APPENDIX C

Water Quality History

City of Woodland
Water System 982002
Source Data 2009-October 2012

PRE-TREATMENT:

Date	Source	Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	Units	State Reporting Limit
8/4/2009	01	19	FLUORIDE	EQ	1.06	4	mg/L	0.2
10/5/2009	01	20	NITRATE-N	EQ	0.22	10	mg/L	0.2
6/30/2010	01	8	IRON	EQ	1.7	0.3	mg/L	0.1
6/30/2010	01	10	MANGANESE	EQ	0.22	0.05	mg/L	0.01
6/30/2010	01	165	GROSS ALPHA	LT	3		pCi/L	3
6/30/2010	01	166	RADIUM 228	EQ	0.8	5	pCi/L	1
10/2/2012	01	20	NITRATE-N	EQ	0.2	10	mg/L	0.2

POST-TREATMENT:

Date	Source	Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	Units	State Reporting Limit
5/18/2009	01	33	ENDRIN	LT	0.05	2	ug/L	0.05
5/18/2009	01	34	LINDANE (BHC - GAMMA)	LT	0.04	0.2	ug/L	0.04
5/18/2009	01	35	METHOXYCHLOR	LT	10	40	ug/L	10
5/18/2009	01	117	ALACHLOR	LT	0.4	2	ug/L	0.4
5/18/2009	01	118	ALDRIN	LT	0.1		ug/L	0.1
5/18/2009	01	119	ATRAZINE	LT	0.5	3	ug/L	0.5
5/18/2009	01	120	BENZO (A) PYRENE	LT	0.04	0.2	ug/L	0.04
5/18/2009	01	121	BUTACHLOR	LT	0.4		ug/L	0.4
5/18/2009	01	122	CHLORDANE (TOTAL)	LT	0.4	2	ug/L	0.4
5/18/2009	01	123	DIELDRIN	LT	0.1		ug/L	0.1
5/18/2009	01	124	DI (ETHYLHEXYL) ADIPATE	LT	1.3	400	ug/L	1.3
5/18/2009	01	125	DI (ETHYLHEXYL) PHTHALATE	LT	1.3	6	ug/L	1.3
5/18/2009	01	126	HEPTACHLOR	LT	0.09	0.4	ug/L	0.09
5/18/2009	01	127	HEPTACHLOR EPOXIDE	LT	0.1	0.2	ug/L	0.1
5/18/2009	01	128	HEXACHLOROBENZENE	LT	0.5	1	ug/L	0.5
5/18/2009	01	129	HEXACHLOROCYCLO PENTADIENE	LT	0.5	50	ug/L	0.5
5/18/2009	01	130	METOLACHLOR	LT	1		ug/L	1
5/18/2009	01	131	METRIBUZIN	LT	0.2		ug/L	0.2
5/18/2009	01	132	PROPACHLOR	LT	0.1		ug/L	0.1
5/18/2009	01	133	SIMAZINE	LT	0.15	4	ug/L	0.15
5/18/2009	01	134	PENTACHLOROPHENOL	LT	0.2	1	ug/L	0.2
5/18/2009	01	179	BROMACIL	LT	0.2		ug/L	0.2
5/18/2009	01	254	FLUORENE	LT	0.2		ug/L	0.2
5/18/2009	01	258	BENZYL BUTYL PHTHALATE	LT	0.6		ug/L	0.6
10/12/2010	01	115	ASBESTOS	LT	0.128	7	MFL	1.4
10/12/2010	01	20	NITRATE-N	EQ	0.22	10	mg/L	0.2
10/11/2011	01	20	NITRATE-N	EQ	0.22	10	mg/L	0.2

City of Woodland
Water System 982002
Distribution System Data 2011- October 2012

Date	Source	Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	Units	State Reporting Limit
3/8/2011	DIST	412	DICHLOROACETIC ACID	EQ	3		ug/L	1
3/8/2011	DIST	413	TRICHLOROACETIC ACID	EQ	3.7		ug/L	1
3/8/2011	DIST	415	DIBROMOACETIC ACID	EQ	1.4		ug/L	1
3/8/2011	DIST	416	HAA(5)	EQ	8.1	60	ug/L	15
3/8/2011	DIST	411	MONOCHLOROACETIC ACID	LT	2		ug/L	2
3/8/2011	DIST	414	MONOBROMOACETIC ACID	LT	1		ug/L	1
3/8/2011	DIST	27	CHLOROFORM	EQ	4.9		ug/L	0.25
3/8/2011	DIST	28	BROMODICHLOROMETHANE	EQ	4.6		ug/L	0.5
3/8/2011	DIST	29	DIBROMOCHLOROMETHANE	EQ	3.9		ug/L	1.5
3/8/2011	DIST	30	BROMOFORM	EQ	0.8		ug/L	0.6
3/8/2011	DIST	31	TOTAL TRIHALOMETHANE	EQ	14.2	80	ug/L	
5/17/2011	DIST	27	CHLOROFORM	EQ	5.7		ug/L	0.25
5/17/2011	DIST	28	BROMODICHLOROMETHANE	EQ	5.9		ug/L	0.5
5/17/2011	DIST	29	DIBROMOCHLOROMETHANE	EQ	4.6		ug/L	1.5
5/17/2011	DIST	30	BROMOFORM	EQ	0.9		ug/L	0.6
5/17/2011	DIST	31	TOTAL TRIHALOMETHANE	EQ	17.1	80	ug/L	
5/17/2011	DIST	412	DICHLOROACETIC ACID	EQ	3.8		ug/L	1
5/17/2011	DIST	413	TRICHLOROACETIC ACID	EQ	4.8		ug/L	1
5/17/2011	DIST	415	DIBROMOACETIC ACID	EQ	1.3		ug/L	1
5/17/2011	DIST	416	HAA(5)	EQ	9.9	60	ug/L	15
5/17/2011	DIST	411	MONOCHLOROACETIC ACID	LT	2		ug/L	2
5/17/2011	DIST	414	MONOBROMOACETIC ACID	LT	1		ug/L	1
5/17/2011	DIST	414	MONOBROMOACETIC ACID	LT	1		ug/L	1
8/16/2011	DIST	27	CHLOROFORM	EQ	4.1		ug/L	0.25
8/16/2011	DIST	28	BROMODICHLOROMETHANE	EQ	5.3		ug/L	0.5
8/16/2011	DIST	29	DIBROMOCHLOROMETHANE	EQ	4.9		ug/L	1.5
8/16/2011	DIST	30	BROMOFORM	EQ	1.2		ug/L	0.6
8/16/2011	DIST	31	TOTAL TRIHALOMETHANE	EQ	15.5	80	ug/L	
8/16/2011	DIST	412	DICHLOROACETIC ACID	EQ	3		ug/L	1
8/16/2011	DIST	413	TRICHLOROACETIC ACID	EQ	3		ug/L	1
8/16/2011	DIST	415	DIBROMOACETIC ACID	EQ	1.7		ug/L	1
8/16/2011	DIST	416	HAA(5)	EQ	7.7	60	ug/L	15
8/16/2011	DIST	411	MONOCHLOROACETIC ACID	LT	2		ug/L	2
8/16/2011	DIST	414	MONOBROMOACETIC ACID	LT	1		ug/L	1
11/17/2011	DIST	412	DICHLOROACETIC ACID	EQ	3.2		ug/L	1
11/17/2011	DIST	413	TRICHLOROACETIC ACID	EQ	3.8		ug/L	1
11/17/2011	DIST	415	DIBROMOACETIC ACID	EQ	1.4		ug/L	1
11/17/2011	DIST	416	HAA(5)	EQ	8.4	60	ug/L	15
11/17/2011	DIST	411	MONOCHLOROACETIC ACID	LT	2		ug/L	2
11/17/2011	DIST	414	MONOBROMOACETIC ACID	LT	1		ug/L	1
11/17/2011	DIST	27	CHLOROFORM	EQ	5		ug/L	0.25
11/17/2011	DIST	28	BROMODICHLOROMETHANE	EQ	5.5		ug/L	0.5
11/17/2011	DIST	29	DIBROMOCHLOROMETHANE	EQ	5.1		ug/L	1.5
11/17/2011	DIST	30	BROMOFORM	EQ	0.9		ug/L	0.6
11/17/2011	DIST	31	TOTAL TRIHALOMETHANE	EQ	16.5	80	ug/L	
2/22/2012	DIST	27	CHLOROFORM	EQ	4.6		ug/L	0.25
2/22/2012	DIST	28	BROMODICHLOROMETHANE	EQ	4.5		ug/L	0.5
2/22/2012	DIST	29	DIBROMOCHLOROMETHANE	EQ	3.1		ug/L	1.5
2/22/2012	DIST	31	TOTAL TRIHALOMETHANE	EQ	12.2	80	ug/L	
2/22/2012	DIST	30	BROMOFORM	LT	0.6		ug/L	0.6
2/22/2012	DIST	412	DICHLOROACETIC ACID	EQ	3.9		ug/L	1
2/22/2012	DIST	413	TRICHLOROACETIC ACID	EQ	5.4		ug/L	1
2/22/2012	DIST	416	HAA(5)	EQ	9.3	60	ug/L	15

Date	Source	Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	Units	State Reporting Limit
2/22/2012	DIST	411	MONOCHLOROACETIC ACID	LT	2		ug/L	2
2/22/2012	DIST	414	MONOBROMOACETIC ACID	LT	1		ug/L	1
2/22/2012	DIST	415	DIBROMOACETIC ACID	LT	1		ug/L	1
5/14/2012	DIST	27	CHLOROFORM	EQ	6.4		ug/L	0.25
5/14/2012	DIST	28	BROMODICHLOROMETHANE	EQ	5.5		ug/L	0.5
5/14/2012	DIST	29	DIBROMOCHLOROMETHANE	EQ	4		ug/L	1.5
5/14/2012	DIST	30	BROMOFORM	EQ	0.6		ug/L	0.6
5/14/2012	DIST	31	TOTAL TRIHALOMETHANE	EQ	16.5	80	ug/L	
5/14/2012	DIST	412	DICHLOROACETIC ACID	EQ	5.6		ug/L	1
5/14/2012	DIST	413	TRICHLOROACETIC ACID	EQ	5.3		ug/L	1
5/14/2012	DIST	416	HAA(5)	EQ	10.9	60	ug/L	15
5/14/2012	DIST	411	MONOCHLOROACETIC ACID	LT	2		ug/L	2
5/14/2012	DIST	414	MONOBROMOACETIC ACID	LT	1		ug/L	1
5/14/2012	DIST	415	DIBROMOACETIC ACID	LT	1		ug/L	1
6/7/2012	DIST	9	LEAD	EQ	0.0013		mg/L	0.001
6/7/2012	DIST	23	COPPER	EQ	0.053		mg/L	0.02
6/7/2012	DIST	9	LEAD	EQ	0.0003		mg/L	0.001
6/7/2012	DIST	23	COPPER	EQ	0.019		mg/L	0.02
6/7/2012	DIST	23	COPPER	EQ	0.011		mg/L	0.02
6/7/2012	DIST	9	LEAD	LT	0.001		mg/L	0.001
6/7/2012	DIST	9	LEAD	EQ	0.0009		mg/L	0.001
6/7/2012	DIST	23	COPPER	EQ	0.043		mg/L	0.02
6/7/2012	DIST	9	LEAD	EQ	0.0013		mg/L	0.001
6/7/2012	DIST	23	COPPER	EQ	0.4		mg/L	0.02
6/7/2012	DIST	9	LEAD	EQ	0.0007		mg/L	0.001
6/7/2012	DIST	23	COPPER	EQ	0.034		mg/L	0.02
6/7/2012	DIST	9	LEAD	EQ	0.0026		mg/L	0.001
6/7/2012	DIST	23	COPPER	EQ	0.24		mg/L	0.02
6/7/2012	DIST	9	LEAD	EQ	0.0006		mg/L	0.001
6/7/2012	DIST	23	COPPER	EQ	0.48		mg/L	0.02
6/7/2012	DIST	9	LEAD	EQ	0.0038		mg/L	0.001
6/7/2012	DIST	23	COPPER	EQ	0.035		mg/L	0.02
6/7/2012	DIST	9	LEAD	EQ	0.0007		mg/L	0.001
6/7/2012	DIST	23	COPPER	EQ	0.076		mg/L	0.02
6/7/2012	DIST	9	LEAD	EQ	0.004		mg/L	0.001
6/7/2012	DIST	23	COPPER	EQ	0.089		mg/L	0.02
6/7/2012	DIST	9	LEAD	EQ	0.0006		mg/L	0.001
6/7/2012	DIST	23	COPPER	EQ	1.3		mg/L	0.02
6/7/2012	DIST	9	LEAD	EQ	0.0021		mg/L	0.001
6/7/2012	DIST	23	COPPER	EQ	0.5		mg/L	0.02
6/7/2012	DIST	9	LEAD	EQ	0.001		mg/L	0.001
6/7/2012	DIST	23	COPPER	EQ	0.024		mg/L	0.02
6/7/2012	DIST	23	COPPER	EQ	0.018		mg/L	0.02
6/7/2012	DIST	9	LEAD	LT	0.001		mg/L	0.001
6/7/2012	DIST	9	LEAD	EQ	0.0015		mg/L	0.001
6/7/2012	DIST	23	COPPER	EQ	0.19		mg/L	0.02
6/7/2012	DIST	9	LEAD	EQ	0.0042		mg/L	0.001
6/7/2012	DIST	23	COPPER	EQ	0.8		mg/L	0.02
6/7/2012	DIST	9	LEAD	EQ	0.0009		mg/L	0.001
6/7/2012	DIST	23	COPPER	EQ	0.025		mg/L	0.02
6/7/2012	DIST	9	LEAD	EQ	0.0032		mg/L	0.001
6/7/2012	DIST	23	COPPER	EQ	0.13		mg/L	0.02
6/8/2012	DIST	9	LEAD	EQ	0.0007		mg/L	0.001

City of Woodland
Water System 982002
Distribution System Data 2011- October 2012

Date	Source	Analyte DOH Num	Analyte Name	Result Range	Result Quantity	Maximum Contaminant Level	Units	State Reporting Limit
6/8/2012	DIST	23	COPPER	EQ	0.018		mg/L	0.02
9/24/2012	DIST	412	DICHLOROACETIC ACID	EQ	2.5		ug/L	1
9/24/2012	DIST	413	TRICHLOROACETIC ACID	EQ	3		ug/L	1
9/24/2012	DIST	415	DIBROMOACETIC ACID	EQ	1.2		ug/L	1
9/24/2012	DIST	416	HAA(5)	EQ	6.7	60	ug/L	15
9/24/2012	DIST	411	MONOCHLOROACETIC ACID	LT	2		ug/L	2
9/24/2012	DIST	414	MONOBROMOACETIC ACID	LT	1		ug/L	1
9/24/2012	DIST	27	CHLOROFORM	EQ	5.3		ug/L	0.25
9/24/2012	DIST	28	BROMODICHLOROMETHANE	EQ	5.6		ug/L	0.5
9/24/2012	DIST	29	DIBROMOCHLOROMETHANE	EQ	4.6		ug/L	1.5
9/24/2012	DIST	30	BROMOFORM	EQ	1.1		ug/L	0.6
9/24/2012	DIST	31	TOTAL TRIHALOMETHANE	EQ	16.6	80	ug/L	

