360) 236-3030
Fax (360) 664-8058

Eastern Regional Office:
1500 West Fourth Ave.
Suite 305
Spokane WA 99201
(509) 456-2788
Fax: (509) 456-2997

DOH Form #331-264 (Updated 05/07)

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 <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>.

###

10-17-08

Your logo or
company name here

News Release

For Immediate Release: <DATE>

Contact: Water purveyor/system contact name and telephone number

<Water System Name> Boil Water Advisory Rescinded

CITY NAME – 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>.

###

Oct. 2008
DOH 331-179
Revised

Questions & Answers

Public Health Advisory
Coliform

Why must I boil my water?

Recent testing shows that your water system is contaminated with organisms that could 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 1/8-teaspoon bleach per gallon of water, mix thoroughly, and then let stand for 60 minutes before using.

Washington State Department of Health
Division of Environmental 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.

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Fact Sheet

Coliform Bacteria and Drinking Water

November 2007
DOH PUB. #331-181
(Revised)

Public water systems are required to 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 become seriously ill. Fortunately, public water systems take many steps to ensure that the public has safe, reliable drinking water. One of the most important steps is to regularly test the water for coliform bacteria.

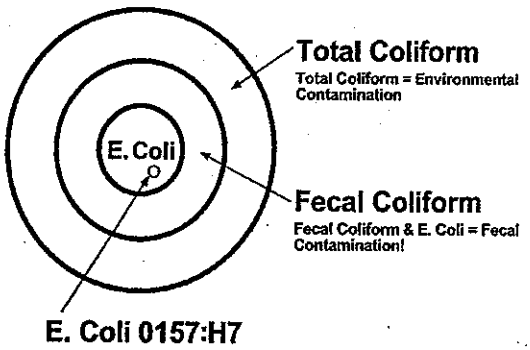
What are coliform bacteria?

Coliform bacteria are organisms that are present in the environment and in the feces of all warm-blooded animals and humans. Coliform bacteria will not likely 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 relatively easy and inexpensive to test for coliform bacteria. If coliform bacteria are found in a water sample, water system operators work to find the source of contamination and restore safe drinking water. There are three different groups of coliform bacteria; each has a different level of risk.

Total coliform, fecal coliform, and E. coli

Total coliform, fecal coliform, and *E. coli* are all indicators of drinking water quality. The total coliform group is a large collection of different kinds of bacteria. Fecal coliforms are types of total coliform that mostly exist in feces. *E. coli* is a sub-group of fecal coliform. When a water sample is sent to a lab, it is tested for total coliform. If total coliform is present, the sample will also be tested for either fecal coliform or *E. coli*, depending on the lab testing method.

TOTAL COLIFORM, FECAL COLIFORM AND E. COLI



Total coliform bacteria are commonly found in the environment (e.g., soil or vegetation) and are generally harmless. If only total coliform bacteria are detected in drinking water, the source is probably environmental. Fecal contamination is not likely. However, if environmental contamination can enter the system, there may also be a way for pathogens to enter the system. Therefore, it is important to find the source and resolve the problem.

Fecal coliform bacteria are a sub-group of total coliform bacteria. They appear in great quantities in the intestines and feces of people and animals. The presence of fecal coliform in a drinking water sample often indicates recent fecal contamination – meaning that there is a greater risk that pathogens are present than if only total coliform bacteria is detected.

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

HELPING TO ENSURE SAFE AND RELIABLE DRINKING WATER

E. coli is a sub-group of the fecal coliform group. Most *E. coli* bacteria are harmless and are found in great quantities in the intestines of people and warm-blooded animals. Some strains, however, can cause illness. The presence of *E. coli* in a drinking water sample almost always indicates recent fecal contamination – meaning there is a greater risk that pathogens are present.

A note about *E. coli:* *E. coli* outbreaks receive much media coverage. Most outbreaks have been caused by a specific strain of *E. coli* bacteria known as ***E. coli O157:H7***. When a drinking water sample is reported as "*E. coli* present" it does not mean that this dangerous strain is present and in fact, it is probably not present. However, it does indicate recent fecal contamination. Boiling or treating contaminated drinking water with a disinfectant destroys all forms of *E. coli*, including *O157:H7*.

What happens 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, or "repeat," water samples for testing, and often inspect the entire system. Taking repeat samples helps determine whether an actual problem exists in the system. If any of the repeat samples detect coliform bacteria, the initial findings are considered confirmed.

What happens if total coliform bacteria are confirmed in my water?

If total coliform bacteria are confirmed in your drinking water, your water system should be inspected to find and eliminate any possible sources of contamination. Once the source is identified, it can usually be resolved by making system repairs, flushing, and adding chlorine for a short period of time. The state Health Department works with water systems and utility managers to help resolve such problems. When total coliform bacteria are confirmed in drinking water, a water system or utility is required to notify its customers within 30 days about the situation. The Health Department recommends that this notice be distributed as soon as possible. The notice will inform you of actions being taken to correct the problem, when the problem will likely be resolved, and what you may need to do until then.

What happens if fecal coliform bacteria or *E. coli* are confirmed in my water?

Confirmation of fecal coliform bacteria or *E. coli* in a water system indicates recent fecal contamination, which may pose an immediate health risk to anyone consuming the water. Responding to health emergencies is the state Health Department's highest priority. A "Health Advisory" will be issued within 24 hours to alert all water users that there is a health risk associated with the water supply. In most cases, the use of boiled or bottled water will be recommended for drinking and cooking. The notice will inform customers of actions being taken to correct the problem, and when the problem will likely be resolved. The department will inspect the system as soon as possible to assist the water system in resolving the problem. More water samples will be taken to find and eliminate potential contamination sources, and chlorination and flushing of the system will most likely occur. The Health Advisory will remain in effect until the situation is resolved and the water is safe to drink.

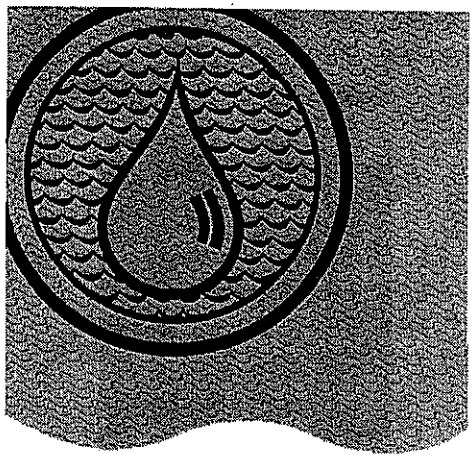
For more information:

Northwest Regional Office – Kent
Coliform Program: 253-395-6775 Main Office: 253-395-6750
Southwest Regional Office – Tumwater
Coliform Program: 360-236-3044 Main Office: 360-236-3030
Eastern Regional Office – Spokane
Coliform Program: 509-456-2788 Main Office: 509-456-3115

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Coliform Sampling Procedure

November 2007
(Revised)

DOH PUB #331-225

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

Coliform Sampling Procedure

The State Department of Health Office of Drinking Water (ODW) recommends that you collect your sample using the following steps. If instructions from your laboratory are different, please call ODW for clarification.

Generally the sample kit contains:

- A sample bottle
- A lab form
- A rubber band

The general sampling procedure for coliform monitoring is as follows:

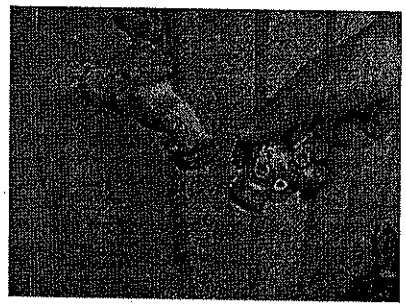
Step One

Routine and repeat samples should be collected from sites throughout the distribution system in accordance with your Coliform Monitoring Plan.

Choose a sample tap that represents the water in your distribution system. Avoid poor sample sites such as swivel faucets, hot and cold mixing faucets (with a single lever), leaky or spraying faucets, drinking fountains, janitorial sinks, frost-free hose bibs, and faucets below or near ground level.

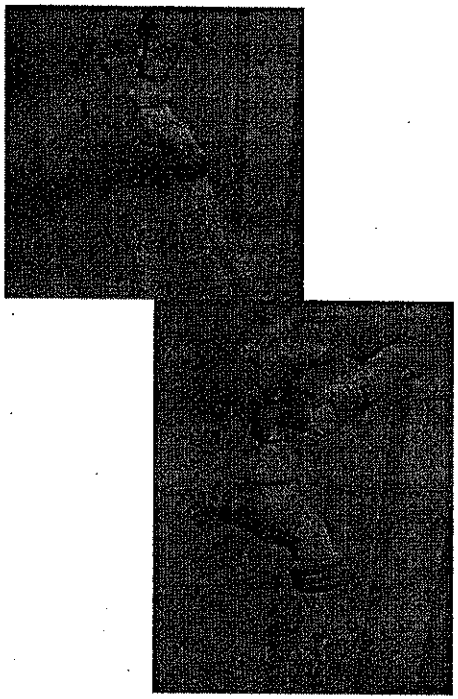
Step Two

Remove any attachments from the faucet, including aerators, screens, washers, hoses, and water filters. If you choose to disinfect the sample site prior to sample collection, be sure to thoroughly flush until all disinfectant is removed.



Step Three

Turn on the cold water only and let it run with a steady stream for at least five minutes. Before collecting the sample, turn the water down to a thin stream (about the width of a pencil), then let the water run one minute. If the system is chlorinated, measure the chlorine residual and note the results on the lab slip. Water conservation tip: The flushed water may be saved in a bucket to be used later.



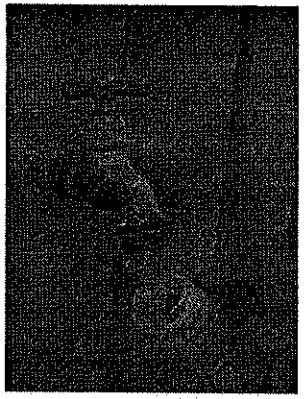
Step Four

There may be some liquid or powder in the sample bottle to neutralize any chlorine that may be present. Do not rinse it out.

Step Five

To avoid contamination while taking the sample, hold the bottle near the bottom with one hand, hold the top of the cap with the other, and then unscrew the cap.

Do not set the cap down, touch any part of the cap that touches the bottle, or let anything touch the rim of the bottle or the inside of the cap.

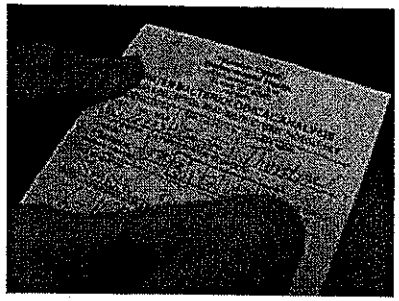


Step Six

Hold the bottle under the stream of water, being careful not to let the bottle touch the sample tap. Fill the bottle to the neck or indicated fill line, but do not allow it to overflow. Remove the bottle from the water flow and replace the cap.

Step Seven

Complete the lab slip. If there was anything unusual about the sample collection, note it on the lab slip.



Laboratory forms vary, but the following information is very important to complete:

- Water system ID number
- Water system name
- Collection date and time the sample was taken
- Type of sample (check ONLY ONE Type: Routine, Repeat, Raw, or For Information Only)
- Sample location (street address or other type of location identifier)
- System type (Group A or B)

Step Eight

Secure the lab slip to the bottle with the rubber band. Deliver the sample to a certified lab or to a designated drop-off location for the lab as soon as possible. Lab analysis must begin within 30 hours of sample collection.

If you have questions about coliform sampling collection procedures, contact your regional office:

SW Regional Office:
(360) 236-3044

NW Regional Office:
(253) 395-6775

Eastern Regional Office:
(509) 456-2788

Fact Sheet

Routine Coliform Monitoring Requirements

October 2007
DOH PUB. #331-205
(Revised)

Group A public water systems are required to perform routine coliform monitoring. The minimum number of samples required each calendar month depends on the type of water system, how many people are served, and the source of the water. A month's population is the total number of residential and non-residential users. The population, number of connections, and the assigned coliform monitoring schedule for your water system can be found on the Water Facilities Inventory form (WFI).

A non-community water system serving less than 25 people per month that uses only protected groundwater sources may have a reduced monitoring schedule. A reduced monitoring schedule is not possible for a system that is served by a surface water source or a groundwater source influenced by surface water (GWI).

The table below lists the minimum number of routine samples required for community (COMM), non-transient non-community (NTNC), and transient non-community (TNC) water systems. Refer to the table in WAC 246-290-300 if your water system is larger than listed below.

Population Served During the Month	Monthly Routine Samples	Number of Routine Samples If coliform presence found in previous month
0	0*	
1 - 1,000	1	5
1,001 - 2,500	2	5
2,501 - 3,300	3	5
2,301 - 4,100	4	5
4,101 - 4,900	5	5
4,901 - 5,800	6	6
5,801 - 6,700	7	7
6,701 - 7,600	8	8
7,601 - 8,500	9	9

* Monitoring is not required for a calendar month when a system does not serve water to any customers. If this is due to unusual circumstances, contact your DOH regional office. If your system remains open during a month it is normally closed, sampling is required according to the above table.

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

For more information:

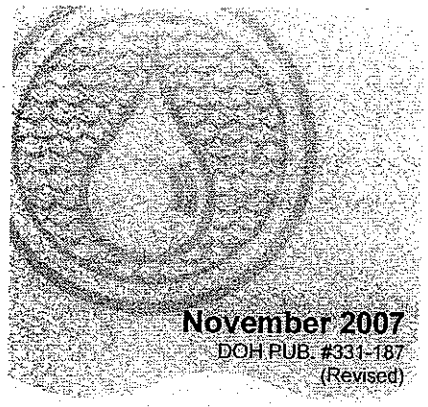
Northwest Regional Office – Kent
Coliform Program: 253-395-6775 Main Office: 253-395-6750

Southwest Regional Office – Olympia
Coliform Program: 360-236-3044 Main Office: 360-236-3030

Eastern Regional Office – Spokane
Coliform Program: 509-456-2788 Main Office: 509-456-3115

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Fact Sheet

Follow-up to an Unsatisfactory Coliform Sample

A drinking water sample is unsatisfactory whenever coliform bacteria are present. If your water system receives unsatisfactory sample results, you must collect a set of repeat samples within 24 hours.

The purpose of repeat samples is to confirm the presence of coliform bacteria in the system and determine possible causes of contamination. **Do not** shock-chlorinate the system before collecting repeat samples without prior approval from the Department of Health Office of Drinking Water (ODW).

Thoroughly inspect the water system

Try to identify potential sources of contamination, such as "openings" in the system and/or treatment equipment failure. Make needed repairs to your system. For help see *Troubleshooting Checklist for Coliform Contamination* (DOH Pub. #331-180).* If obvious sources of contamination are found, contact your ODW regional office at the number listed on back of this Fact Sheet.

Review your sampling procedure

Review your sampling procedure to make sure samples are taken correctly. For help see *Coliform Sampling Procedure* (DOH Pub. #331-225).*

Collect repeat samples

The number of required repeat samples is based on the number of routine samples your system collects monthly.

If your system collects ONE routine sample per month, a total of **FOUR REPEAT** samples are required from the following locations:

1. The same tap as the original unsatisfactory routine sample.
2. An active service within five active connections upstream from where the original unsatisfactory sample was taken.
3. An active service within five active connections downstream from where the original unsatisfactory sample was taken.

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

HELPING TO ENSURE SAFE AND RELIABLE DRINKING WATER

4. Another location – such as the source or right after the storage tank – that will provide useful information for determining a source of contamination. If you do not have a tap at the source or storage tank, choose another active service.

If a system collects TWO OR MORE routine samples per month, a total of **THREE REPEAT** samples are required from the following locations:

1. The same tap as the original unsatisfactory routine sample.
2. An active service within five active connections upstream from where the original unsatisfactory sample was taken.
3. An active service within five active connections downstream from where the original unsatisfactory sample was taken.

If you cannot sample as outlined above, or **if any repeat samples are unsatisfactory**, call your ODW regional office at the number listed below.