City of Woodland
Water System 982002
Fluoride Data 2010 -Oct 2012

Date	Source	Analyte Name	Monthly Avg. ppm
Jan-10	01 TREATED	FLUORIDE	1.16
Feb-10	01 TREATED	FLUORIDE	1.13
Mar-10	01 TREATED	FLUORIDE	1.11
Apr-10	01 TREATED	FLUORIDE	1.09
May-10	01 TREATED	FLUORIDE	1.00
Jun-10	01 TREATED	FLUORIDE	0.95
Jul-10	01 TREATED	FLUORIDE	1.08
Aug-10	01 TREATED	FLUORIDE	1.01
Sep-10	01 TREATED	FLUORIDE	0.91
Oct-10	01 TREATED	FLUORIDE	1.11
Nov-10	01 TREATED	FLUORIDE	1.01
Dec-10	01 TREATED	FLUORIDE	1.07
Jan-11	01 TREATED	FLUORIDE	1.04
Feb-11	01 TREATED	FLUORIDE	1.00
Mar-11	01 TREATED	FLUORIDE	1.00
Apr-11	01 TREATED	FLUORIDE	1.01
May-11	01 TREATED	FLUORIDE	1.03
Jun-11	01 TREATED	FLUORIDE	1.02
Jul-11	01 TREATED	FLUORIDE	1.02
Aug-11	01 TREATED	FLUORIDE	1.00
Sep-11	01 TREATED	FLUORIDE	1.00
Oct-11	01 TREATED	FLUORIDE	0.91
Nov-11	01 TREATED	FLUORIDE	1.02
Dec-11	01 TREATED	FLUORIDE	0.90
Jan-12	01 TREATED	FLUORIDE	0.90
Feb-12	01 TREATED	FLUORIDE	1.04
Mar-12	01 TREATED	FLUORIDE	1.03
Apr-12	01 TREATED	FLUORIDE	1.20
May-12	01 TREATED	FLUORIDE	1.14
Jun-12	01 TREATED	FLUORIDE	1.08
Jul-12	01 TREATED	FLUORIDE	1.10
Aug-12	01 TREATED	FLUORIDE	1.10
Sep-12	01 TREATED	FLUORIDE	1.20
Oct-12	01 TREATED	FLUORIDE	1.15

History of Exceedances
Water System 982002

Washington State Department of Health

Division of Environmental Health
Office of Drinking Water

Help

Individual System View

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	01		6/30/2010	IRON	1.70	mg/L	IOC_SHORT	IOC	73571	152
MCL2	01		6/30/2010	MANGANESE	0.220	mg/L	IOC_SHORT	IOC	73571	152
MCL2	01		12/21/1998	IRON	2.40	mg/L	IOC	IOC	09145	046
MCL2	01		12/21/1998	MANGANESE	0.117	mg/L	IOC	IOC	09145	046
MCL2	01		11/13/1997	IRON	2.16	mg/L	IOC	IOC	84302	017
MCL2	01		11/13/1997	MANGANESE	0.123	mg/L	IOC	IOC	84302	017
MCL2	01		4/28/1997	IRON	1.70	mg/L	IOC	IOC	04875	088
MCL2	01		1/24/1994	IRON	1.02	mg/L	IOC	IOC	14883	051
MCL2	01		1/24/1994	MANGANESE	0.117	mg/L	IOC	IOC	14883	051
MCL2	01		8/15/1988	MANGANESE	0.100	mg/L	ICHEM	IOC	11042	051
MCL2	01		2/26/1987	IRON	0.340	mg/L	ICHEM	IOC	09534	051
MCL2	01		1/21/1985	IRON	0.470	mg/L	ICHEM	IOC	07869	051
MCL2	01		5/1/1984	IRON	0.680	mg/L	ICHEM	IOC	07114	051
MCL2	01		5/1/1984	MANGANESE	0.055	mg/L	ICHEM	IOC	07114	051
P	Distribution		9/17/2004	TOTAL COLIFORM	Present	/100ml	COLI_AP	MICRO	04852	144
P	Distribution		10/29/2003	TOTAL COLIFORM	Present	/100ml	COLI_AP	MICRO	05195	144
MCL2	Distribution		4/28/1997	IRON	1.40	mg/L	IOC	IOC	04876	088

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Recent Sanitary Survey Results

RECEIVED
JUL 18 2011
CITY OF WOODLAND

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
SOUTHWEST DRINKING WATER REGIONAL OPERATIONS
P.O. Box 47823 Olympia, Washington 98504-7823
TDD Relay 1-800-833-6388

July 13, 2011	Woodland ID #98200-2	
	County:	Cowlitz
Steve Branz Post Office Box 9 Woodland, Washington 98674	System Type:	Community-Grp. A
	Operating Permit Color:	green
	Surveyor:	T. Walker, Joseph Bezovics
	Inspection Date:	6-14-2011

Thank you for meeting with me to conduct a survey of this water system. Sanitary surveys are the Office of Drinking Water's (ODW) way to inspect public water systems through a field visit. ODW is also able to offer technical assistance to help utilities improve their system operations and ensure that public health is protected.

This report documents the findings of this survey. The following summarizes the deficiencies that need your attention.

OTHER FINDINGS:

- Please send photos of top of tank which show hatch gasket, cover, etc..
- The system is due for a Water System Plan update in 2012. Please contact Corina Hayes at 360-236-3130 to set a pre-Plan meeting.
- Please update non-residential connections on the WFI.
- Please verify that chlorine is NSF approved.
- High Service pumps are in need of painting and .
- Please verify how often alarms at the treatment plant are tested. Low chlorine must have plant shutdown capability
- The transmission line from the Ranney well to the treatment plant was cleaned in 2009. This has reduced raw water iron. Please verify the frequency of this task.
- Please update your Coliform Monitoring Plan with these new locations in the Plan update.

RECOMMENDATIONS

- The system should evaluate costs of DBPs compared to monthly TOCs. TOCs must be taken by a certified lab.

Steve Branz stated that the cross connection program is quite costly to maintain. ODW suggests looking into automated programs, such as XC2 and Tokay. Both of these programs have customized modules unique for Washington that helps systems generate ASR statistics. These two companies coordinate closely with ODW to ensure that their programs track and report information per the drinking water rules and ASR requirements.

Enclosed is a summary of the Longview Emergency Water Shortage response. Please contact Debbie Phillips at (360) 236-3023 if you would like the entire document copied.

As you complete the items noted above, send me photo verification of the items you have completed. Include the system name, ID number, and the date the deficiencies were corrected. You can send them to me by e-mail at teresa.walker@doh.wa.gov or by mail at PO Box 47823, Olympia, Washington 98504-7823.

SYSTEM INFORMATION

This system is a typical community and has approximately 2,000 connections, serving schools, retirement places, and hospitals. This system is currently approved for 5,794 equivalent residential units (ERU) with storage as a limiting factor.

SECTION 1: SOURCE

This system has:

Source ID #	Name:	Description:	Ecology Tag #
S01	Lewis River	Ranney Well	

WELL PUMP EQUIPMENT	Source ID #01 Yes No
Pump type-vertical turbine	3 VFDs
Pumping capacity (gpm)	100hp
Functional pump controls	☒ ☐
Generator available	☐ ☒
Generator has automatic startup	☐ ☒

BUILDINGS/ENCLOSURE	Source ID # Yes	No
Facility secure	☒	☐
Structure in good condition	☒	☐

This system currently uses 3 of the 12 laterals. The others are either clogged, broken, or not useable. This system is considering several options to accommodate future growth: 1) redevelop five laterals, 2) install a new Ranney collector ¼ miles downriver, and 3) install new laterals at the existing well. There is a level indicator in the Ranney well. During low flows and high usage (summer), Ranney has been drawn down to almost empty.

There is a 12-inch transmission main from the Ranney collector pump station to the Water Treatment Plant (WTP). It was cleaned (pigged out) in 2010, which reduced raw water iron levels. **Please add this to the list of operations and maintenance (O&M) tasks to be done every three years.**

SECTION 2: DISINFECTION

This is a surface water system. Please see the enclosed Sanitary Survey of Rapid Rate Filter Plant.

SECTION 4: DISTRIBUTION SYSTEM

This distribution system has:

FEATURES	Yes	No
Service area and facility map	☒	☐
Minimum pressure requirements met	☐	☒
Service meters (reading frequency bimonthly)	☒	☐
Leak detection program	☐	☒
Water system leakage (%) 20-30%		
Blow-offs on dead ends	☒	☐
Routine flushing (frequency _annually)	☒	☐
Routing valve exercise (frequency _two years)	☒	☐

There is an area of low pressure, approximately 10 homes, located near the WTP and reservoirs, which is below 30 psi. The homeowners are on individual booster pumps. WAC 246-290-230 states that this system must plan for resolving this issue. **Please have a plan that addresses this resolution in the WSP update.**

Service meter reading is contracted out but spot checked by operators. This system feels this is cost effective.

Distribution system leakage (DSL) is tracked on a monthly basis. Unmetered uses are estimated. This system found a very large leak in June 2011, which they believe could account for 5 percent of the DSL.

A large leak was found in June 2011 [estimates at 200,000 gallons per day (gpd) based on reduction of source production at the WTP].

This system has an annual pipe replacement program and most of the mains are less than 20 years old.

CROSS CONNECTION CONTROL (Community Systems)	Yes	No
System has enabling authority	☒	☐
Ongoing hazard inspections	☒	☐
High hazards identified	☒	☐
High hazards protected	☒	☐
Annual testing	☒	☐
System has installation standards	☒	☐

Steve Branz expressed concern over the cost of running the cross connection program. Bob Choate is currently in charge of maintaining the database, adding new installations, and sending out notifications. ODW suggests looking into automated programs, such as XC2 and Tokay. Steve is considering installing backflow devices on all new residential connections.

SECTION 5: FINISHED WATER STORAGE

This finished water storage has two reservoirs, where clearwell discharges and are configured in parallel.

RESERVOIR	RESERVOIR NAME	DESCRIPTION	YEAR BUILT	TOTAL VOLUME (GAL)
1	Concrete tank	Concrete	1960	0.5 MG
2	Steel tank	Glass lined AquaStor	1990	1.1 MG

HATCH	Reservoir 1		Reservoir 2	
	Yes	No	Yes	No
Locked	☐	☐	☐	☐

Watertight seal or gasket	☐	☐	☐	☐
Over-lapping cover	☐	☐	☐	☐

FEATURES	Reservoir 1		Reservoir 2	
	Yes	No	Yes	No
Separate inlet/outlet	☒	☐	☒	☐
Protected drain outlet	☒	☐	☒	☐
Protected overflow outlet	☒	☐	☒	☐
Screened air vent	☐	☐	☐	☐
Operational water level gauge	☒	☐	☒	☐
Bypass piping or isolation possibility	☒	☐	☒	☐
Protected from unauthorized entry	☒	☐	☒	☐
Low level alarms	☒	☐	☒	☐

MAINTENANCE	Reservoir 1		Reservoir 2	
	Yes	No	Yes	No
Frequency of interior inspection	Five years			
Frequency of routine site visit	daily			
Exterior in good condition	☐	☒	☒	☐
Clear of excessive vegetation	☒	☐	☒	☐

The Reservoirs are piped in parallel so that either may be isolated. The overflow and drains are routed to a single manhole that discharges to a ditch on site. **Please send photos of the top of the tank that show the hatch gasket, cover, and so on.**

This system has one pressure tank located within the WTP for boosting pressure in the plant. Water is gravity fed from the reservoirs to the entire distribution system. There are no booster pump stations.

SECTION 8: WATER QUALITY MONITORING AND REPORTING

Refer to the Water Quality Monitoring Report (WQMR) for monitoring requirements. If you have any questions on source monitoring, please contact Sophia Petro at (360) 236-3046.

Entry Point #	Description
1	Following treatment

CHEMICAL	Entry Point #1 Yes	No
Monitoring adequate	☒	☐
ODW WQ data reviewed	☒	☐
Sample collection sites correct	☒	☐

System has prior:
- ☐ Nitrate results above 5 mg/L
- ☐ Nitrite results above 0.5 mg/L
- ☐ Primary MCL
- ☐ Secondary MCL exceedance(s)
- ☐ Organic detections
- ☐ Other

_____

COLIFORM	Yes	No
Monitoring adequate	☒	☐
Monitoring plan adequate	☒	☐
Monitoring plan followed	☒	☐
# of violations since last survey	none	

This system is in the process of installing a dedicated sampling station for easier access and reliability. **Please update the Coliform Monitoring Plan with these new locations in the WSP update.**

LEAD & COPPER	Yes	No
Monitoring adequate	☒	☐
Results below action level	☒	☐

DISINFECTION BYPRODUCTS	Yes	No
Monitoring adequate	☒	☐
# of treatment plants	one	
Monitoring plan adequate	☒	☐
Monitoring plan followed	☒	☐

Results satisfactory	yes

This system takes quarterly DBP samples and does not think it is worth the cost to do monthly TOCs. THMs are between 16-20 ug/L and HAA5 are less than 10 ug/L. This system should evaluate the costs of DBPs compared to monthly TOCs. TOCs must be taken by a certified lab.

SECTION 9: SYSTEM MANAGEMENT AND OPERATIONS

The system management and operation has:

PROJECT/PLANNING	Yes	No
System approved	☒	☐
Current WSP/SWSMP	☒	☐
Year WSP/SWSMP approved	2006	
Distribution main submittal exception	☒	☐
Emergency response plan	☐	☐

This system is due for a WSP update in 2012. We discussed Appropriate Level of Planning (ALOP) with this system. Steve asked if he could submit a short report in place of a WSP update. Corina Hayes encouraged him to hire an engineering consultant and attend a pre-plan meeting to scope the update.

We discussed the need for a thorough Emergency Response Plan and conservation plan in case of low river levels.

REPORTING	Yes	No
WFI reviewed and updated with purveyor	☒	☐
Consumer confidence report (Community's Only)	☒	☐
Water use efficiency report (Municipal Water Suppliers)	☒	☐
Cross connection control annual report (> 1000 conn)	☒	☐

This system has not been reporting non-residential connections correctly. I explained that ODW wants to see these connections on a per-unit basis and explained that coliform monitoring might increase with these revisions. **Please update non-residential connections on the WFI.**

OPERATOR CERTIFICATION

This system is required to have four certified positions.

Name of Operator	Certification Number	Certifications	Mandatory Operator
Robert Choate	006910	WTPO3, WDM, CCS	☒
Dennis Ripp	002375	WTPO2, WDM3, CCS	☒
Mike Peterson	005583	WTPO2	☒
			☐

WDS-Water Distribution Specialist; WDM-Water Distribution Manager; WTPO-Water Treatment Plant Operator, BTO-Basic Treatment Operator; CCS-Cross Connection Specialist; BAT-Backflow Assembly Tester

Bob Choate is in charge of the WTP. Dennis is in charge of the distribution system. If you have any questions or this information is inaccurate, please contact Operator Certification at (800) 525-2536.

OPERATIONS	Yes	No
Operational records maintained	☒	☐
Complaints followed up	☒	☐
Complaints documented	☒	☐
# of complaints recorded at ODW (since last survey)	0	
Operation and maintenance program	☒	☐
Previous survey deficiencies/findings corrected	☒	☐

CLOSING

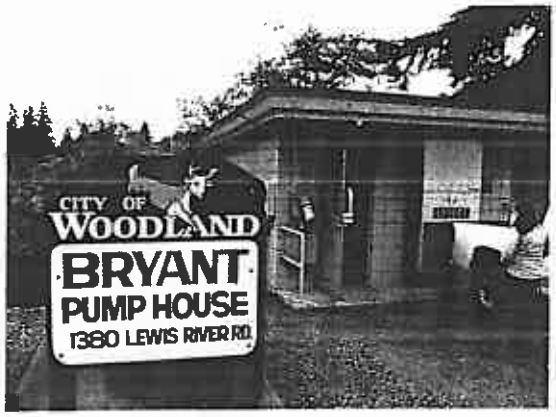
Regulations establishing a schedule of fees, including fees for sanitary surveys, were adopted August 3, 2007 (WAC 246-290-990). An itemized invoice for $1,836 is enclosed.

If you have any questions, please contact me at (360) 236-3032 or by e-mail at Teresa.walker@doh.wa.gov.

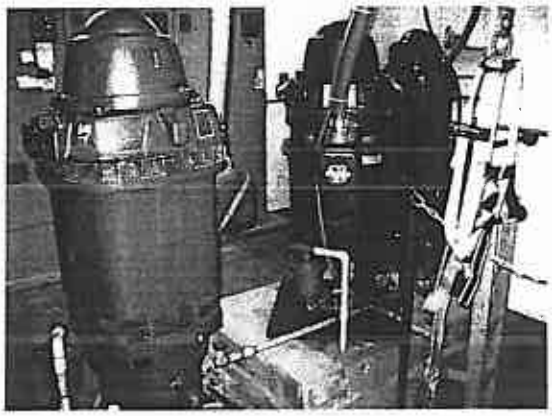
Sincerely,

TERESA A WALKER
Office of Drinking Water, Regional Engineer

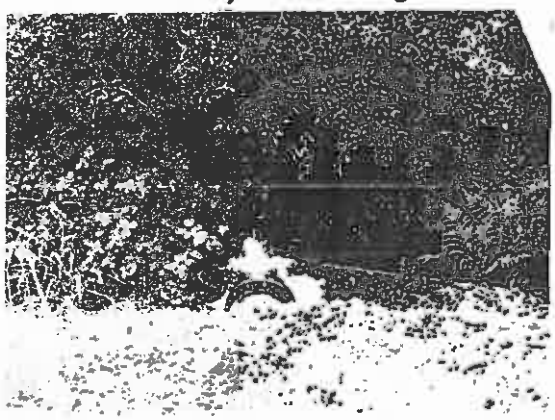
cc: Robert Choate, City of Woodland
Jesse Smith, Cowlitz County Health Department
Denise Miles, ODW



Ranney Well Building

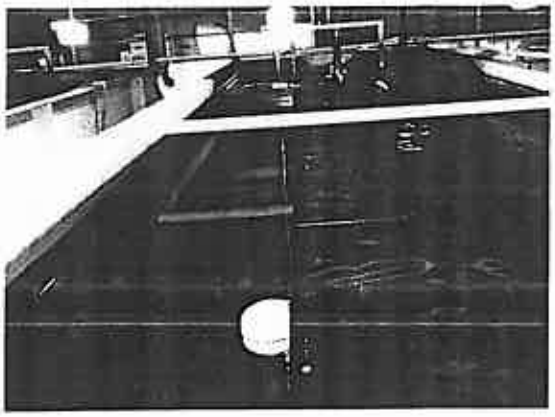


Well pumps 3 100hp vfds

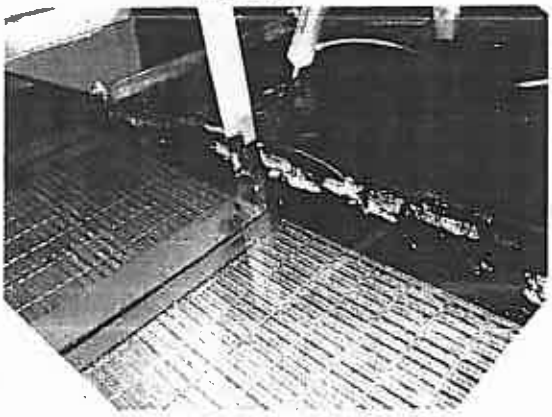


Backwash pond discharge

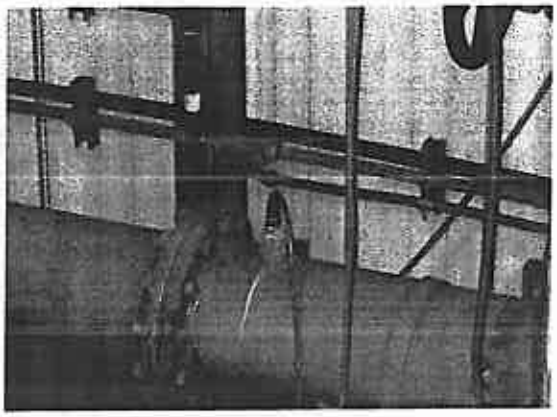
Ranney Well



Filter



Upflow Clarifier

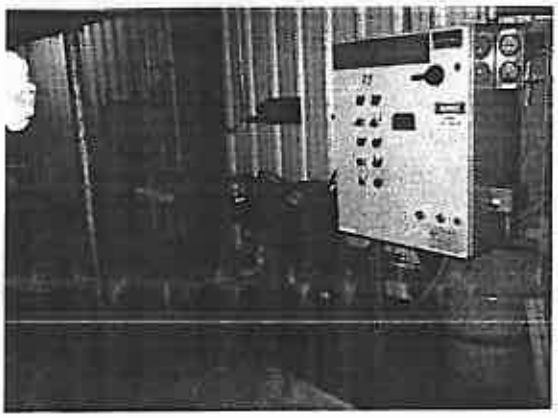


CT POint

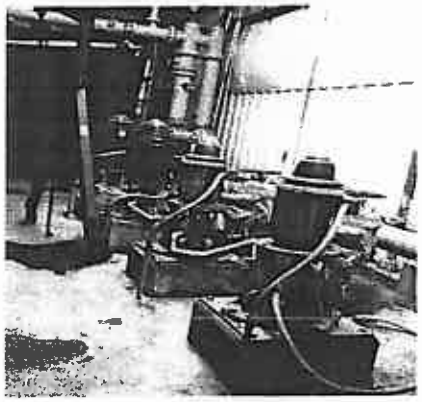
Backwash piping

Fluoride saturator

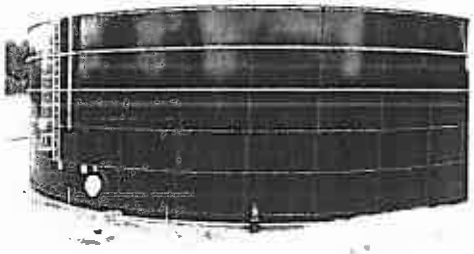
Soda Ash Chemical Feeds



Small booster pump station in plant

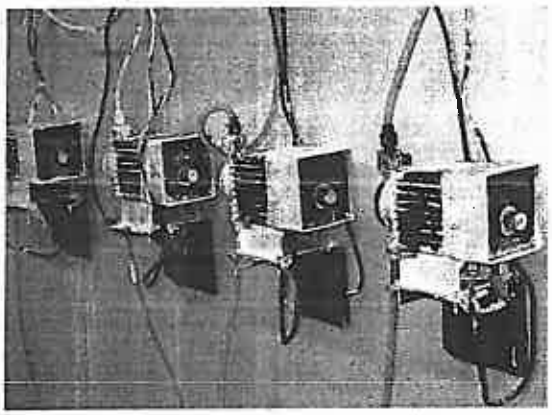


High Service pumps (needs painting)



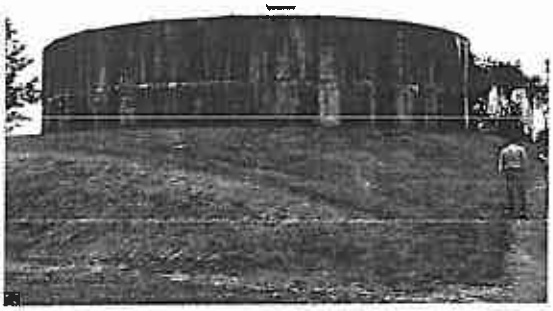
Aqua Stor Reservoir (1.1 MG)

Polymer and chem. feeds

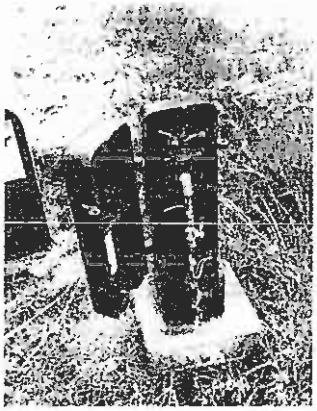


Soda Ash chemical feed pumps (pre&post)

Backwash pond



Concrete 0.5 MG



Dedicated coli sample station

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

Sanitary Survey of Rapid Rate Filter Plant

Field Data Sheet

System Name	I.D. Number	Date	Evaluation By
City of Woodland	**982002**	**June 14, 2011**	**Teresa Walker, Jozsef Bezovics**

Operator Present	WTPO#	Certification Level	Title	Phone Number
Bob Choate	**006910**	**WTPO3**	**Water Plant Manager**	(360) 225-6174
Dennis Ripp	**002375**	**WTPO2**	**Operator**	

Identify lead operator/WTP supervisor above. Is lead operator new since the last survey (Y/N)? Does this person sign the report? Present during survey?
The lead operator is the same, Bob Choate. He signs the reports. Bob was present during this survey.

Source Water & Watershed Information *(Review Watershed Risk Report from Surface Water Database (SWDB); Gather information needed if incomplete) Intake: Protection provided to Intake facilities; adequate screening; adjustable levels of withdrawal; pumped or gravity (reliability concerns)? Frequency and location of raw water turbidity and coliform samples.*

The raw water intake is a Ranney Well located on the Lewis River.

The gallery is accessible through a pit in the Intake Building. Three new variable frequency drive (VFD) pumps, rated at 100 HP each, were installed in the gallery during the plant upgrade in 2008.

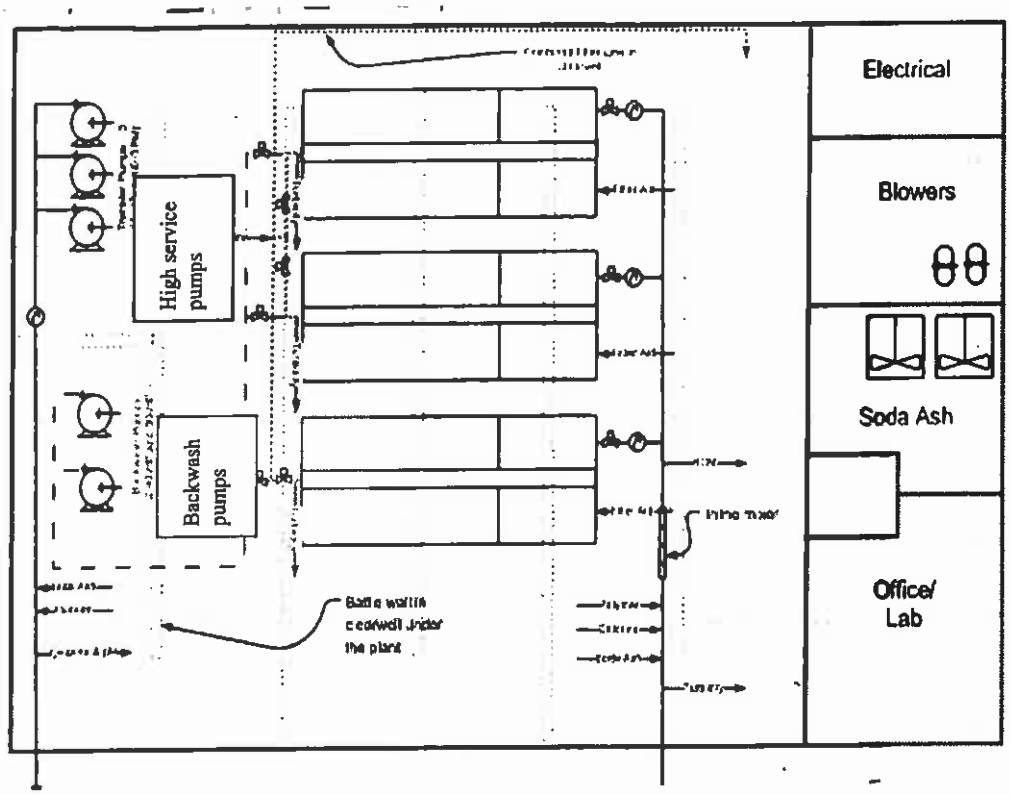
This system currently uses 3 of the 12 laterals. The others are either clogged, broken, or are not useable. This system is considering several options to accommodate future growth: 1) redevelop five laterals; 2) install a new Ranney collector ¼ miles downriver; 3) install new laterals at the existing well. There is a level indicator in the Ranney well. During low flows and high usage (summer) the Ranney well has been drawn down to the point where the pumps would cavitate if operated. This situation is a concern for ODW because this system can run out of water. Operators record well levels, river levels, and temperature on a weekly basis.

There is a 12-inch transmission main from the Ranney collector pump station to the WTP. It was cleaned (pigged out) in 2010, which reduced raw water iron levels. **Please verify the frequency of this task.**

Raw water has elevated iron levels approximately 3 milligrams per liter (mg/L). Raw water turbidity is rarely about 20 NTU.

Watershed rating evaluation??

Plant Schematic *– Use schematic from CPE report, if available; Show actual compliance monitoring locations for CFE turbidity, CT, and residuals @ entry point to DS; Place arrow and letter at chemical addition points and ID in tables below.*


Electrical
Blowers
Soda Ash
Office/
Lab
High service
pumps
Backwash
pumps
Baffle wall in
clearwell under
the plant

Chemical Addition - Coagulant(s), Filter Aid(s), pH Adjustment, Pre-Cl_2 /Rapid Mix:

Chemical		Location	Dose	Chemical		Location	Dose
Alum				Soda Ash	X	Solvay	7.92 mg/l
Ferric Cl/SO_4				Caustic Soda			
PACl				Lime			
CAPolymer:				Pre Chlorine	X	12.5%	3.65 mg/l
CAPolymer:	X	Caschem 8185	1.5 mg/l	Potassium Perm			
FAPolymer:	X	NaClear8170	0.16 mg/l	Other:			

Per my notes, they use Cashem 8185 now (to be checked w/Bob).

Note: PACl = Polyaluminum Chloride; CAP = Coagulant Aid Polymer; FAP = Filter Aid Polymer; Insert name(s).
How are dosages determined; how are they controlled?(Jar tests, Visual floc formation, streaming current detector, historical, monitoring data, etc.); what turbidity variation triggers a change?(Compare monthly chemical usage to dosage.) Bulk storage? Day tanks?

Chlorine, soda ash, and CA polymer are added by injection ports directly into static mixer, prior to filter trains. Chlorination is not flow paced. There is a streaming current monitor (SCM) though it is not used for automatic dosage adjustments. Dosages are obtained from spreadsheets and based on historical usage. Operators do not jar test due to constant raw water characteristics, although it was recommended to become familiar with in the plant's November 2008 Comprehensive Performance Evaluation. Chlorine is added as an oxidant for iron removal as well as additional contact time. Raw and finished water iron is tested daily. Manganese content is not tested. It is unknown how manganese is removed year-round. It is recommended that manganese (raw and finished water) be tested at least once a month.