The month after an unsatisfactory sample

In the month following an unsatisfactory sample, a minimum of FIVE ROUTINE samples are required. These samples must be marked as "Routine" on the lab slips submitted with the samples.

If you usually take five or more samples each month, follow your regular schedule.

If any of these samples are unsatisfactory, further investigation and more repeat samples are required. Contact ODW for assistance.

For more information

Northwest Region – Kent
Coliform Program: 253-395-6775
Main Office: 253-395-6750

Southwest Region – Olympia
Coliform Program: 360-236-3044
Main Office: 360-236-3030

Eastern Region – Spokane
Coliform Program: 509-456-2788
Main Office: 509-456-3115

* ODW publications are online at http://www4.doh.wa.gov/dw/publications/publications.cfm

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November 2007

DOH PUB. #331-206
(Revised)

Types of Coliform Violations for Group A Public Water Systems

Coliform Testing

All public water systems in Washington State must be tested for coliform bacteria on a regular basis; the number of samples required depends on the population served by the system. Coliform presence indicates contamination which could possibly cause illness to those who drink it. For this reason, a water system must comply with coliform monitoring requirements.

Laboratories test compliance distribution samples with a presence absence test. S*atisfactory* test results indicate the sample has no coliform bacteria present. If the sample does contain coliform bacteria, it is *unsatisfactory* and will be further tested for *E. coli* or fecal coliform bacteria presence. The presence of *E. coli* or fecal coliform indicates a greater likelihood that disease-causing organisms may be present and there is a greater public health concern.

Standards called maximum contaminant levels (MCLs) have been set for the presence of *E. coli*, fecal coliform, and total coliform bacteria. The MCL is the maximum permissible level of coliform in drinking water. A water system has a violation if it exceeds the standard. The two types of MCL violations are *acute* and *non-acute*.

Acute MCL Violation

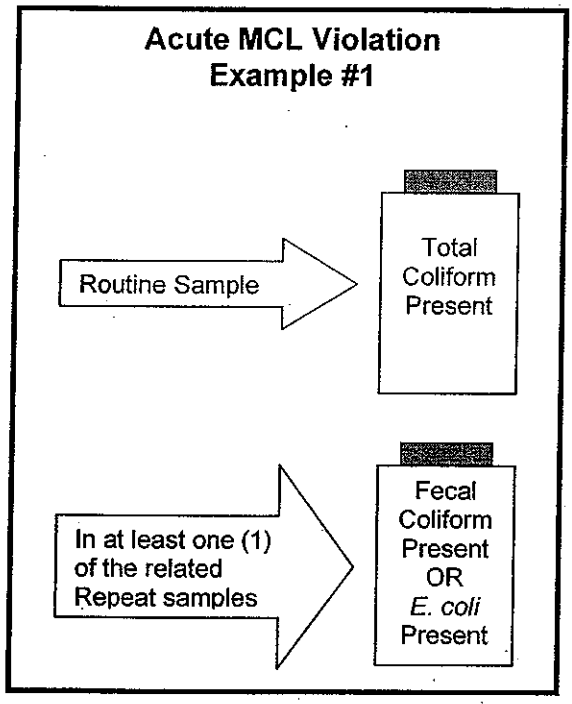
The acute MCL is the standard for the presence of *E. coli* and fecal coliform bacteria in drinking water. *E. coli* and fecal coliform are indicators for recent contamination by sewage or animal waste.

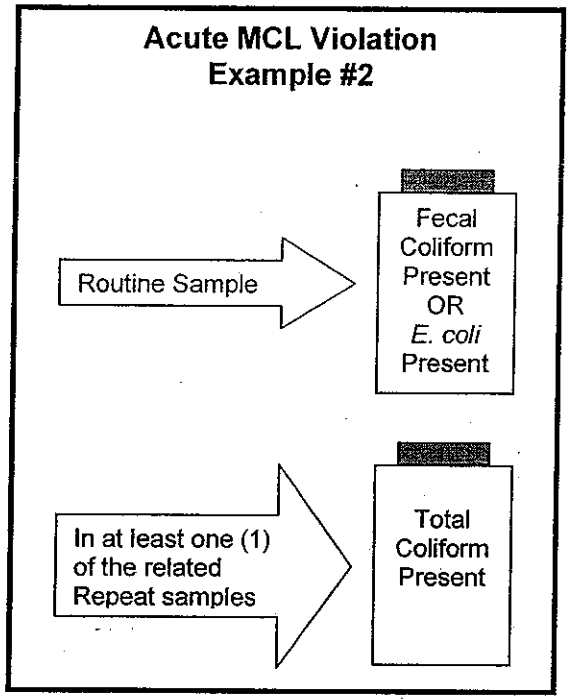
A single sample with a coliform presence, an *E. coli* presence, or a fecal coliform presence does not result in an acute MCL violation. *The acute MCL violation is determined based on the results of both the routine sample and the related set of repeat samples collected as follow-up to the unsatisfactory routine sample.*

For an acute MCL violation to occur, a sample and at least one *related* repeat sample must both have coliform bacteria present, and one of the samples must show the presence of *E. coli* or fecal coliform bacteria. If this occurs, contamination is confirmed in the water supply.

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water
HELPING TO ENSURE SAFE AND RELIABLE DRINKING WATER

The following shows how an acute MCL violation could occur:





Non-Acute MCL Violation

The non-acute MCL is the standard for the presence of total coliform bacteria. The presence of total coliform bacteria in a water sample generally indicates contamination from the environment (such as soils and plants). It is possible disease-causing organisms could be present as well.

Non-acute MCL violations are calculated on a monthly basis. As with acute MCL violations, a single sample with a coliform presence does not result in a violation. *All routine and repeat samples collected for a specific month count towards determining compliance with the non-acute MCL.*

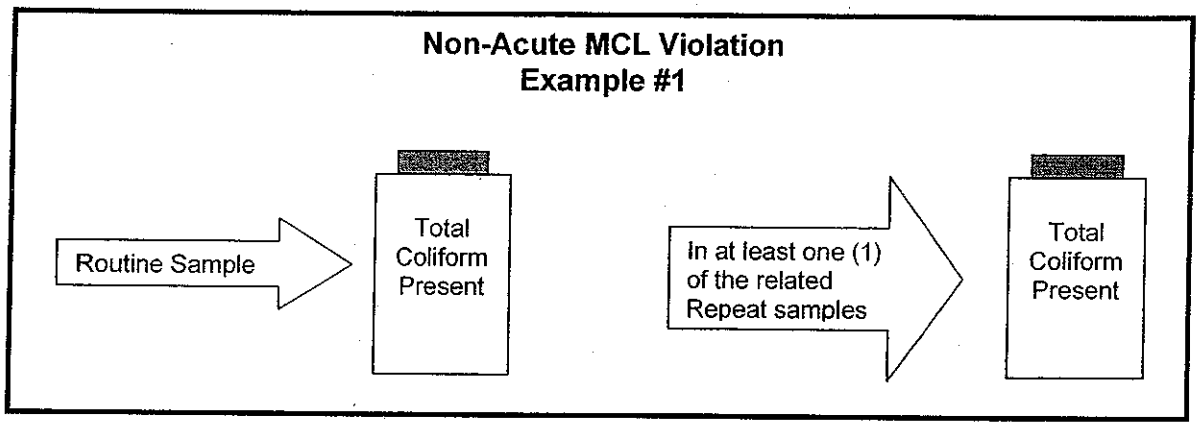
For a system that collects less than 40 routine samples during the month:

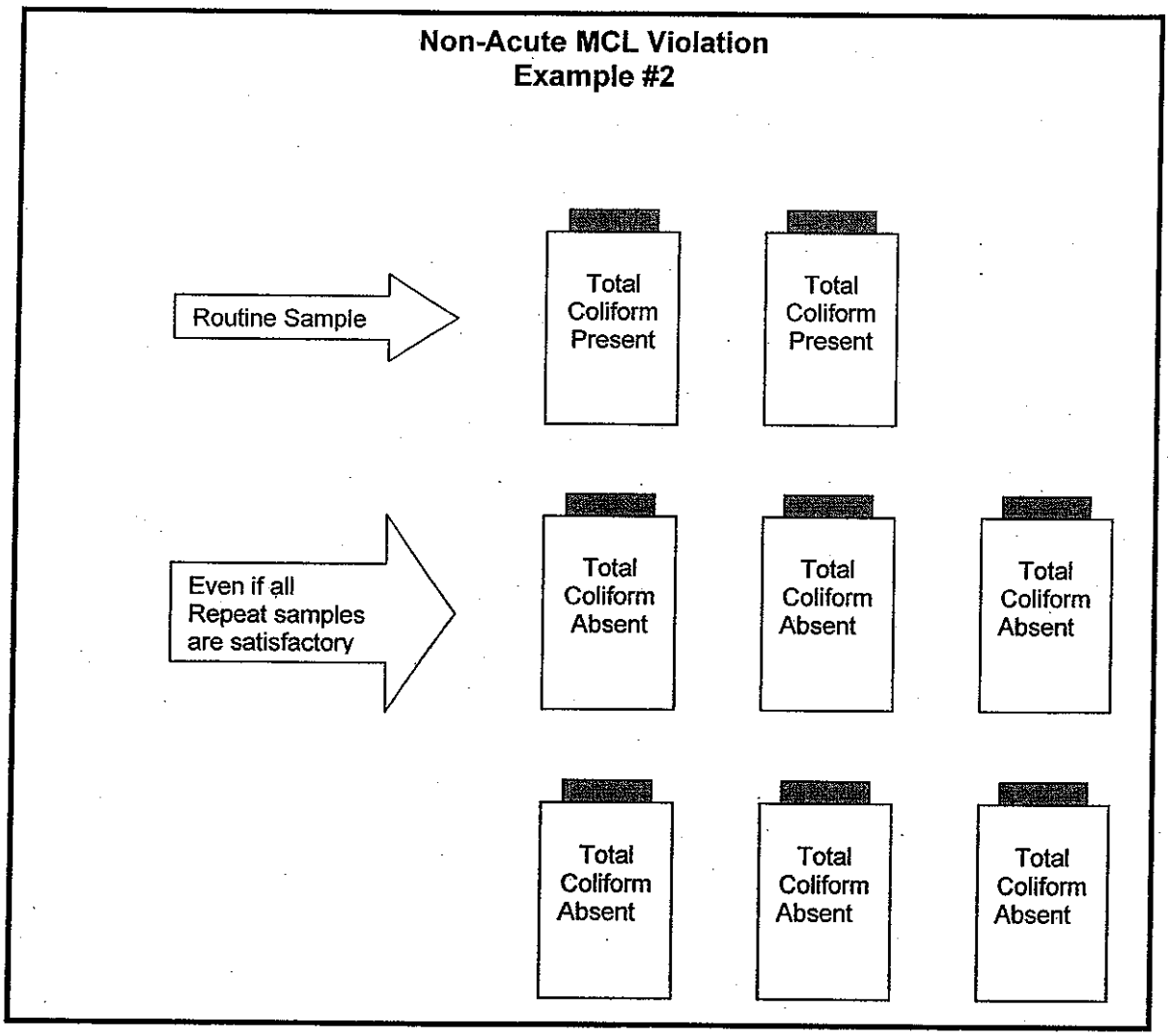
- The system has a non-acute MCL violation if two or more routine and/or repeat samples are unsatisfactory with coliform present.

For a system that collects 40 or more routine samples during the month:

- The system has a non-acute MCL violation if more than five percent of all routine and repeat samples are unsatisfactory with coliform present.

The following shows how a non-acute MCL violation could occur:





What to do if you have an MCL violation:

If you have an MCL violation, contact your DOH regional office as soon as possible to discuss public notification, follow-up requirements, and steps you can take to resolve the problem quickly. *There are requirements to notify everyone served by the water system:*

- Acute MCL violation – public notification is required within 24 hours. Due to the public health risk, a boil water advisory will typically be issued in response to an acute MCL violation.
- Non-acute MCL violation – public notification is required to be completed as soon as practical, no later than 30 days after the system learns of the violation.

Notification forms are available from DOH.

Other Types of Coliform Violations

There are two other types of coliform violations that are related to monitoring requirements for the water system:

Major Repeat Violation
A system has a Major Repeat Violation if the system fails to collect repeat samples in response to an unsatisfactory routine sample(s). A Major Repeat Violation is considered a water quality violation since the routine sample showed the presence of bacteria. *Public notification is required.*

Major Monitoring Violation
This type of violation occurs if a system does not collect any samples during a month when one or more are required. Monitoring is important to assure that the water served to customers is free of coliform bacteria. *Public notification is required.*

Significant Non-Compliance (SNC) with Coliform Requirements

DOH classifies violations as either water quality or monitoring violations, and identifies a water system as a *SNC* if the system has one of the following violations within a 12-month period:

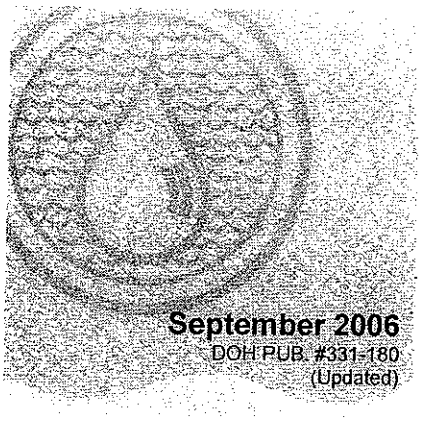
- Four water quality violations (MCL and/or major repeat).
- Six major monitoring violations.
- A combined total of six water quality and monitoring violations.

When a water system becomes a SNC, the department will pursue enforcement.

For more information:

Northwest Regional Office – Kent
Coliform Program: (253) 395-6775 Main Office: (253) 395-6750
Southwest Regional Office – Tumwater
Coliform Program: (360) 236-3044 Main Office: (360) 236-3030
Eastern Regional Office – Spokane
Coliform Program: (509) 456-2788 Main Office: (509) 456-3115

The Department of Health is an equal opportunity agency. For persons with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TTY 1-800-833-6388). For additional copies of this publication, call 1-800-521-0323. This and other publications are available at http://www.doh.wa.gov/ehp/dw



September 2006
DOH PUB. #331-180
(Updated)

Fact Sheet

Troubleshooting Checklist for Coliform Contamination

Coliform bacteria in a water system are generally either a result of a failure to maintain a "closed" water system and/or a treatment failure. Visually inspect the system for "openings" and/or treatment equipment failures. Look for areas of the system where soil, leaves, insects, birds, sewage, or animal wastes could possibly get into your water system.

Check the following:

WELLS

- Well casing is above the floor or ground and the area around the well is clean.
- Well has a watertight seal and has a U-shaped, inverted, screened (minimum 24 mesh) vent.
- There are no openings in the well cap or casing, including around the electrical wires.
- There is no standing water around the source.
- The well is at least 100 feet from sources of contamination, such as septic tanks, drain fields, sewers, manure, or garbage.
- The well has been effectively disinfected following any well or pump repairs.
- A dug well has a watertight lid with overhanging edge and a neoprene-type seal between the lid and the well casing.

SPRINGS

- The collection box and the hatch or lid are watertight. The hatch should have an overhanging edge and a neoprene-type seal.
- Vents are covered with an insect-proof non-corroding screen (minimum 24 mesh).
- Overflow and drain lines are screened or protected with an angle-flap valve.
- Surface water is directed away from the spring collection area by a diversion ditch.
- The spring is at least 200 feet from sources of contamination, such as septic tanks, drain fields, sewers, manure, or garbage.

TREATMENT

- Chlorine residual is measured and levels are adequate.
- UV system is operating correctly.

HYDROPNEUMATIC and BLADDER TANKS

- Tank(s) are not waterlogged.
- Sediment has not accumulated in the tank.
- Bladders are intact and functional.

RESERVOIRS and STORAGE TANKS

- There are no openings that allow entry of surface water, debris, insects, etc.
- The access hatch has an overlapping, watertight cover and a neoprene-type seal.
- Vents are clean, directed downward, and screened (minimum 24 mesh).
- Overflow and drain lines are protected with screens or angle-flap valves and discharge above ground. The drainpipe should not be submerged in non-potable water.
- There are no signs of dirt, insects, growth, sediment or debris inside the tank.
- There are no cracks, leaks, or vegetative growth on the outside of the tank.