All chemicals are NSF approved. For Bob: **Please verify that chlorine is NSF approved.**

Pump calibration curves were discussed.

Rapid Mix Type: Static Mixer [X] Mechanical Mixers [ ] Injection Mixers [ ] In-line Blender Mixers [ ]
Operational?
Yes, the static mixer is operational. An injection port inputs directly into the mixer/pipe.

Flocculation:
Flocculator Type: **NONE** [X] Hydraulic [ ] Mechanical [ ] Number of basins _____
Appearance of floc; tapered energy input?:

Sedimentation/Clarification:

NONE (Direct Filtration) [ ] Horizontal-flow rectangular [ ] Tube Settlers [ ] Dissolved Air Flotation [ ]
Adsorption Clarifier [X] Horizontal-flow round [ ] Inclined-plate [ ] Other _____ [ ]

Basin Dimensions: Length: 8.9 feet Width: 7.9 feet Depth: 3.5 feet (

Number of trains 3 Total Basin Volume: 7943 Gallons
Contact clarifier media type? Cleaning frequency?

Each train has a contact absorption clarifier, which uses plastic beads as a medium. Settled water is obtained from a grab sample on a weekly basis. CAC is run 400 minutes then flushed.

Filtration:

Single Media [ ] Dual Media [ ] Mixed Media [X] Pressure Filter [ ] Deep Bed Mono-media [ ]

Media Type: Sand [X] Anthracite [X] Garnet [X] Other: _____ [ ]

Filter Dimensions: Length: 17.8 feet Width7.9 feet No. Filters: 3

Total Area: 140 sq ft (each) Max. plant flow rate: 1200 gpm(two filters) Filter Rate: 5 gpm/sq ft

Individual Filter Turbidimeters [X] Combined Filter Effluent Turbidimeter [ ] Calibration Date: every 3 months

Backwash criteria: 1,400-1,500 hrs of filter operation 0.1 ntu Rate : 5-18 gpm/sq ft Time 15 min

Backwash to: Lagoon [ ] Lagoon To Raw Water [X] Plant intake [ ] Sanitary Sewer [ ]

Filter-to-waste: No [ ] Yes [X] Time : 5-15 min Stopped @ _0.1____ ntu

Condition of media (mounding, cracking, mudballs); when replaced; Control of filter rate and backwash rate; Variability of filter rate; Turbidimeters properly operating? Numbers reported when plant is running? Models of turbidimeters: continuous and benchtop; FTW at all start-ups or after BW?

A new filter was installed in 2008. Two filters are run at a time at 1,200 gallons per minute (gpm). This system does not have a CFE turbidimeter and the highest of the IFEs is reported. Filters are rotated monthly. Turbidimeters are HACH 1720 E's. Filter to waste for 13 minutes and put into clearwell if 0.1 NTU or less. Filters are backwashed every 1,600 minutes. Backwash water accounts for 5 percent of total production, excluding FTW.

Backwash begins with a low flow rate, followed by air scour and high flow rate, which lasts for 13 minutes.

Backwash water is discharge into two lagoon. Where is decanted water discharged to after de-chlorination? Decanting is stopped during backwash.

A CPE was conducted in November 2008. Many of the recommendations were implemented, including replacing non-functional equipment and developing written Standard Operating Procedures.

Chemical Addition – Disinfection:

Chemical		Location	Dose	Chemical		Location	Dose
Gas Chlorine				UV*			
NaOCl	x		3.5-4.0	Ozone			
$Ca(OCl)_2$				Chloramines			
ClO_2				Other:			

** For UV, request records on bulb cleaning/replacement; check sensors and readings; dose = fluence, mJ/cm²*

Clearwell Dimensions: Length: _____ Width: _____ Depth: _____

High/Low Levels: _____ No. Basins: one Total Volume: 180,000 Gallons

Parameter Monitored	Location	When/ Frequency
pH	Prior to soda ash injection	daily
Temperature	"	"
Disinfectant Residual	"	"
Peak Hourly Flow (PHF)	1300 gpm (reporting)	
Other:		

Redundancy of equipment; Contact time (T) evaluation – how derived, variable or constant; How is PHF determined – compare to value used for T in CT calcs; Check CT Summary Report in database, complete as necessary (If CT summary Report is not available, review CT determination in system files); Clearwell vents and screens; Calibration of pH meters and disinfectant residual monitors

There is no post chlorination. There is adequate contact time in the plant. The value reported and approved does not account for contact time in the reservoirs or in the filters. Approved contact time is based only on the clearwell. This system uses an approved contact time of 77 minutes at 1,400 gpm. This is very conservative.

Water from the clearwell is piped to one of two reservoirs prior to entering the distribution system. Inactivation ratios from monthly reports range from 1.0 to 2.3.

Chemical Addition – Corrosion Control/Stability/Other:

Chemical		Location	Dose	Chemical		Location	Dose
Soda Ash	X	Clearwell effluent	7.92 mg/l	Orthophosphate			
Caustic Soda				Polyphosphate			
Lime				Other:			

Fluoridation: NONE [ ] Hydrofluosilicic Acid [ ]

Sodium Fluoride (Saturator) [X] Sodium Silicofluoride (Dry Feed) [ ]

Location and Dose:

0.73 mg/l added prior to clearwell

Target pH and alkalinity: _____ and ____mg/L (to be checked w/Bob)

General Plant Operations/ Cross-Connection Protection (CCP)
Has purveyor had plant hazard evaluation by CCS? Internal CCP – chemical makeup; use of day tanks; chemical feed/ makeup interconnections; surface washers? Protection from overfeed? Any other treatment provided?

There are reduced pressure backflow devices on potable and non-potable equipment.

Is plant staffed during all times of operation? No [X] Yes [ ]

Hours of operation: Start: 8 AM_ Stop: _Varies | Number of Shifts _1-2

Plant staffing – plant rating/mandatory level; certification levels of operators; coverage, shift operation; vacations/ weekends/holidays

Bob Choate is a WTPO 3, WDM3, CCS # 6910, Dennis Ripp is a WTPO2, WDM3,CCS #2375, and Mike Petersen is WTPO2. The plant is rated as a Class 3 plant. Operator staff plan approximately 8-10 hours during the week and briefly on weekends. The plant is on auto dialer at other times.

SCADA has been improved and operators may now access and control the plant remotely.

Ventilation within the plant has been greatly improved by installing many large fans that run 24/7. The temperature inside the plant though has decreased and some chemical feeds have frozen.

High Service pumps are in need of painting.

WTP facility and the gate to the site are locked when operators are not present.

Alarms:

Parameter	Monitoring Point	Alarm Level	Shutdown Level	Response
Turbidity - finished	Prior to clearwell	0.1NTU	NTU	Filter to waste
Turbidity - raw			NA	"
Chlorine Residual		0.5 mg/l	None	"
Other:				

Please verify how often alarms are tested. Low chlorine must have plant shutdown capability

Source and Storage Calculation Spreadsheets

EXAMPLE 6-1: ERU WORKSHEET - EXISTING

System Physical Capacity Documentation
(Note: Capacity determinations are for all facilities in place and operations for the System)

System Specific Data:
Average Day Demand (ADD) 185 (gpd/ERU) Maximum Day Demand (MDD) 248 (gpd/ERU)

Water System Service Connections and ERUs:

Residential:	**Total Peak Demand (gpd)**	**No. of Service Connections**	**ERUs**
Single Family (Full or Part Time)	1,314,093	1,379	1,379
Multi-Family (Full or Part Time)	449,336	520	506
Residential **(subtotal)**	1,763,429		1,885

Non-Residential:	**Total Peak Demand (gpd)**	**No of Service Connections**	**ERUs**
Industrial/Commercial	1,930,362	761	2,381
Governmental			
Agricultural			
Other (specify)			
Non-Residential (subtotal)			
Unaccounted (unmetered Uses, leakage, etc)	198,256	N/A	37

TOTAL CAPACITY (ERU's) = Residential = Non-residential = Unaccounted = 4,303

Specific Physical Capacity in Equivalent Residential Units (ERUs):

Facility:		**Physical Capacity (in ERUs)**
Source Capacity:	1,400 gpm – Ranney Pumps	8,129
Treatment Capacity	2,100 gpm – WTP	12,194
Storage Capacity		6,452
Distribution Capacity		N/A
Transmission Capacity		16,258
Other (please specify)	Water Rights (Qi) 2,800 gpm	16,258
Total System Physical Capacity (ERUs): (based upon *the limiting physical facility capacity determined above*)		**6,452**

Note: *Separate estimates will be needed if multiple-day storage is used to augment source(s)to meet system MDD requirements.*

EXAMPLE 6-1: ERU WORKSHEET – 20-YEAR PROJECTION

System Physical Capacity Documentation
(Note: Capacity determinations are for all facilities in place and operations for the System)

System Specific Data:
Average Day Demand (ADD) 185 (gpd/ERU) Maximum Day Demand (MDD) 248 (gpd/ERU)

Water System Service Connections and ERUs:

Residential:	**Total Peak Demand (gpd)**	**No. of Service Connections**	**ERUs**
Single Family (Full or Part Time)	2,071,674		2,174
Multi-Family (Full or Part Time)	707,748		797
Residential **(subtotal)**	2,779,422		2,971

Non-Residential:	**Total Peak Demand (gpd)**	**No of Service Connections**	**ERUs**
Industrial/Commercial	3,044,313		3,755
Governmental			
Agricultural			
Other (specify)			
Non-Residential (subtotal)			
Unaccounted (unmetered Uses, leakage, etc)	287,278	N/A	538

TOTAL CAPACITY (ERU's) = Residential = Non-residential = Unaccounted = 7,264

Specific Physical Capacity in Equivalent Residential Units (ERUs):

Facility:		**Physical Capacity (in ERUs)**
Source Capacity: 2,500 gpm – Ranney Pumps/Water Rights		16,258
Treatment Capacity	2,100 gpm – WTP	12,194
Storage Capacity		8,468
Distribution Capacity		N/A
Transmission Capacity		16,258
Other (please specify)	Water Rights (Qi) 2,800 gpm	16,258
Total System Physical Capacity (ERUs): (based upon *the limiting physical facility capacity determined above*)		**8,468**

Note: *Separate estimates will be needed if multiple-day storage is used to augment source(s)to meet system MDD requirements.*

Woodland Water System Design Criteria

Average Daily Demand (ADD): 185 gpd/ERU Average of 2009 - 2012 data is 185 gpd/ERU.
Maximum Daily Demand (MDD): 248 gpd/ERU Average of 2009 - 2012 data is 248 gpd/ERU.
Peak Hour Demand (PHD): Based on WSDOH Formula w/C=1.6, F=225
Unaccounted For Water: 7.4% of total production (Average since Fall of 2011 when major leak found and repaired)

Year	Estimated Population	Estimated System User Population	Monthly Bact Samples	Service ERUs	Unaccounted For ERU's	System ERUs	Design Criteria (mgd) ADD	MDD	PHD	Design Criteria (gpm) ADD	MDD	PHD	2006 WSP ADD (MGD)	2006 WSP ADD(AF/yr)	WTP Output Plant Rating (GPM)	Maximum Supply (GPM)	Water Demands ADD Af/Yr	MDD Af/Yr	PHD Af/Yr	Water Rights Primary WR gpm	Primary WR AF/yr
2009	5,195	8,946	7	3376	945	4321	0.80	1.07	1.80	555	744	1,247	1.00	1,116	2,100	1,400	895	1,200	2,012	2,800	2,186
2010	5,509	9,122	10	3228	707	3935	0.73	0.98	1.64	506	678	1,141	1.03	1,149	2,100	1,400	815	1,093	1,841	2,800	2,186
2011	5,550	9,159	10	3454	754	4208	0.78	1.04	1.75	541	725	1,216	1.06	1,185	2,100	1,400	872	1,169	1,962	2,800	2,186
2012	5,590	9,283	10	3479	278	3757	0.70	0.93	1.57	483	647	1,092	1.09	1,221	2,100	1,400	779	1,044	1,762	2,800	2,186
2013	5,700	9,436	10	3547	283	3831	0.71	0.95	1.60	492	660	1,112	1.12	1,259	2,100	1,400	794	1,064	1,794	2,800	2,186
2014	5,900	9,616	10	3672	293	3965	0.73	0.98	1.66	509	683	1,149	1.16	1,298	2,100	2,800	822	1,102	1,854	2,800	2,186
2015	6,044	9,782	10	3761	301	4062	0.75	1.01	1.69	522	700	1,176	1.19	1,338	2,100	2,800	842	1,128	1,897	2,800	2,186
2016	6,271	9,974	10	3903	312	4215	0.78	1.05	1.75	541	726	1,218	1.23	1,379	2,100	2,800	873	1,171	1,965	2,800	2,186
2017	6,498	10,168	10	4044	323	4367	0.81	1.08	1.81	561	752	1,260	1.27	1,423	2,100	2,800	905	1,213	2,033	2,800	2,186
2018	6,725	10,364	10	4185	334	4520	0.84	1.12	1.88	581	778	1,302	1.31	1,467	2,100	2,800	937	1,256	2,101	2,800	2,186
2019	6,952	10,562	10	4327	346	4672	0.86	1.16	1.94	600	805	1,344	1.35	1,513	2,100	2,800	968	1,298	2,168	2,800	2,186
2020	7,179	10,762	10	4468	357	4825	0.89	1.20	2.00	620	831	1,386	1.39	1,560	2,100	2,800	1,000	1,340	2,236	2,800	2,186
2021	7,448	10,976	10	4635	370	5006	0.93	1.24	2.07	643	862	1,436	1.44	1,611	2,100	2,800	1,037	1,391	2,317	2,800	2,186
2022	7,718	11,193	10	4803	384	5187	0.96	1.29	2.14	666	893	1,486	1.48	1,661	2,100	2,800	1,075	1,441	2,397	2,800	2,186
2023	7,987	11,412	10	4971	397	5368	0.99	1.33	2.21	690	924	1,536	1.53	1,715	2,100	2,800	1,112	1,491	2,478	2,800	2,186
2024	8,257	11,633	10	5138	411	5549	1.03	1.38	2.28	713	956	1,586			2,100	2,800	1,150	1,542	2,558	2,800	2,186
2025	8,526	11,857	10	5306	424	5730	1.06	1.42	2.36	736	987	1,636			2,100	2,800	1,188	1,592	2,639	2,800	2,186
2026	8,824	12,099	10	5492	439	5931	1.10	1.47	2.44	762	1,021	1,691			2,100	2,800	1,229	1,648	2,728	2,800	2,186
2027	9,133	12,343	10	5684	454	6138	1.14	1.52	2.52	789	1,057	1,748			2,100	2,800	1,272	1,705	2,820	2,800	2,186
2028	9,453	12,591	10	5883	470	6353	1.18	1.58	2.60	816	1,094	1,807			2,100	2,800	1,317	1,765	2,916	2,800	2,186
2029	9,784	12,840	10	6089	487	6575	1.22	1.63	2.69	845	1,132	1,869			2,100	2,800	1,363	1,827	3,014	2,800	2,186
2030	10,126	13,092	15	6302	504	6806	1.26	1.69	2.78	874	1,172	1,932			2,100	2,800	1,410	1,891	3,117	2,800	2,186
2031	10,481	13,347	15	6523	521	7044	1.30	1.75	2.88	905	1,213	1,998			2,100	2,800	1,460	1,957	3,223	2,800	2,186
2032	10,847	13,604	15	6751	539	7290	1.35	1.81	2.97	937	1,256	2,066			2,100	2,800	1,511	2,025	3,332	2,800	2,186
2033	11,227	13,865	15	6987	558	7545	1.40	1.87	3.08	969	1,299	2,136			2,100	2,800	1,564	2,096	3,446	2,800	2,186

*2006 WSP ADD w/conservation measures.

NOTES:

2013 - 2033 ERU's are projections based on proposed population growth from Woodland Comprehensive Plan.
2009 - 2012 ADD and MDD numbers are based on recorded production and consumption records.
System user population based on WSDOH
1 ERU = Average residential service consumption in gallons per day

Figure 3 - Woodland Minimum Storage Requirement Projection

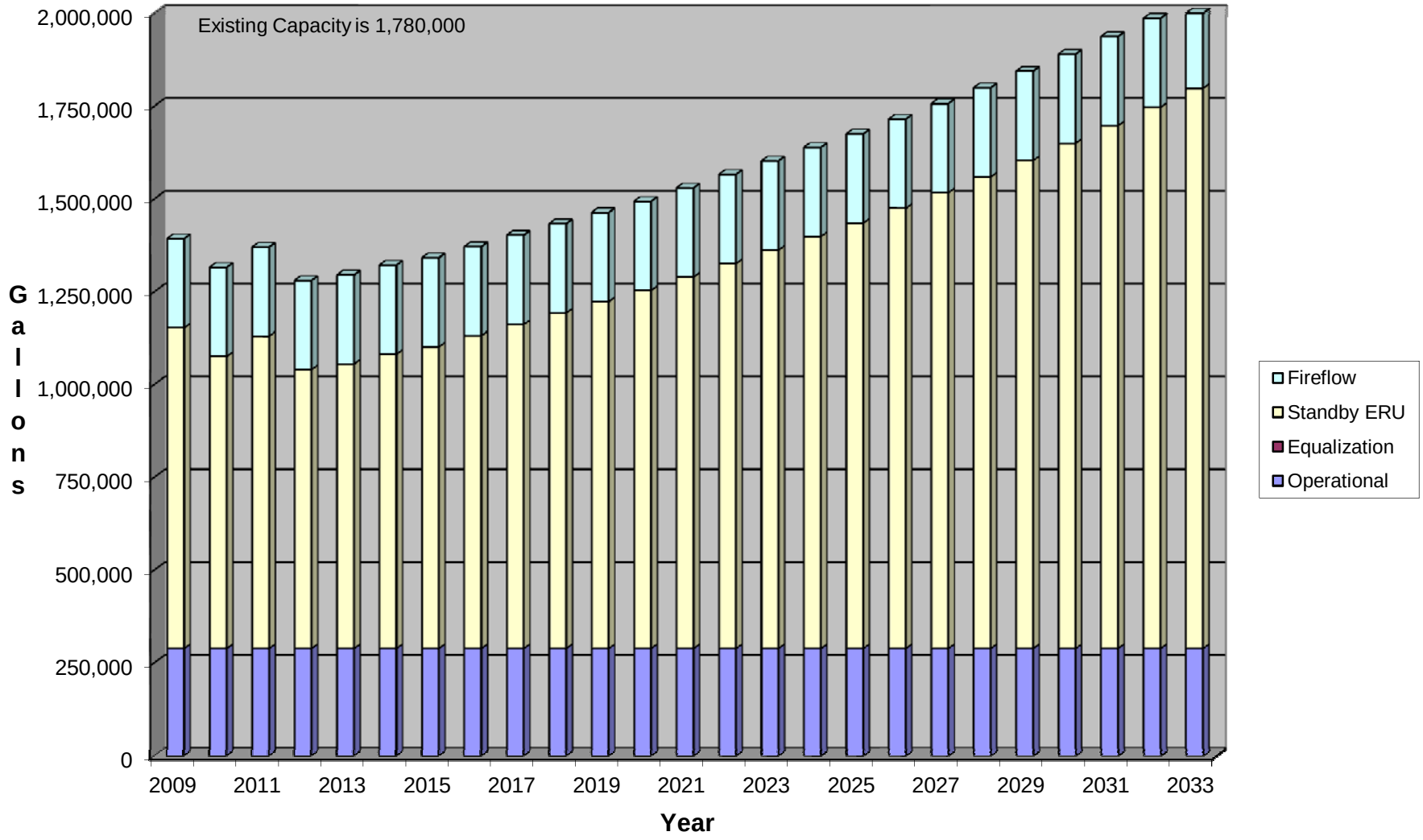
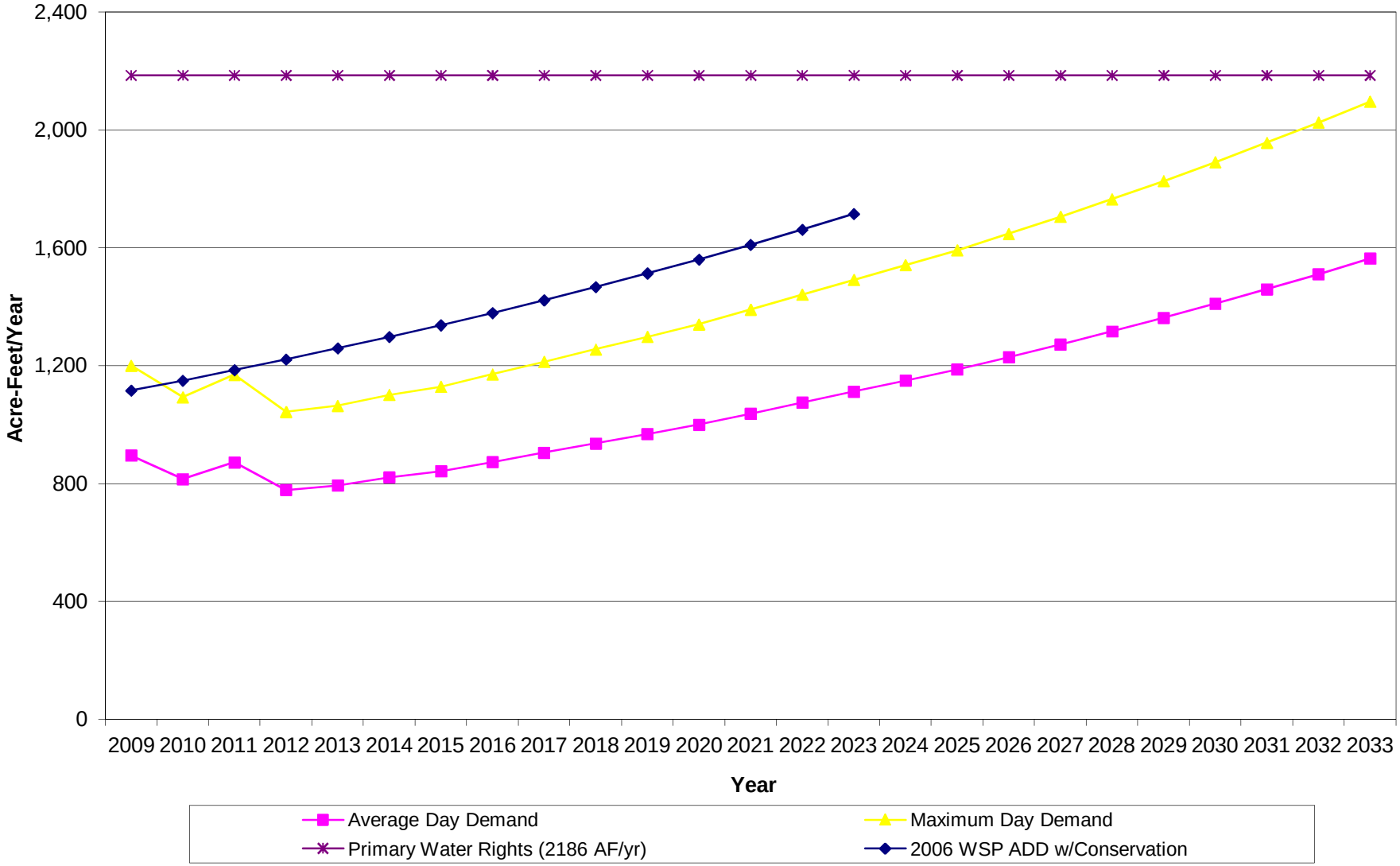
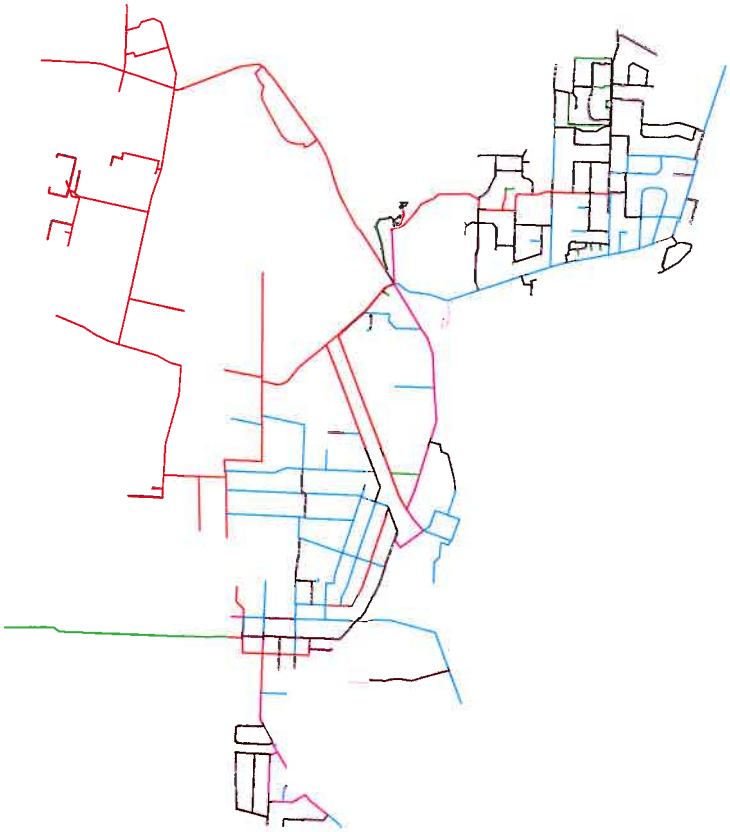


Figure 4 - Woodland Water Rights compared to ADD, MDD, and 2006 ADD



Hydraulic Model Results

Scenario: 2012 Base Calibrated



Project Inventory: Woodland Water 2012 System.wtg

Title	City of Woodland Water System Hydraulic Model
Engineer	Bart Stepp, PE
Company	City of Woodland
Date	11/9/2012
Notes	Calibrated model for Water System Plan

Scenario Summary

ID	2027
Label	2012 Base Calibrated
Notes	
Active Topology	Base-Active Topology
Physical	2012 Physical Calibrated
Demand	Base- 2012 MDD
Initial Settings	Base-Initial Settings
Operational	Base-Operational
Age	Base-Age Alternative
Constituent	Base-Constituent
Trace	Base-Trace Alternative
Fire Flow	Base-Fire Flow
Flushing	Base Flushing
Energy Cost	Base-Energy Cost
Transient	Base Transient
Pressure Dependent Demand	Base Pressure Dependent Demand
Failure History	Base Failure History
User Data Extensions	Base-User Data
Steady State/EPS Solver Calculation Options	Base
Transient Solver Calculation Options	Base Calculation Options

Network Inventory

Pipes	414	-Constant Speed - No Pump Curve	1
Junctions	339	-Constant Speed - Pump Curve	0
Hydrants	0	-Shut Down After Time Delay	0
Tanks	2	-Variable Speed/Torque	0
-Circular	2	-Pump Start - Variable Speed/Torque	0
-Non-Circular	0	Variable Speed Pump Batteries	0
-Variable Area	0	Pump Stations	0
Reservoirs	1	PRV's	0
Pumps	1	PSV's	0
-Constant Power	0	PBV's	0
-Custom Extended	1	FCV's	0
-Design Point (1 Point)	0	TCV's	0
-Multiple Point	0	GPV's	0
-Standard (3 Point)	0	Isolation Valves	0
-Standard Extended	0	Spot Elevations	0

Transient Network Inventory

Project Inventory: Woodland Water 2012 System.wtg

Transient Network Inventory			
Air Valves	0	Rupture Disks	0
-Double Acting	0	Surge Valves	0
-Slow Closing	0	Surge Tanks	0
-Triple Acting	0	-Simple	0
-Vacuum Breaker	0	-Differential	0
Discharges to Atmosphere	0	-Variable Area	0
Orifice	0	Turbines	0
Rating Curve	0	Valves With Linear Area Change	0
Valve	0	Periodic Head-Flows	0
Check Valves	0	-Sinusoidal (Head)	0
-Towards Wye	0	-Not Sinusoidal (Head)	0
-Away from Wye	0	-Sinusoidal (Flow)	0
Hydropneumatic Tanks	0	-Not Sinusoidal (Flow)	0
Orifices Between Pipes	0		

Pressure Pipes Inventory			
2.0 (in)	1,206 ft	10.0 (in)	10,884 ft
3.0 (in)	28 ft	12.0 (in)	55,346 ft
4.0 (in)	11,104 ft	16.0 (in)	1,569 ft
6.0 (in)	48,009 ft	All Diameters	184,666 ft
8.0 (in)	56,520 ft		

Scenario Summary Report
Scenario: 2012 Base Calibrated

Scenario Summary	
ID	2027
Label	2012 Base Calibrated
Notes	
Active Topology	Base-Active Topology
Physical	2012 Physical Calibrated
Demand	Base- 2012 MDD
Initial Settings	Base-Initial Settings
Operational	Base-Operational
Age	Base-Age Alternative
Constituent	Base-Constituent
Trace	Base-Trace Alternative
Fire Flow	Base-Fire Flow
Flushing	Base Flushing
Energy Cost	Base-Energy Cost
Transient	Base Transient
Pressure Dependent Demand	Base Pressure Dependent Demand
Failure History	Base Failure History
User Data Extensions	Base-User Data
Steady State/EPS Solver Calculation Options	Base
Transient Solver Calculation Options	Base Calculation Options

Hydraulic Summary			
Time Analysis Type	EPS	Simulation Start Date	10/4/2012
Friction Method	Hazen-Williams	Hydraulic Time Step	1.000 hours
Accuracy	0.001	Duration	24.000 hours
Trials	40	Calculation Type	Hydraulics Only

Calculation Summary (2027: 2012 Base Calibrated)