DISTRIBUTION SYSTEM

- There are no obvious leaks or breaks.
- The system has been effectively disinfected following any construction or repair work.
- There have been no low pressure or water outage incidents.
- Non-looped, dead-end sections are regularly flushed.
- System is free of possible cross connections.

AFTER INSPECTING SYSTEM

- Make needed repairs and improvements.
- Disinfect and flush the system according to DOH guidelines.
- Install sample taps at source and storage facilities, if needed.
- Establish or improve preventative maintenance program (routine sanitary control area inspection, storage tank inspection, and distribution system flushing).

FOR MORE INFORMATION

Northwest Regional Office – Kent
Coliform Program: 253-395-6775 Main Office: 253-395-6750

Southwest Regional Office – Tumwater
Coliform Program: 360-236-3044 Main Office: 360-236-3030

Eastern Regional Office – Spokane
Coliform Program: 509-456-2788 Main Office: 509-456-3115

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

The Department of Health is an equal opportunity agency. For persons with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TTY 1-800-833-6388). For additional copies of this publication, call 1-800-521-0323. This and other publications are available at http://www.doh.wa.gov/ehp/dw

IMPORTANT NOTICE ABOUT YOUR WATER SYSTEM
Coliform Maximum Contaminant Level (MCL) Exceeded: Non-Acute MCL

The _____ water system, ID# _____ in _____ County routinely monitors for the presence of total coliform bacteria and in _____ this type of bacteria was detected. Although this incident was not an emergency, as our customer, you have a right to know what happened and what we did or are doing to correct the situation.

Coliforms are bacteria which are naturally present in the environment and are used as indicators that other, potentially-harmful, bacteria may be present. Coliforms were found in more samples than allowed and this was a warning of potential problems. The samples that showed the presence of coliform were further tested to see if other bacteria of greater concern, such as fecal coliform or E.coli were present. **None of these bacteria were found.**

You do not need to boil your water. People with severely compromised immune systems, infants, and some elderly may be at an increased risk. These people should seek advice from their health care provider.

What happened? What is the suspected or known source of contamination?

At this time:

☐ The problem is resolved. Additional samples collected were found to be free of coliform bacteria.
☐ We anticipate resolving the problem by ____ / ____ / ____.
☐ Other _____.

For more information, contact _____ at ( )____-_____ or at _____.
(owner or operator) (phone number) (address)

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 _____ Date Distributed ____ / ____ / ____.

Coliform Non-Acute Public Notice Certification Form
The purpose of this form (below) is to provide documentation to the department that public notice was distributed. Please check the appropriate box and fill in the date that the notice was distributed:

☐ Notice was mailed to all water customers on ____ / ____ / ____.
☐ Notice was hand delivered to all water customers on ___ / ___ / ___.
☐ Notice was posted (*with department approval*) at:
_____ on ___ / ___ / ____.

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

_____ _____ _____
Signature of owner or operator Position Date

The Department of Health is an equal opportunity agency. For persons with disabilities, this form is available on request in other formats. To submit a request, please call 1-800-525-0127 (TTY 1-800-833-6388).

Send copy of completed notification and certification to:

☐ ***Eastern Drinking Water Operations, 1500 West Fourth Ave., Suite 305, Spokane WA 99201 or fax to (509) 456-2997***
☐ ***Northwest Drinking Water Operation, 20435 72nd Ave South, Suite 200, Kent WA 98032 or fax to (253) 395-6760***
☐ ***Southwest Drinking Water Operation, PO Box 47823, Olympia WA 98504 or fax to (360) 664-8058***

DOH Form #331-263 (Updated 11/07)

AVISO IMPORTANTE ACERCA DEL SISTEMA DE SUMINISTRO DE AGUA

Las bacterias coliformes rebasaron el Nivel Máximo de Contaminación: NMC no agudo

El sistema de suministro de agua _____, número (ID#) _____ en el condado de _____ monitorea rutinariamente la presencia de bacterias coliformes totales. En la fecha _____, se encontró este tipo de bacteria. Aunque este incidente no es considerado una emergencia, como consumidor, Usted tiene el derecho a saber que pasó y que se ha hecho o se esta haciendo para corregir esta situación.

Las bacterias coliformes se encuentran naturalmente en el medio ambiente y se usan como indicador de la posible presencia de otras bacterias que pueden causar daño a la salud. En las muestras tomadas, las bacterias se encontraron en mayor número que el permitido y esto es una indicación de posibles problemas. Las muestras con bacterias coliformes se analizaron con más detalle en el laboratorio para ver si bacterias coliformes fecales o E. Coli pudieran también haber estado presentes. Estas bacterias causan daño a la salud de las personas. **No se encontró ninguna de estas bacterias.**

No es necesario que usted hierva el agua. Personas con un sistema inmunológico severamente comprometido, los recién nacidos y algunas personas de edad avanzada pueden tener mas riesgo de salud y deberían llamar a algún personal médico para mayor información.

¿Qué fue lo que pasó? ¿Cuál es la fuente de contaminación de la que se sabe o sospecha?

En este momento:

☐ El problema esta resuelto. En muestras adicionales que se colectaron no se encontraron bacterias coliformes.
☐ Anticipamos resolver el problema el día ____/____/____.
☐ Otro _____.

Para mayor información comuníquese con _____ al teléfono ( ) _____-_____ o con

_____	_____	_____
(dueño u operador)	(teléfono)	(dirección)

Pase esta información a todas las personas pudieran tomar agua de este suministro, especialmente aquellas personas que no hayan recibido este aviso (por ejemplo, personas que vivan en apartamentos, asilos de ancianos, escuelas y negocios.) Usted puede hacer esto colocando este aviso en un lugar público donde se pueda leer claramente o distribuyendo copias en persona o enviándolas por correo.

Este aviso es enviado a Usted por el Sistema de Suministro de Agua_____ fecha ___/___/____.

April 2006

DOH PUB. #331-242
(Revision)

Emergency Disinfection of Small Systems

Has your system lost pressure lately due to a power outage, failed pumping system, main break, or other unusual event? Or have you just learned you have an Acute or Non-Acute Total Coliform Rule MCL violation? If so, and if you normally provide water that is not disinfected, please read on.

When to disinfect

A water system should be disinfected any time it experiences any of the following:

- The system loses pressure for any reason.
- Any part of the system is "opened up" for maintenance or repairs.
- Backflow or back-siphonage creates a cross-connection event.
- Total coliform, fecal coliform, or E. coli is found present in both routine and repeat coliform samples.

A system should also be batch chlorinated if multiple routine coliform samples in one month show the presence of total coliform, fecal coliform, or E. coli. This disinfection should not occur until after the required repeat samples have been collected for each of the unsatisfactory routine samples.

Notify your customers first

Before disinfecting any system that is normally not disinfected, notify all users first. Of special concern are people with unique medical needs, such as kidney dialysis patients. All water systems should maintain a list of such customers. People with aquariums or ponds that contain fish will also want to know that the water is to be chlorinated.

Note: *This document is primarily written for smaller, non-municipal type systems, though the information may be helpful to any system. The document discusses how to disinfect both for a simple groundwater system with pressure tanks and distribution pipes, as well as a system with a storage reservoir. The first four steps are different for the two kinds of systems, but steps 5-8 are identical.*

Adding chlorine to a groundwater source

1. Calculate the volume of water in the well or spring box. To do this, multiply the number of cubic feet by 7.5 to determine the number of gallons. (Or use the table on the next page.)