Time (hours)	Balanced?	Trials	Relative Flow Change	Flow Supplied (gpm)
All Time Steps(67)	True	617	0.0008784	480
0.00	True	13	0.0000280	1,280
1.00	True	4	0.0000906	1,277
2.00	True	5	0.0003252	1,276
2.51	True	7	0.0008784	1,139
3.00	True	8	0.0005659	1,211
3.41	True	8	0.0006750	1,134
3.89	True	7	0.0007876	0
4.00	True	7	0.0000807	0
4.41	True	6	0.0006259	1,250
4.93	True	9	0.0006511	0
5.00	True	7	0.0002246	0
5.40	True	8	0.0000212	1,264
5.93	True	11	0.0003393	0
6.00	True	7	0.0002117	0
6.40	True	8	0.0000192	1,268
6.93	True	12	0.0001825	0
7.00	True	7	0.0002448	0
7.40	True	8	0.0000183	1,268
7.93	True	14	0.0004894	0
8.00	True	7	0.0001920	0
8.40	True	8	0.0000184	1,268
8.93	True	17	0.0003311	0
9.00	True	7	0.0001933	0
9.40	True	8	0.0000190	1,268
9.93	True	11	0.0005272	0
10.00	True	7	0.0002619	0
10.40	True	8	0.0000159	1,268
10.93	True	13	0.0004153	0
11.00	True	7	0.0002149	0
11.39	True	8	0.0000127	1,268
11.93	True	13	0.0003726	0
12.00	True	7	0.0001807	0
12.39	True	8	0.0000112	1,268
12.93	True	14	0.0003942	0
13.00	True	7	0.0002098	0
13.39	True	8	0.0000090	1,268
13.93	True	11	0.0007775	0
14.00	True	7	0.0002324	0
14.39	True	8	0.0000079	1,268
14.93	True	16	0.0001611	0
15.00	True	7	0.0002074	0
15.39	True	8	0.0000073	1,268
15.93	True	13	0.0004783	0
16.00	True	7	0.0001817	0
16.39	True	8	0.0000067	1,268
16.93	True	13	0.0004450	0
17.00	True	7	0.0001834	0

Calculation Summary (2027: 2012 Base Calibrated)

Time (hours)	Balanced?	Trials	Relative Flow Change	Flow Supplied (gpm)	Flow Demanded (gpm)	Flow Stored (gpm)
17.39	True	8	0.0000066	1,268	681	-200
17.93	True	12	0.0005578	0	681	599
18.00	True	7	0.0002299	0	681	597
18.39	True	8	0.0000059	1,268	681	596
18.93	True	15	0.0001602	0	681	458
19.00	True	7	0.0002200	0	681	530
19.39	True	8	0.0000059	1,268	681	453
19.93	True	11	0.0006352	0	681	-681
20.00	True	7	0.0002588	0	681	-681
20.39	True	8	0.0000049	1,268	681	570
20.93	True	13	0.0005110	0	681	-681
21.00	True	7	0.0002166	0	681	-681
21.39	True	8	0.0000054	1,268	681	583
21.93	True	18	0.0001507	0	681	-681
22.00	True	7	0.0002148	0	681	-681
22.39	True	8	0.0000054	1,268	681	587
22.93	True	13	0.0007226	0	681	-681
23.00	True	7	0.0001710	0	681	-681
23.39	True	8	0.0000054	1,268	681	587
23.93	True	11	0.0008023	0	681	-681
24.00	True	7	0.0002339	0	681	-681
					681	587

Calculation Summary (2027: 2012 Base Calibrated)

Flow Demanded (gpm)	Flow Stored (gpm)
681	-681
681	-681
681	587
681	-681
681	-681
681	588
681	-681
681	-681
681	588
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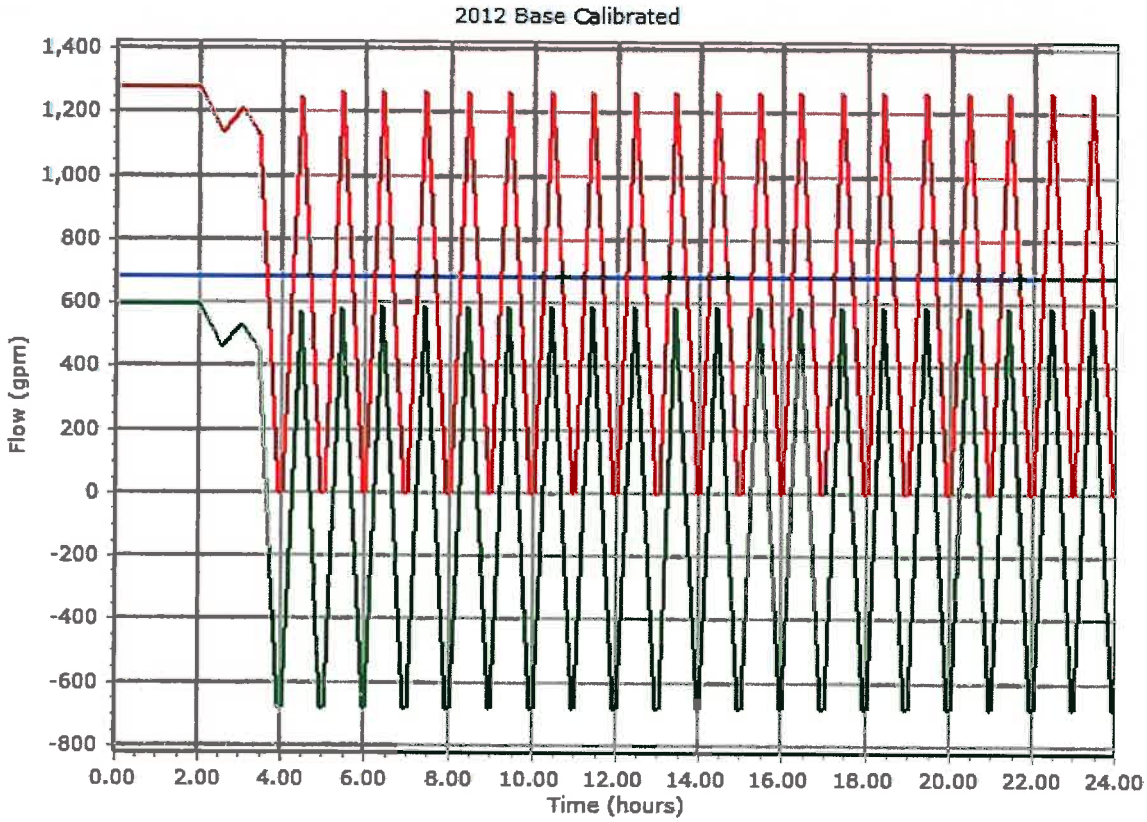
681	588
681	-681
681	-681

Calculation Summary (2027: 2012 Base Calibrated)



Project Inventory: Woodland Water 2012 System.wtg

Title	City of Woodland Water System Hydraulic Model
Engineer	Bart Stepp, PE
Company	City of Woodland
Date	11/9/2012
Notes	Calibrated model for Water System Plan

Scenario Summary

ID	73
Label	6 Year PHD
Notes	Created: 03/14/05 03:06:53 PM
Active Topology	Base-Active Topology
Physical	2018 Physical Calibrated II
Demand	2018 PHD
Initial Settings	Base-Initial Settings
Operational	Base-Operational
Age	Base-Age Alternative
Constituent	Base-Constituent
Trace	Base-Trace Alternative
Fire Flow	Base-Fire Flow
Flushing	Base Flushing
Energy Cost	Base-Energy Cost
Transient	Base Transient
Pressure Dependent Demand	Base Pressure Dependent Demand
Failure History	Base Failure History
User Data Extensions	Base-User Data
Steady State/EPS Solver Calculation Options	6 Year PHD
Transient Solver Calculation Options	Base Calculation Options

Network Inventory

Pipes	414	-Constant Speed - No Pump Curve	1
Junctions	339	-Constant Speed - Pump Curve	0
Hydrants	0	-Shut Down After Time Delay	0
Tanks	2	-Variable Speed/Torque	0
-Circular	2	-Pump Start - Variable Speed/Torque	0
-Non-Circular	0	Variable Speed Pump Batteries	0
-Variable Area	0	Pump Stations	0
Reservoirs	1	PRV's	0
Pumps	1	PSV's	0
-Constant Power	0	PBV's	0
-Custom Extended	1	FCV's	0
-Design Point (1 Point)	0	TCV's	0
-Multiple Point	0	GPV's	0
-Standard (3 Point)	0	Isolation Valves	0
-Standard Extended	0	Spot Elevations	0

Transient Network Inventory

Project Inventory: Woodland Water 2012 System.wtg

Transient Network Inventory			
Air Valves	0	Rupture Disks	0
-Double Acting	0	Surge Valves	0
-Slow Closing	0	Surge Tanks	0
-Triple Acting	0	-Simple	0
-Vacuum Breaker	0	-Differential	0
Discharges to Atmosphere	0	-Variable Area	0
Orifice	0	Turbines	0
Rating Curve	0	Valves With Linear Area Change	0
Valve	0	Periodic Head-Flows	0
Check Valves	0	-Sinusoidal (Head)	0
-Towards Wye	0	-Not Sinusoidal (Head)	0
-Away from Wye	0	-Sinusoidal (Flow)	0
Hydropneumatic Tanks	0	-Not Sinusoidal (Flow)	0
Orifices Between Pipes	0		

Pressure Pipes Inventory			
2.0 (in)	458 ft	10.0 (in)	10,884 ft
3.0 (in)	28 ft	12.0 (in)	55,346 ft
4.0 (in)	11,104 ft	16.0 (in)	1,569 ft
6.0 (in)	48,757 ft	All Diameters	184,666 ft
8.0 (in)	56,520 ft		

Scenario Summary Report
Scenario: 6 Year PHD

Scenario Summary	
ID	73
Label	6 Year PHD
Notes	Created: 03/14/05 03:06:53 PM
Active Topology	Base-Active Topology
Physical	2018 Physical Calibrated II
Demand	2018 PHD
Initial Settings	Base-Initial Settings
Operational	Base-Operational
Age	Base-Age Alternative
Constituent	Base-Constituent
Trace	Base-Trace Alternative
Fire Flow	Base-Fire Flow
Flushing	Base Flushing
Energy Cost	Base-Energy Cost
Transient	Base Transient
Pressure Dependent Demand	Base Pressure Dependent Demand
Failure History	Base Failure History
User Data Extensions	Base-User Data
Steady State/EPS Solver Calculation Options	6 Year PHD
Transient Solver Calculation Options	Base Calculation Options

Hydraulic Summary			
Time Analysis Type	EPS	Simulation Start Date	1/1/2000
Friction Method	Hazen-Williams	Hydraulic Time Step	1.000 hours
Accuracy	0.001	Duration	24.000 hours
Trials	40	Calculation Type	Hydraulics Only

Woodland Water System 2018 PHD Junction Report

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-100	26	City Zone	4	170.65	62.6
J-105	26.56	City Zone	4	170.77	62.4
J-101	26	City Zone	4	170.65	62.6
J-102	25.7	City Zone	4	170.66	62.7
J-103	24.83	City Zone	4	170.68	63.1
J-104	25.05	City Zone	4	170.74	63
J-106	27.6	City Zone	4	170.77	61.9
J-107	28.15	City Zone	4	170.78	61.7
J-108	27.45	City Zone	4	170.78	62
J-109	31.1	City Zone	4	170.8	60.4
J-121	22.26	City Zone	4	172.42	65
J-111	24.93	City Zone	4	170.77	63.1
J-112	24.85	City Zone	4	170.77	63.1
J-113	25.46	City Zone	4	172.25	63.5
J-114	25.81	City Zone	4	172.26	63.4
J-115	25.5	City Zone	4	172.27	63.5
J-116	25.25	City Zone	4	172.27	63.6
J-117	24.36	City Zone	4	172.29	64
J-118	23.95	City Zone	4	172.32	64.2
J-119	24.9	City Zone	4	172.33	63.8
J-120	27.76	City Zone	4	172.42	62.6
J-122	25	City Zone	4	172.29	63.7
J-123	24.51	City Zone	4	172.3	63.9
J-124	26.11	City Zone	4	172.36	63.3
J-125	22.91	City Zone	4	172.29	64.6
J-126	24	City Zone	4	172.3	64.2
J-141	32.72	City Zone	4	172.6	60.5
J-128	22.21	City Zone	4	172.4	65
J-129	21	City Zone	4	172.44	65.5
J-130	17.78	City Zone	4	172.51	66.9
J-131	15.48	City Zone	4	172.63	68
J-132	18.94	City Zone	4	173.37	66.8
J-133	23.56	City Zone	4	173.54	64.9
J-134	32.82	City Zone	4	174.45	61.3
J-136	32.1	City Zone	4	170.53	59.9
J-135	31.68	City Zone	4	170.97	60.3
J-137	34.02	City Zone	4	174.16	60.6
J-138	31.58	City Zone	4	173.34	61.3
J-139	27.57	City Zone	4	172.67	62.8
J-140	28.89	City Zone	4	172.53	62.1
J-143	30.33	City Zone	4	171.99	61.3
J-142	31.94	City Zone	4	172.4	60.8
J-144	34.65	City Zone	4	173.43	60
J-145	33.91	City Zone	4	172.88	60.1
J-146	32.22	City Zone	4	172.65	60.8
J-200	26.7	City Zone	4	170.74	62.3
J-201	26	City Zone	4	170.64	62.6
J-202	26	City Zone	4	170.64	62.6
J-203	26	City Zone	4	170.63	62.6

Woodland Water System 2018 PHD Junction Report

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-204	26	City Zone	4	170.63	62.6
J-205	26	City Zone	4	170.62	62.6
J-211	30	City Zone	4	170.82	60.9
J-206	25	City Zone	4	170.77	63.1
J-207	25.75	City Zone	4	170.86	62.8
J-208	27.5	City Zone	4	170.99	62.1
J-209	32.74	City Zone	4	171.22	59.9
J-210	30	City Zone	4	170.82	60.9
J-212	21	City Zone	4	170.81	64.8
J-213	25.04	City Zone	4	170.77	63
J-214	27.48	City Zone	4	170.77	62
J-215	29.25	City Zone	4	170.77	61.2
J-216	29.65	City Zone	4	170.81	61.1
J-217	27.02	City Zone	4	171.33	62.4
J-218	26.48	City Zone	4	171.46	62.7
J-219	27.32	City Zone	4	171.6	62.4
J-222	33.16	City Zone	4	171.75	60
J-221	29.93	City Zone	4	171.7	61.3
J-220	27.8	City Zone	4	171.63	62.2
J-223	26.59	City Zone	4	171.74	62.8
J-224	30.12	City Zone	4	171.72	61.3
J-225	30.21	City Zone	4	171.91	61.3
J-226	30.73	City Zone	4	171.74	61
J-227	27.71	City Zone	4	171.91	62.4
J-228	27.76	City Zone	4	171.91	62.4
J-229	30.65	City Zone	4	171.7	61
J-230	27.09	City Zone	4	171.46	62.5
J-231	27.89	City Zone	4	171.46	62.1
J-232	28.1	City Zone	4	171.46	62
J-233	27.09	City Zone	4	172.46	62.9
J-234	32.38	City Zone	4	172.18	60.5
J-235	29.64	City Zone	4	171.9	61.5
J-237	24.32	City Zone	4	172.19	64
J-238	26.23	City Zone	4	172.13	63.1
J-239	26.73	City Zone	4	172.14	62.9
J-240	26.96	City Zone	4	172.03	62.8
J-241	26.81	City Zone	4	172.01	62.8
J-242	24.53	City Zone	4	171.96	63.8
J-243	25.27	City Zone	4	171.97	63.5
J-244	25.35	City Zone	4	172.14	63.5
J-245	24.2	City Zone	4	172.31	64.1
J-246	26	City Zone	4	170.86	62.7
J-247	20.34	City Zone	4	170.62	65
J-248	38	City Zone	4	172.42	58.2
J-249	32.28	City Zone	4	172.42	60.6
J-250	38.09	City Zone	4	172.45	58.1
J-251	35.91	City Zone	4	172.57	59.1
J-252	31.07	City Zone	4	173.34	61.6
J-254	29.71	City Zone	4	172.88	61.9