CALCULATING WELL VOLUME	
Well Casing Diameter (inches)	**Volume** (gallons per vertical foot of water)
6	1.5
8	2.6
10	4.1
12	5.9
14	8.0
16	10
36	53

2. Calculate how much chlorine to add to the well or spring box, using this table:

WELL DISINFECTION: Amount of chlorine bleach to use				
Well Volume (gallons)	**Desired Chlorine Dosage**			
	5 ¼ % bleach			**12 % bleach**
	5 ppm	***20 ppm***	***50 ppm***	***5 ppm***
50	1 ¼ Tbsp.	¼ cup	1 cup	½ Tbsp.
100	2 ½ Tbsp.	½ cup	1 ½ cups	1 Tbsp.
150	¼ cup	1 cup	2 ¼ cups	1 ½ Tbsp.
200	5 Tbsp.	1 ¼ cups	3 cups	2 Tbsp.
250	6 Tbsp.	1 ½ cups	4 cups	3 Tbsp.
500	¾ cup	3 cups	½ gallon	5 Tbsp.
750	1 ¼ cup	4 ½ cups	¾ gallon	½ cup
1000	1 ½ cup	6 cups	1 gallon	¾ cup

(Also see the boxed information on the last page of this document: *What chlorine dose is needed?*) If your distribution system is extensive, consider the volume of water in the distribution piping when determining how much chlorine to use.

3. Pour the required quantity of bleach into the well or spring box.

4. Connect a brand new garden hose to the nearest outside faucet and circulate the water through the hose and back into the source. This will mix the chlorine with the water, and the pump will draw the chlorine to the bottom of the well. After you start smelling the chlorine in the water coming out of the hose, use the hose to rinse the upper portion of the well with the disinfectant. Note: If you cannot reach the well with the hose, mix one cup chlorine bleach per bucket of water and pour chlorinated water down the inside of the casing. The bucket method will also work when you are disinfecting a gravity-flow spring box.

Now proceed to Step 5, next page.

Adding chlorine to a storage reservoir

Note: *If you must chlorinate both your source and your storage reservoir, disinfect the reservoir and distribution system first, and then do the source and the pipe leading to the reservoir. This will ensure adequate disinfection of the source.*

1. If the contamination does not appear to be originating at the water source, the system may be disinfected by adding disinfectant to the storage reservoir rather than the water source.

2. Determine the amount of chlorine that will need to be added to the storage tank, using the table below:

RESERVOIR DISINFECTION: Amount of chlorine bleach to use				
Reservoir Volume (gallons)	Desired Chlorine Dosage			
	5 ¼ % bleach			12 % bleach
	1 ppm	*20 ppm*	*50 ppm*	*1 ppm*
5,000	1 ½ cups	2 gallon	5 gallon	1 cup
10,000	3 cups	4 gallon	10 gallon	1 ¼ cups
15,000	4 ½ cups	6 gallon	14 gallon	2 cups
20,000	6 cups	8 gallon	19 gallon	3 cups
25,000	½ gallon	10 gallon	24 gallon	3 ¼ cups
50,000	1 gallon	19 gallon	48 gallon	7 cups
75,000	1 ½ gallon	29 gallon	71 gallon	10 cups
100,000	1 ¾ gallon	38 gallon	95 gallon	¾ gallon

(Also see the boxed information on the last page of this document: *What chlorine dose is needed?)* If your distribution system is extensive, the volume of water in the distribution piping should be considered when determining how much chlorine to use.

3. Draw down the level of water in the storage tank, but keep sufficient quantity for fire flow, if required.

4. Pour the chlorine into the tank as the tank is refilling, in order to get some mixing.

Steps 5-8 are identical for both types of disinfection operations.

5. Beginning with the outlet closest to the point of chlorine addition (that is, either the source or the reservoir) draw water at every outlet until you can smell chlorine. To be more accurate, use a chlorine residual test kit. DOH recommends that every water system own such a kit. Turn off each outlet once chlorine is detected.

6. Allow the chlorine to remain in the system overnight (24 hours is preferable.) Chlorine needs time to do an effective job of disinfecting.

7. Use one or more outside faucets, blow-offs, hydrants, etc. to draw water out of the system to remove the chlorine. The system should be thoroughly and repeatedly flushed to remove the chlorine. During this process, make sure you don't damage a pump by drawing water down below the pump intake. Chlorinated water is extremely toxic to fish. It should never be discharged to any water body, wetland, or drainage ditch. High chlorine residuals must be dechlorinated before discharge.

8. After following this procedure and rendering the water completely free of disinfectant, you should wait a minimum of seven days following disinfection before collecting a bacteriological sample. (Note: If you are disinfecting in follow-up to an Acute Total Coliform Rule MCL violation, you should be working with the DOH Regional Office Coliform or Engineering staff to determine when coliform sampling should occur relative to chlorination and flushing.) The chlorine residual should be measured and noted on the coliform lab slip whenever coliform samples are collected. In follow-up to an emergency disinfection event, the measurement of a zero residual is worthy of note too. The bacteriological analysis will indicate whether or not the system disinfection was effective.

If you have any questions about disinfecting your system, please call your DOH regional engineer or coliform program staff member:

Northwest Regional Coliform Program	253-395-6775
Southwest Regional Coliform Program	360-236-3044
Eastern Regional Coliform Program	509-456-2788

Other, more detailed references regarding disinfection of water system facilities include:
- American Water Works Association (AWWA) Standard C564-87, "Disinfection of Wells"
- AWWA Standard C651-92, "Disinfecting Water Mains"
- AWWA Standard C652-92, "Disinfection of Water-Storage Facilities"

These AWWA standards assume that the component being disinfected, such as a well or storage tank, is isolated from the rest of the system during the disinfection. For this reason, these references discuss chlorine doses significantly higher that those discussed above. Such high dose should not be used if there is a chance that any water system user could consume, or otherwise utilize, the water.

What chlorine dose is needed?

A chlorine dose of 1 to 2 ppm (mg/L) should be sufficient whenever contamination is suspected (such as following a pressure loss due to a power outage) or in response to a Non-Acute MCL violation of the Total Coliform Rule. In some cases when responding to a Non-Acute violation, this dose may not be sufficient and a larger dose such as 3 to 4 ppm might be needed. Larger doses may be required in response to an Acute MCL violation of the Total Coliform Rule or when a known bacteriological cross-connection has occurred. Please consult with your DOH regional office in these cases.

Note: There is a regulatory maximum chlorine residual for systems that disinfect full-time. That maximum residual is 4 ppm. It is therefore recommended that for emergency disinfection, the chlorine dose be such that this maximum is not surpassed.

Notes related to the tables

Volume of bleach needed: $V_1 = (C_2 \times V_2) / C_1$, in gallons, where
C_2 = desired chlorine dose, ppm
V_2 = the volume water to be treated, gallons
C_1 = the concentration of the bleach solution, ppm
Well volume = $7.48 \times H \times 3.14 \times (D/12)^2 / 4$, in gallons, where
H =the height of water standing in the well, in feet
D = the well casing diameter, in inches
5 ¼ % household bleach contains 52,500 ppm hypochlorite
12 % bleach contains 120,000 ppm hypochlorite
1 cubic foot of water = 7.48 gallons
1 gallon = 16 cups
1 cup = 16 tablespoons (Tbsp.) or 8 fluid ounces

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APPENDIX J

CROSS-CONNECTION CONTROL ORDINANCE 394 AND 488

CROSS-CONNECTION CONTROL AND BACKFLOW PREVENTION PROGRAM

BACKFLOW PREVENTION PROGRAM ACTIVITY SUMMARY AND COMPLIANCE REPORT

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 backpressure 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 ninth day of August, 1989.

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

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 backflow	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. 08-03-061, § 246-290-490, filed 1/14/08, effective 2/14/08. Statutory Authority: RCW 43.20.050 (2) and (3) and70.119A.080 . 03-08-037, § 246-290-490, filed 3/27/03, effective 4/27/03. Statutory Authority: RCW 43.02.050 [43.20.050]. 99-07-021, § 246-290-490, filed 3/9/99, effective 4/9/99. Statutory Authority: RCW 43.20.050. 91-02-051 (Order 124B), recodified as § 246-290-490, filed 12/27/90, effective 1/31/91. Statutory Authority: P.L. 99-339. 89-21-020 (Order 336), § 248-54-285, filed 10/10/89, effective 11/10/89. Statutory Authority: RCW 34.04.045. 88-05-057 (Order 307), § 248-54-285, filed 2/17/88. Statutory Authority: RCW 43.20.050. 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: _____

_____

Ft. NISQUALLY

BACKFLOW PREVENTION PROGRAM
ACTIVITY SUMMARY & COMPLIANCE REPORT

City of DuPont

Supervisor: Fred Foreman
Report Dates: 01/01/03 to 10/28/03

Printed: October 28, 2003

Assemblies this Period

Tests Due	365	
Assemblies Tested	314	86.0%
Passed Initial Test	299	95.2%
Failed Initial Test	19	
Pass:Fail Ratio	15.7 : 1	
Passed after Repair	14	
Inactive Assemblies	1	
Other: Non Backflow Types		
No Assembly Installed	1	

Activity This Period

New Installations	42	
Replacements		
Repairs	14	
Removals		
Inspections(Surveys)		
Hazards Found		
Other Activities		

Containment

Type	Count
Containment	84
Premises Isolation	2

Activity by Assembly Type

	# of Assemblies		Activity					
AssemblyType	Total	Due	Tests	Passed	Failed	Repairs	Installs	Replaced
RP	27	27	27	25	3	2		
DC	306	306	259	246	16	12	39	
DCDA	23	23	23	23			2	
PVB	6	6	5	5				
AVB	3	3						



BACKFLOW PREVENTION PROGRAM
ACTIVITY SUMMARY

City of DuPont

Supervisor: Fred Foreman

Report Dates: 01/01/03 to 10/28/03 **Printed:** October 28, 2003

Code	Type	Description	Count	Pct
PASS	Test	Pass Test	320	44.0%
FAIL	Test	Fail Test	9	1.2%
FAIL/PASS	Test	Failed Initial/Passed Final Test	15	2.0%
LTR_1	Notice_1	First Notice	317	43.6%
LTR_2	Notice_2	Second Notice	24	3.3%
INSTALL	Installation	Install Assembly	42	5.7%



Backflow Prevention Assembly Tests Overdue Report

City of DuPont

Printed: 10/28/03

#	Name/Address	Assembly ID	Tap Number	Meter	Test Due	Last Test	Serial Num	Type
1	*** Test Facility *** 99999 Test Street Name San Francis	100002	Tap-9999999		12/31/98	00/00/00	SN999999999	RP
2	1437 Richmond Ct 1437 Richmond DuPont	2000116			04/30/02	00/00/00	398396	DC
3	1124 Aldrich 1124 Aldrich DuPont	2000408			04/30/03	09/25/02	085462	DC
4	202 Barksdale Ave 202 Barksdale DuPont	2000360			04/30/03	05/28/02	80208	DC
5	1484 Richmond Ave 1484 Richmond DuPont	2000344			04/30/03	05/22/02	142377	DC
6	28 Madrona Pl 28 Madrona DuPont	2000289			04/30/03	00/00/00	??? 12	DC
7	707 Penniman St 707 Penniman DuPont	2000283			04/30/03	01/23/02	7095	PVB
8	1854 Fisher Ave 1854 Fisher DuPont	2000280			04/30/03	07/09/02	973825	DC
9	6 Lapsley Dr 6 Lapsley DuPont	2000260			04/30/03	06/12/03	AL7593	DC
10	2292 Palisade Blvd 2292 Palisade DuPont	2000256			04/30/03	09/25/02	857122	DC
11	1497 Wilson Ave 1497 Wilson DuPont	2000251			04/30/03	09/25/02	982068	DC
12	1460 Palisade Blvd 1460 Palisade DuPont	2000231			04/30/03	05/28/02	001716	DC
13	1413 Richmond Ct 1413 Richmond DuPont	2000104			04/30/03	06/04/02	389523	DC

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Backflow Prevention Assembly
Tests Overdue Report

City of DuPont

Printed: 10/28/03

#	Name/Address	Assembly ID	Tap Number	Meter	Test Due	Last Test	Serial Num	Type
14	1292 O'Neil CT 1292 O'Neil DuPont	2000101			04/30/03	02/04/02	H21110	DC
15	Quadrant Homes	2000479			10/03/03	10/02/02	1A74681	DC

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APPENDIX K

PLANNING LEVEL COST ESTIMATES

City of Dupont
Prelimiary Project Cost Estimate
Distribution System Improvement D-01
Center Plaza - Building 2 to Dupont-Steilacoom Road Water Line

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization, Cleanup, and Demobilization	LUMP SUM	$ 1,800	$ 1,800
2	8-inch DI Water Pipe, Including Fittings	100 LF	$ 50	$ 5,000
3	Locate Existing Utilities	LUMP SUM	$ 200	$ 200
4	Erosion Control	LUMP SUM	$ 200	$ 200
5	Additional Pipe Fittings	50 LB	$ 3	$ 150
6	Trench Safety Systems	LUMP SUM	$ 100	$ 100
7	8-inch Gate Valves	1 EA	$ 1,000	$ 1,000
8	Gravel Backfill	20 CY	$ 18	$ 360
9	Foundation Gravel	10 TN	$ 22	$ 220
10	Hot Mix Asphalt	0 TN	$ 100	$ -
11	Sawcutting	50 LF	$ 2	$ 100
12	Crushed Surfacing, Top Course	10 TN	$ 25	$ 250
13	Cold Mix Asphalt	0 TN	$ 75	$ -
14	Connections to Existing System	2 EA	$ 1,500	$ 3,000
15	Service Connections	0 EA	$ 1,200	$ -
16	Fire Hydrant	0 EA	$ 3,000	$ -
17	Traffic Control	4 HRS	$ 40	$ 160
	Subtotal			$ 12,540
	Tax rate (9.3%)			1,160
	Subtotal:			$ 13,700
	Contingency (20%)			2,700
	TOTAL ESTIMATED CONSTRUCTION COST:			$ 16,400
	Engineering and AdministrativeCosts (25%):			4,100
	TOTAL ESTIMATED PROJECT COST:			**$ 20,500**

APPENDIX L

CITY OF DUPONT RESOLUTION NO. 12-416 – AMENDING FEE SCHEDULE

SEPA CHECKLIST AND DETERMINATION OF NON-SIGNIFICANCE (DNS)

CITY OF DuPONT
WASHINGTON

RESOLUTION NO. 12-416

A RESOLUTION AMENDING THE FEE SCHEDULE FOR CITY SERVICES

WHEREAS, the City provides certain services to the public; and

WHEREAS, the City is authorized to impose fees to recover the City's costs for these services; and

WHEREAS, from time to time fees need to be added or amended on the fee schedule.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF DuPONT, WASHINGTON DO RESOLVE AS FOLLOWS:

Section 1. Fees for services provided by the City shall be charged according to the fee schedule, attached hereto as **Exhibit A** and incorporated herein by this reference as if fully set forth.

Section 2. In the instance that a fee for service in the fee schedule is inconsistent with a fee for service as set forth in the DuPont Municipal Code, the higher fee shall apply.

ADOPTED BY THE CITY COUNCIL AT A REGULAR MEETING THEREOF ON THE 14th DAY OF FEBRUARY, 2012.