Woodland Water System 2018 PHD Junction Report

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-255	30.08	City Zone	4	173.34	62
J-256	25	City Zone	4	172.4	63.8
J-257	22	City Zone	4	172.44	65.1
J-258	19	City Zone	4	172.48	66.4
J-259	15.5	City Zone	4	172.62	68
J-300	37.16	City Zone	4	170.34	57.6
J-301	32.16	City Zone	4	172.02	60.5
J-302	31.9	City Zone	4	171.3	60.3
J-303	34.58	City Zone	4	170.86	59
J-304	34.4	City Zone	4	170.8	59
J-305	35.06	City Zone	4	170.48	58.6
J-306	36.65	City Zone	4	170.45	57.9
J-307	37.18	City Zone	4	170.42	57.6
J-308	37.57	City Zone	4	170.39	57.5
J-310	36.34	City Zone	4	170.34	58
J-311	31	City Zone	4	170.71	60.4
J-312	31	City Zone	4	170.58	60.4
J-313	32	City Zone	4	170.37	59.9
J-314	32.08	City Zone	4	171.08	60.1
J-315	38.15	City Zone	4	170.34	57.2
J-317	32.79	City Zone	4	170.44	59.6
J-318	33.57	City Zone	4	170.4	59.2
J-319	35.66	City Zone	4	170.39	58.3
J-320	34.3	City Zone	4	170.41	58.9
J-321	35.05	City Zone	4	170.37	58.5
J-322	34.13	City Zone	4	170.34	58.9
J-323	35	City Zone	4	170.33	58.6
J-324	38.17	City Zone	4	170.33	57.2
J-325	38.92	City Zone	4	170.33	56.9
J-326	32.67	City Zone	4	170.51	59.6
J-327	34.48	City Zone	4	170.43	58.8
J-328	34.94	City Zone	4	170.4	58.6
J-329	31.46	City Zone	4	170.58	60.2
J-330	35.37	City Zone	4	170.34	58.4
J-331	33.02	City Zone	4	170.4	59.4
J-332	34.64	City Zone	4	170.37	58.7
J-333	36	City Zone	4	170.37	58.1
J-334	35	City Zone	4	170.47	58.6
J-335	33.02	City Zone	4	170.53	59.5
J-336	34.58	City Zone	4	170.54	58.8
J-337	30.63	City Zone	4	170.54	60.5
J-338	35	City Zone	4	170.47	58.6
J-339	34	City Zone	4	170.47	59
J-340	34.03	City Zone	4	170.41	59
J-341	18	City Zone	4	171.84	66.6
J-342	30.91	City Zone	4	171.11	60.7
J-343	29.74	City Zone	4	171.15	61.2
J-344	29	City Zone	4	171.28	61.6
J-345	36.16	City Zone	4	170.34	58.1

Woodland Water System 2018 PHD Junction Report

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-346	37	City Zone	4	170.35	57.7
J-347	35	City Zone	4	170.33	58.5
J-348	34.11	City Zone	4	170.33	58.9
J-349	34.53	City Zone	4	170.33	58.8
J-350	34	City Zone	4	170.33	59
J-351	34	City Zone	4	170.33	59
J-352	35	City Zone	4	170.34	58.6
J-353	39	City Zone	4	170.33	56.8
J-354	29	City Zone	4	171.28	61.6
J-355	21.44	City Zone	4	172.25	65.2
J-356	23	City Zone	4	170.77	63.9
J-357	25	City Zone	4	170.77	63.1
J-358	15.5	City Zone	4	172.62	68
J-359	15.5	City Zone	4	172.63	68
J-360	15.5	City Zone	4	172.63	68
J-361	24	City Zone	4	172.3	64.2
J-362	24	City Zone	4	172.3	64.2
J-363	24	City Zone	4	172.3	64.2
J-364	32	City Zone	4	170.47	59.9
J-365	150	Reservoir Area	4	174.01	10.4
J-366	140	Reservoir Area	4	172.7	14.1
J-367	26	City Zone	4	170.63	62.6
J-368	26	City Zone	4	170.63	62.6
J-369	29	City Zone	4	171.28	61.6
J-370	29	City Zone	4	171.28	61.6
J-371	29	City Zone	4	171.33	61.6
J-372	34.05	City Zone	4	170.34	59
J-373	32.79	City Zone	4	170.34	59.5
J-374	33.69	City Zone	4	170.34	59.1
J-376	34.53	City Zone	4	170.1	58.7
J-377	33.55	City Zone	4	170.1	59.1
J-378	34.03	City Zone	4	170.35	59
J-379	33.43	City Zone	4	170.34	59.2
J-380	30.35	City Zone	4	171.11	60.9
J-381	30.42	City Zone	4	171.11	60.9
J-382	28	City Zone	4	171.17	61.9
J-383	30.45	City Zone	4	171.15	60.9
J-384	34	City Zone	4	170.86	59.2
J-385	34	City Zone	4	170.86	59.2
J-386	34	City Zone	4	170.86	59.2
J-387	27.84	City Zone	4	173.73	63.1
J-388	36.69	City Zone	4	170.34	57.8
J-309	36.75	City Zone	4	170.35	57.8
J-389	17.75	City Zone	4	172.87	67.1
J-390	29	City Zone	4	170.78	61.3
J-391	25.52	City Zone	4	170.77	62.8
J-392	34.07	City Zone	4	170.35	59
J-393	29.93	City Zone	4	171.29	61.2
J-394	32.53	City Zone	4	171.01	59.9

Woodland Water System 2018 PHD Junction Report

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-395	32.01	City Zone	4	172.09	60.6
J-396	33.28	City Zone	4	173.37	60.6
J-397	32.82	City Zone	4	172.62	60.5
J-398	18	City Zone	4	171.52	66.4
J-399	40	City Zone	4	170.33	56.4
J-400	33.5	City Zone	4	170.33	59.2
J-401	31.8	City Zone	4	170.41	60
J-402	31.8	City Zone	4	172.61	60.9
J-404	32.62	City Zone	4	173.38	60.9
J-405	20.6	City Zone	4	173.4	66.1
J-406	16.17	City Zone	4	172.91	67.8
J-407	23.16	City Zone	4	172.32	64.5
J-408	30.98	City Zone	4	172.62	61.3
J-409	21.07	City Zone	4	170.81	64.8
J-316	31.5	City Zone	4	170.51	60.1
J-410	32.59	City Zone	4	172.37	60.5
J-411	25.7	City Zone	4	170.64	62.7
J-412	26	City Zone	4	170.62	62.6
J-413	27	City Zone	4	172.42	62.9
J-414	24.5	City Zone	4	172.3	63.9
J-415	32	City Zone	4	172.39	60.7
J-416	26.27	City Zone	4	172.39	63.2
J-417	26.27	City Zone	4	172.39	63.2
J-418	32	City Zone	4	170.98	60.1
J-420	17.11	City Zone	4	172.82	67.4
J-421	36	City Zone	4	170.34	58.1
J-422	16	City Zone	4	172.87	67.9
J-423	15	City Zone	4	172.87	68.3
J-424	14	City Zone	4	172.87	68.7
J-425	13	City Zone	4	172.87	69.2
J-426	13	City Zone	4	172.87	69.2
J-427	16	City Zone	4	172.87	67.9
J-428	16	City Zone	4	172.87	67.9
J-429	16	City Zone	4	172.87	67.9
J-430	16	City Zone	4	172.87	67.9
J-431	16	City Zone	4	172.87	67.9
J-432	16	City Zone	4	172.87	67.9
J-433	16	City Zone	4	172.87	67.9
J-434	12	City Zone	4	172.87	69.6
J-436	17	City Zone	4	172.87	67.4
J-437	18.49	City Zone	4	172.48	66.6
J-438	18.5	City Zone	4	172.48	66.6
J-439	18.5	City Zone	4	172.47	66.6
J-440	18.5	City Zone	4	172.47	66.6
J-441	18.5	City Zone	4	172.47	66.6
J-442	18.5	City Zone	4	172.47	66.6
J-443	18.5	City Zone	4	172.47	66.6
J-444	18.5	City Zone	4	172.47	66.6
J-445	18.5	City Zone	4	172.47	66.6

Woodland Water System 2018 PHD Junction Report

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-446	18.5	City Zone	4	172.48	66.6
J-447	18.5	City Zone	4	172.48	66.6
J-448	18.5	City Zone	4	172.48	66.6
J-449	18.79	City Zone	4	172.48	66.5
J-450	18.8	City Zone	4	172.48	66.5
J-451	18.8	City Zone	4	172.48	66.5
J-453	18.87	City Zone	4	172.48	66.5
J-454	18.8	City Zone	4	172.48	66.5
J-456	24.63	City Zone	4	170.77	63.2
J-457	25.04	City Zone	4	170.77	63.1
J-458	27	City Zone	4	170.74	62.2
J-460	27	City Zone	4	170.73	62.2
J-461	28.85	City Zone	4	170.79	61.4
J-462	28	City Zone	4	170.79	61.8
J-464	25.82	City Zone	4	170.66	62.7
J-465	25	City Zone	4	170.66	63
J-466	26	City Zone	4	170.62	62.6
J-467	26	City Zone	4	170.62	62.6
J-468	26	City Zone	4	170.62	62.6
J-469	23	City Zone	4	170.62	63.9
J-470	22.5	City Zone	4	170.61	64.1
J-471	22.25	City Zone	4	170.61	64.2
J-472	24	City Zone	4	170.61	63.4
J-473	21	City Zone	4	169.85	64.4
J-474	27.59	City Zone	4	172.42	62.7
J-475	30.31	City Zone	4	173.34	61.9
J-476	27.66	City Zone	4	172.65	62.7
J-478	33.2	City Zone	4	173.49	60.7
J-479	33.2	City Zone	4	173.49	60.7
J-480	33	City Zone	4	173.49	60.8
J-481	29.79	City Zone	4	172.71	61.8
J-482	29.5	City Zone	4	171.18	61.3
J-483	29.5	City Zone	4	171.18	61.3
J-484	29.92	City Zone	4	171.14	61.1
J-485	29.9	City Zone	4	171.14	61.1
J-487	29.25	City Zone	4	171.23	61.4
J-488	29.25	City Zone	4	171.23	61.4
J-489	28	City Zone	4	171.22	62
J-490	30	City Zone	4	171.4	61.2
J-491	30	City Zone	4	171.21	61.1
J-492	28.5	City Zone	4	171.19	61.7
J-493	28	City Zone	4	171.17	61.9
J-494	28	City Zone	4	171.16	61.9
J-495	28	City Zone	4	171.12	61.9
J-496	28	City Zone	4	171.07	61.9
J-497	28	City Zone	4	171.12	61.9
J-498	28	City Zone	4	171.17	61.9
J-499	29	City Zone	4	171.19	61.5
J-500	28	City Zone	4	171.22	62

Woodland Water System 2018 PHD Junction Report

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-501	28.5	City Zone	4	171.22	61.7
J-502	28	City Zone	4	171.16	61.9
J-503	28	City Zone	4	171.16	61.9
J-504	31.71	City Zone	4	170.94	60.2
J-507	30.86	City Zone	4	170.56	60.4
J-508	31	City Zone	4	170.56	60.4
J-509	34.36	City Zone	4	170.47	58.9
J-510	34	City Zone	4	170.47	59
J-511	35	City Zone	4	170.47	58.6
J-512	34	City Zone	4	170.47	59
J-513	35	City Zone	4	170.47	58.6
J-514	34	City Zone	4	170.47	59
J-515	30	City Zone	4	170.34	60.7
J-516	29	City Zone	4	170.34	61.2
J-517	34	City Zone	4	170.34	59
J-518	33	City Zone	4	170.34	59.4
J-519	33.83	City Zone	4	170.38	59.1
J-520	33.03	City Zone	4	170.4	59.4
J-521	32	City Zone	4	170.55	59.9
J-522	32.68	City Zone	4	170.46	59.6
J-523	45	City Zone	4	170.33	54.2
J-524	34	City Zone	4	170.33	59
J-525	33	City Zone	4	170.33	59.4
J-526	33.78	City Zone	4	170.11	59
J-527	31	City Zone	4	170.17	60.2
J-528	35	City Zone	4	170.33	58.6
J-529	34	City Zone	4	170.21	58.9
J-530	34	City Zone	4	170.14	58.9
J-531	33	City Zone	4	170.1	59.3
J-532	34	City Zone	4	170.09	58.9
J-533	34	City Zone	4	170.09	58.9
J-534	34.82	City Zone	4	170.35	58.6
J-537	35.01	City Zone	4	170.36	58.6
J-540	33.79	City Zone	4	170.34	59.1
J-541	32	City Zone	4	170.55	59.9
J-542	32.05	City Zone	4	170.54	59.9
J-543	32.14	City Zone	4	170.54	59.9
J-545	155	Reservoir Area	4	174.97	8.6
J-546	155	Reservoir Area	4	174.93	8.6
J-547	155	Reservoir Area	4	197.81	18.5
J-549	150	Reservoir Area	4	174.97	10.8
J-550	18	City Zone	4	173.44	67.3
J-551	33.73	City Zone	4	172.61	60.1

Project Inventory: Woodland Water 2012 System.wtg

Title	City of Woodland Water System Hydraulic Model
Engineer	Bart Stepp, PE
Company	City of Woodland
Date	11/9/2012
Notes	Calibrated model for Water System Plan

Scenario Summary

ID	74
Label	20 Year PHD
Notes	Created: 03/14/05 03:07:23 PM
Active Topology	Base-Active Topology
Physical	2033 Physical Calibrated II
Demand	2033 PHD
Initial Settings	Base-Initial Settings
Operational	Base-Operational
Age	Base-Age Alternative
Constituent	Base-Constituent
Trace	Base-Trace Alternative
Fire Flow	Base-Fire Flow
Flushing	Base Flushing
Energy Cost	Base-Energy Cost
Transient	Base Transient
Pressure Dependent Demand	Base Pressure Dependent Demand
Failure History	Base Failure History
User Data Extensions	Base-User Data
Steady State/EPS Solver Calculation Options	20 Year PHD
Transient Solver Calculation Options	Base Calculation Options

Network Inventory

Pipes	414	-Constant Speed - No Pump Curve	1
Junctions	339	-Constant Speed - Pump Curve	0
Hydrants	0	-Shut Down After Time Delay	0
Tanks	2	-Variable Speed/Torque	0
-Circular	2	-Pump Start - Variable Speed/Torque	0
-Non-Circular	0	Variable Speed Pump Batteries	0
-Variable Area	0	Pump Stations	0
Reservoirs	1	PRV's	0
Pumps	1	PSV's	0
-Constant Power	0	PBV's	0
-Custom Extended	1	FCV's	0
-Design Point (1 Point)	0	TCV's	0
-Multiple Point	0	GPV's	0
-Standard (3 Point)	0	Isolation Valves	0
-Standard Extended	0	Spot Elevations	0