CITY OF DuPONT

Michael Grayum, Mayor

ATTEST/AUTHENTICATED:

Erin Larsen, City Clerk

Approved as to form:

Bob Sterbank, City Attorney

Filed with the City Clerk:
Passed by the City Council: 2-14-12
Resolution No.: 12-416
Date Posted:

EXHIBIT A
CITY OF DUPONT FEE SCHEDULE

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

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

EXHIBIT A
CITY OF DUPONT FEE SCHEDULE

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)	$47.00/hr*
Inspection– Other (Min. ½ hr)	$47.00/hr*
Inspection – Re-Inspect	$47.00/hr*
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

* or total cost to the jurisdiction ,whichever is greater

**Include administrative and overhead costs

***Single Family Dwelling

EXHIBIT A
CITY OF DUPONT FEE SCHEDULE

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 Fee's	
Bike Helmets	$7
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

EXHIBIT A
CITY OF DUPONT FEE SCHEDULE

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 Spinkler 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

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 Fee's (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

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

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

EXHIBIT A
CITY OF DUPONT FEE SCHEDULE

PLANNING:

Annexation	$500.00
Developer Agreement	$500.00 + consultant cost
Home Occupation	$100.00
Home Occupation Address Change	$25.00
Residential plot plan review	$50/lot
Review of Professional Studies	Consultant Cost
Right of way (street) vacation	$4,000.00
Sign application	$100.00
Street Standards Variance	$750.00 + ~~Engineering~~Consultant Cost
Temporary use	$100.00
Type I or Type II Procedure	$1,500.00+~~Engineering~~Consultant Cost
Type I and Type II Decision Appeal	$1,500.00+~~Engineering~~Consultant Cost
Type III Procedure	$3,000.00+~~Engineering~~Consultant Cost
Type IV Procedure	$4,000.00+~~Engineering~~Consultant Cost
Type V Procedure	$5,000.00+~~Engineering~~Consultant 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

EXHIBIT A
CITY OF DUPONT FEE SCHEDULE

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 –	$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

NOTE – Small meeting room rental fee includes 2 rectangular tables and 12 chairs

Other Facility Rental Charges -

Community 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:

Clock Tower Stage Rental (DuPont Resident)	$75.00 per hour
Clock Tower Stage Rental (Non-Resident)	$100.00 per hour
Clock Tower 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	$29.00 plus any inspection Fee's
Sports Field Hourly Reservation/Use Rates	
Youth/Practice (Resident Team or Group)	$4.00/hour

EXHIBIT A
CITY OF DUPONT FEE SCHEDULE

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

UTILITY RATES & FEES:

General

Utility Billing Past Due Fee	$10.00 or 10% of past due balance (whichever is greater)
Utility Administrative Fee (Set-up for All Accounts)	$25.00
Utility Turn on Fee (Water)	$25.00
Utility Turn on Fee (Water) After Hours	$75.00
Water Account Deposit	$100.00
Water Account Deposit – High Risk (applicable after 2 NSF checks received within a 1 year period; or 2 door hangers received within a 6 month period)	$100.00 (additional)

Stormwater Rates and Charges

Stormwater Utility Rate [1]								
Account Type	Description	ERU Factor	2010	2011	2012	2013	2014	2015
1	Non-Single Family with 100 year	0.50	$ 3.72	$ 4.80	$ 5.35	$ 6.05	$ 6.75	$ 7.60
2	Non-Single Family with 25 year	0.65	$ 4.79	$ 6.20	$ 6.90	$ 7.80	$ 8.70	$ 9.75
3	Cleared and Compacted	0.33	$ 2.45	$ 3.15	$ 3.55	$ 4.00	$ 4.45	$ 5.00
4	Equivalent Residential Unit (ERU)	1.00	$ 7.40	$ 9.55	$ 10.70	$ 12.00	$ 13.45	$ 15.05

[1] Rates for each calendar year are effective January 1st of that year.

A. BACKGROUND

1. Name of proposed project, if applicable:

City of DuPont 2011 Water System Comprehensive 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) 292-7481

Contact Person: Peter Zahn, Public Works Director, City of DuPont

4. Date Checklist Prepared:

October 2011

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 2011. Water system comprehensive plans are typically effective for six 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 Land Use Plan, dated November 13, 2001
City of DuPont Land Use Code, dated April 2002

B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site (check one): ☒ flat, ☐ rolling, ☐ hilly, ☐ steep slope, ☐ 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 at on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.

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, and approximate quantities of any 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.

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:**

1) **Will ground water be withdrawn, or will water be discharged to ground water? Give general description, purpose, and approximate quantities if known.**

Yes. In year 2012, the projected peak day instantaneous production from ground water is projected to be approximately 3,500. It is predicted that the instantaneous water right limit of 5,100 gpm will be exceeded in year 2027. The projected annual water right production in year 2012 is approximately 1,540 acre feet per year. The permitted annual withdrawal is 3,160 acre/feet/year. A projected surplus of annual water rights of 590 acre/feet/year is predicted at the end of the 20-year planning period.

2) **Describe the waste material that will be discharged into the ground from septic tanks or other sources if any (for example:**

☐ Pasture
☐ Crop or grain
☒ Wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
☒ Water plants: water lily, eelgrass, milfoil, other
☐ Other types of vegetation

b. What kind and amount of vegetation will be removed or altered?

None. Project specific impacts will be evaluated on a project specific basis.

c. List threatened or 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.

5. Animals

a. Check any birds and animals which have been observed on or near the site or are known to be on or near the site:

☒ Birds: hawk, heron, eagle, songbirds, other:
☒ Mammals: dear, bear, elk, beaver, other:
☒ Fish: bass, salmon, trout, herring, shellfish, other;
☐ None.

b. List any threatened or 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.

2) **What types and levels of noise would be created by or associated with the project on a short-term or a long-term (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.

9. **Land and Shoreline Use**

a. **What is the current use of the site and adjacent properties?**

Land use within the City of DuPont city limits is detailed in the City of DuPont Comprehensive Plan (2001).

b. **Has the site been used for agriculture? If so, describe.**

The area has not been used for agricultural purposes for at least 120 years with the exception of cattle grazing.

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 classifications 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.

c. **Proposed measures to reduced or control housing impacts, if any:**

Not Applicable.

11. 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.

c. **Proposed measures to reduce or control aesthetic impacts, if any.**

To be determined on a project specific basis.

12. Light and Glare

a. **What type of light or glare will be proposal produce? What time of day would it mainly occur?**

None.

b. **Could light and glare from the finished project be a safety hazard or interfere with views?**

No.

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.

b. **Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?**

Not Applicable.

c. **How many parking spaces would the completed project have? How many would the project eliminate?**

The proposed water system capital improvement projects would not create or eliminate any public parking spaces.

d. **Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveway? If so, generally describe (indicated whether public or private).**

No.

e. **Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe?**

No.

f. **How many vehicle trips per day would be generated by the completed project? If known, indicated when peak volumes would occur.**

To be determined on a project specific basis.

g. **Proposed measures to reduce or control transportation impacts, if any.**

Not Applicable.

16. **Public Services**

a. **Would the project result in an increased need for public services (for example: fire protection, police protection, 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.

D. SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS

(do not use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. **How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?**

   The proposal will facilitate development of the DuPont Water System based on the City's Comprehensive Plan. The anticipated rates of development are not possible without improvements to the City's water system. No water, air, hazardous substance, or noise impacts are specifically associated with the proposal.

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.

3. **How would the proposal be likely to deplete energy or natural resources?**

   Not Applicable.

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.

City of DuPont
SEPA Determination of Non-Significance

DuPont Water System Comprehensive Plan Update
DuPont File No. SEPA 11-05

Description
The proposal is to update the DuPont Water System Comprehensive Plan, evaluate the performance and adequacy of the existing City of DuPont water system, determine what will be necessary to meet the infrastructure demands of the next twenty years, and identify compliance issues that may affect operation of the water system. In addition, the Plan incorporates the elements of the Municipal Water Supply – Efficiency Requirements Act, Chapter 5 Law of 2003 as they are currently interpreted. The Plan was prepared in accordance with applicable Washington State Department of Health requirements specified in Washington Administrative Code (WAC) 246-290.

The DuPont Water System Comprehensive Plan Update is an update of previous water system plans prepared for and adopted by the City of DuPont in accordance with the requirements set forth in WAC 246-290-100. The previous 2004 DuPont Water System Comprehensive Plan was completed with the assistance of Gray & Osborne, Inc., and was approved by the Washington Department of Health on January 7, 2005.

Proponent
City of DuPont

Location
City–wide. The City of DuPont is located in Sections 15, 22, 23, 24, 25, 26, 27, 28, 33, 34, 25, and 36, Township 19 North, Range 1 East, Pierce County, Washington State.

Lead Agency
City of DuPont.

Findings
1. The Applicant submitted:
   a. Draft DuPont Water System Comprehensive Plan Update dated August 2011.
   b. SEPA Checklist dated October 25, 2011.

2. The proposed DuPont Water System Comprehensive Plan Update is an update of the previously adopted 2004 DuPont Water System Comprehensive Plan that was completed with the assistance of Gray & Osborne, Inc., approved by the Washington Department of Health on January 7, 2005.

3. The proposal is consistent with DuPont Comprehensive Plan policies regarding utilities and capital facilities.