Transient Network Inventory

Project Inventory: Woodland Water 2012 System.wtg

Transient Network Inventory			
Air Valves	0	Rupture Disks	0
-Double Acting	0	Surge Valves	0
-Slow Closing	0	Surge Tanks	0
-Triple Acting	0	-Simple	0
-Vacuum Breaker	0	-Differential	0
Discharges to Atmosphere	0	-Variable Area	0
Orifice	0	Turbines	0
Rating Curve	0	Valves With Linear Area Change	0
Valve	0	Periodic Head-Flows	0
Check Valves	0	-Sinusoidal (Head)	0
-Towards Wye	0	-Not Sinusoidal (Head)	0
-Away from Wye	0	-Sinusoidal (Flow)	0
Hydropneumatic Tanks	0	-Not Sinusoidal (Flow)	0
Orifices Between Pipes	0		

Pressure Pipes Inventory			
2.0 (in)	458 ft	10.0 (in)	10,884 ft
3.0 (in)	28 ft	12.0 (in)	55,346 ft
4.0 (in)	11,104 ft	16.0 (in)	1,569 ft
6.0 (in)	48,757 ft	All Diameters	184,666 ft
8.0 (in)	56,520 ft		

Scenario Summary Report
Scenario: 20 Year PHD

Scenario Summary	
ID	74
Label	20 Year PHD
Notes	Created: 03/14/05 03:07:23 PM
Active Topology	Base-Active Topology
Physical	2033 Physical Calibrated II
Demand	2033 PHD
Initial Settings	Base-Initial Settings
Operational	Base-Operational
Age	Base-Age Alternative
Constituent	Base-Constituent
Trace	Base-Trace Alternative
Fire Flow	Base-Fire Flow
Flushing	Base Flushing
Energy Cost	Base-Energy Cost
Transient	Base Transient
Pressure Dependent Demand	Base Pressure Dependent Demand
Failure History	Base Failure History
User Data Extensions	Base-User Data
Steady State/EPS Solver Calculation Options	20 Year PHD
Transient Solver Calculation Options	Base Calculation Options

Hydraulic Summary			
Time Analysis Type	EPS	Simulation Start Date	1/1/2000
Friction Method	Hazen-Williams	Hydraulic Time Step	0.250 hours
Accuracy	0.001	Duration	24.000 hours
Trials	40	Calculation Type	Hydraulics Only

Woodland Water System 2033 PHD Junction Report

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-100	26	City Zone	7	164.21	59.8
J-105	26.56	City Zone	7	164.5	59.7
J-101	26	City Zone	7	164.21	59.8
J-102	25.7	City Zone	7	164.24	59.9
J-103	24.83	City Zone	7	164.29	60.3
J-104	25.05	City Zone	7	164.43	60.3
J-106	27.6	City Zone	7	164.51	59.2
J-107	28.15	City Zone	7	164.53	59
J-108	27.45	City Zone	7	164.53	59.3
J-109	31.1	City Zone	7	164.59	57.8
J-121	22.26	City Zone	7	168.59	63.3
J-111	24.93	City Zone	7	164.5	60.4
J-112	24.85	City Zone	7	164.5	60.4
J-113	25.46	City Zone	7	168.18	61.7
J-114	25.81	City Zone	7	168.21	61.6
J-115	25.5	City Zone	7	168.22	61.7
J-116	25.25	City Zone	7	168.23	61.9
J-117	24.36	City Zone	7	168.28	62.3
J-118	23.95	City Zone	7	168.35	62.5
J-119	24.9	City Zone	7	168.38	62.1
J-120	27.76	City Zone	7	168.59	60.9
J-122	25	City Zone	7	168.28	62
J-123	24.51	City Zone	7	168.3	62.2
J-124	26.11	City Zone	7	168.46	61.6
J-125	22.91	City Zone	7	168.28	62.9
J-126	24	City Zone	7	168.3	62.4
J-141	32.72	City Zone	7	169.04	59
J-128	22.21	City Zone	7	168.56	63.3
J-129	21	City Zone	7	168.64	63.9
J-130	17.78	City Zone	7	168.83	65.4
J-131	15.48	City Zone	7	169.11	66.5
J-132	18.94	City Zone	7	170.96	65.8
J-133	23.56	City Zone	7	171.37	63.9
J-134	32.82	City Zone	7	173.64	60.9
J-136	32.1	City Zone	7	163.93	57
J-135	31.68	City Zone	7	165.01	57.7
J-137	34.02	City Zone	7	172.91	60.1
J-138	31.58	City Zone	7	170.87	60.3
J-139	27.57	City Zone	7	169.21	61.3
J-140	28.89	City Zone	7	168.88	60.6
J-143	30.33	City Zone	7	167.53	59.4
J-142	31.94	City Zone	7	168.55	59.1
J-144	34.65	City Zone	7	171.1	59
J-145	33.91	City Zone	7	169.74	58.8
J-146	32.22	City Zone	7	169.18	59.3
J-200	26.7	City Zone	7	164.42	59.6
J-201	26	City Zone	7	164.2	59.8
J-202	26	City Zone	7	164.18	59.8
J-203	26	City Zone	7	164.17	59.8

Woodland Water System 2033 PHD Junction Report

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-204	26	City Zone	7	164.16	59.8
J-205	26	City Zone	7	164.14	59.8
J-211	30	City Zone	7	164.62	58.2
J-206	25	City Zone	7	164.51	60.4
J-207	25.75	City Zone	7	164.74	60.1
J-208	27.5	City Zone	7	165.07	59.5
J-209	32.74	City Zone	7	165.63	57.5
J-210	30	City Zone	7	164.63	58.2
J-212	21	City Zone	7	164.61	62.1
J-213	25.04	City Zone	7	164.5	60.3
J-214	27.48	City Zone	7	164.52	59.3
J-215	29.25	City Zone	7	164.52	58.5
J-216	29.65	City Zone	7	164.6	58.4
J-217	27.02	City Zone	7	165.91	60.1
J-218	26.48	City Zone	7	166.22	60.5
J-219	27.32	City Zone	7	166.57	60.2
J-222	33.16	City Zone	7	166.95	57.9
J-221	29.93	City Zone	7	166.81	59.2
J-220	27.8	City Zone	7	166.64	60.1
J-223	26.59	City Zone	7	166.92	60.7
J-224	30.12	City Zone	7	166.88	59.2
J-225	30.21	City Zone	7	167.33	59.3
J-226	30.73	City Zone	7	166.92	58.9
J-227	27.71	City Zone	7	167.34	60.4
J-228	27.76	City Zone	7	167.33	60.4
J-229	30.65	City Zone	7	166.82	58.9
J-230	27.09	City Zone	7	166.22	60.2
J-231	27.89	City Zone	7	166.22	59.8
J-232	28.1	City Zone	7	166.22	59.8
J-233	27.09	City Zone	7	168.71	61.3
J-234	32.38	City Zone	7	168.01	58.7
J-235	29.64	City Zone	7	167.32	59.6
J-237	24.32	City Zone	7	168.03	62.2
J-238	26.23	City Zone	7	167.89	61.3
J-239	26.73	City Zone	7	167.9	61.1
J-240	26.96	City Zone	7	167.64	60.9
J-241	26.81	City Zone	7	167.59	60.9
J-242	24.53	City Zone	7	167.45	61.8
J-243	25.27	City Zone	7	167.48	61.5
J-244	25.35	City Zone	7	167.9	61.7
J-245	24.2	City Zone	7	168.34	62.4
J-246	26	City Zone	7	164.73	60
J-247	20.34	City Zone	7	164.14	62.2
J-248	38	City Zone	7	168.6	56.5
J-249	32.28	City Zone	7	168.61	59
J-250	38.09	City Zone	7	168.67	56.5
J-251	35.91	City Zone	7	168.96	57.6
J-252	31.07	City Zone	7	170.88	60.5
J-254	29.71	City Zone	7	169.74	60.6

Woodland Water System 2033 PHD Junction Report

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-255	30.08	City Zone	7	170.87	60.9
J-256	25	City Zone	7	168.56	62.1
J-257	22	City Zone	7	168.64	63.4
J-258	19	City Zone	7	168.75	64.8
J-259	15.5	City Zone	7	169.11	66.5
J-300	37.16	City Zone	7	163.43	54.6
J-301	32.16	City Zone	7	167.61	58.6
J-302	31.9	City Zone	7	165.82	57.9
J-303	34.58	City Zone	7	164.73	56.3
J-304	34.4	City Zone	7	164.59	56.3
J-305	35.06	City Zone	7	163.8	55.7
J-306	36.65	City Zone	7	163.72	55
J-307	37.18	City Zone	7	163.63	54.7
J-308	37.57	City Zone	7	163.56	54.5
J-310	36.34	City Zone	7	163.44	55
J-311	31	City Zone	7	164.36	57.7
J-312	31	City Zone	7	164.04	57.6
J-313	32	City Zone	7	163.53	56.9
J-314	32.08	City Zone	7	165.28	57.6
J-315	38.15	City Zone	7	163.44	54.2
J-317	32.79	City Zone	7	163.7	56.6
J-318	33.57	City Zone	7	163.6	56.3
J-319	35.66	City Zone	7	163.56	55.3
J-320	34.3	City Zone	7	163.62	55.9
J-321	35.05	City Zone	7	163.52	55.6
J-322	34.13	City Zone	7	163.43	55.9
J-323	35	City Zone	7	163.43	55.6
J-324	38.17	City Zone	7	163.43	54.2
J-325	38.92	City Zone	7	163.43	53.9
J-326	32.67	City Zone	7	163.86	56.8
J-327	34.48	City Zone	7	163.66	55.9
J-328	34.94	City Zone	7	163.59	55.7
J-329	31.46	City Zone	7	164.03	57.4
J-330	35.37	City Zone	7	163.43	55.4
J-331	33.02	City Zone	7	163.59	56.5
J-332	34.64	City Zone	7	163.52	55.8
J-333	36	City Zone	7	163.52	55.2
J-334	35	City Zone	7	163.77	55.7
J-335	33.02	City Zone	7	163.92	56.6
J-336	34.58	City Zone	7	163.94	56
J-337	30.63	City Zone	7	163.95	57.7
J-338	35	City Zone	7	163.77	55.7
J-339	34	City Zone	7	163.78	56.1
J-340	34.03	City Zone	7	163.63	56.1
J-341	18	City Zone	7	167.17	64.5
J-342	30.91	City Zone	7	165.34	58.2
J-343	29.74	City Zone	7	165.45	58.7
J-344	29	City Zone	7	165.78	59.2
J-345	36.16	City Zone	7	163.43	55.1

Woodland Water System 2033 PHD Junction Report

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-346	37	City Zone	7	163.47	54.7
J-347	35	City Zone	7	163.41	55.6
J-348	34.11	City Zone	7	163.42	55.9
J-349	34.53	City Zone	7	163.42	55.8
J-350	34	City Zone	7	163.41	56
J-351	34	City Zone	7	163.41	56
J-352	35	City Zone	7	163.43	55.6
J-353	39	City Zone	7	163.42	53.8
J-354	29	City Zone	7	165.78	59.2
J-355	21.44	City Zone	7	168.18	63.5
J-356	23	City Zone	7	164.5	61.2
J-357	25	City Zone	7	164.5	60.4
J-358	15.5	City Zone	7	169.11	66.5
J-359	15.5	City Zone	7	169.11	66.5
J-360	15.5	City Zone	7	169.11	66.5
J-361	24	City Zone	7	168.3	62.4
J-362	24	City Zone	7	168.3	62.4
J-363	24	City Zone	7	168.3	62.4
J-364	32	City Zone	7	163.76	57
J-365	150	Reservoir Area	7	172.55	9.8
J-366	140	Reservoir Area	7	169.3	12.7
J-367	26	City Zone	7	164.16	59.8
J-368	26	City Zone	7	164.16	59.8
J-369	29	City Zone	7	165.78	59.2
J-370	29	City Zone	7	165.78	59.2
J-371	29	City Zone	7	165.89	59.2
J-372	34.05	City Zone	7	163.45	56
J-373	32.79	City Zone	7	163.45	56.5
J-374	33.69	City Zone	7	163.45	56.1
J-376	34.53	City Zone	7	162.84	55.5
J-377	33.55	City Zone	7	162.84	55.9
J-378	34.03	City Zone	7	163.46	56
J-379	33.43	City Zone	7	163.45	56.3
J-380	30.35	City Zone	7	165.35	58.4
J-381	30.42	City Zone	7	165.36	58.4
J-382	28	City Zone	7	165.5	59.5
J-383	30.45	City Zone	7	165.45	58.4
J-384	34	City Zone	7	164.73	56.6
J-385	34	City Zone	7	164.73	56.6
J-386	34	City Zone	7	164.73	56.6
J-387	27.84	City Zone	7	171.84	62.3
J-388	36.69	City Zone	7	163.45	54.8
J-309	36.75	City Zone	7	163.46	54.8
J-389	17.75	City Zone	7	169.72	65.8
J-390	29	City Zone	7	164.52	58.6
J-391	25.52	City Zone	7	164.51	60.1
J-392	34.07	City Zone	7	163.47	56
J-393	29.93	City Zone	7	165.8	58.8
J-394	32.53	City Zone	7	165.1	57.4

Woodland Water System 2033 PHD Junction Report

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-395	32.01	City Zone	7	167.78	58.7
J-396	33.28	City Zone	7	170.95	59.6
J-397	32.82	City Zone	7	169.1	59
J-398	18	City Zone	7	166.37	64.2
J-399	40	City Zone	7	163.41	53.4
J-400	33.5	City Zone	7	163.43	56.2
J-401	31.8	City Zone	7	163.63	57
J-402	31.8	City Zone	7	169.07	59.4
J-404	32.62	City Zone	7	170.98	59.9
J-405	20.6	City Zone	7	171.03	65.1
J-406	16.17	City Zone	7	169.81	66.5
J-407	23.16	City Zone	7	168.34	62.8
J-408	30.98	City Zone	7	169.1	59.8
J-409	21.07	City Zone	7	164.62	62.1
J-316	31.5	City Zone	7	163.87	57.3
J-410	32.59	City Zone	7	168.47	58.8
J-411	25.7	City Zone	7	164.19	59.9
J-412	26	City Zone	7	164.13	59.8
J-413	27	City Zone	7	168.59	61.3
J-414	24.5	City Zone	7	168.3	62.2
J-415	32	City Zone	7	168.53	59.1
J-416	26.27	City Zone	7	168.52	61.5
J-417	26.27	City Zone	7	168.52	61.5
J-418	32	City Zone	7	165.02	57.6
J-420	17.11	City Zone	7	169.59	66
J-421	36	City Zone	7	163.45	55.1
J-422	16	City Zone	7	169.72	66.5
J-423	15	City Zone	7	169.72	66.9
J-424	14	City Zone	7	169.72	67.4
J-425	13	City Zone	7	169.72	67.8
J-426	13	City Zone	7	169.72	67.8
J-427	16	City Zone	7	169.72	66.5
J-428	16	City Zone	7	169.72	66.5
J-429	16	City Zone	7	169.72	66.5
J-430	16	City Zone	7	169.72	66.5
J-431	16	City Zone	7	169.72	66.5
J-432	16	City Zone	7	169.72	66.5
J-433	16	City Zone	7	169.72	66.5
J-434	12	City Zone	7	169.72	68.2
J-436	17	City Zone	7	169.72	66.1
J-437	18.49	City Zone	7	168.75	65
J-438	18.5	City Zone	7	168.74	65
J-439	18.5	City Zone	7	168.73	65
J-440	18.5	City Zone	7	168.73	65
J-441	18.5	City Zone	7	168.72	65
J-442	18.5	City Zone	7	168.72	65
J-443	18.5	City Zone	7	168.73	65
J-444	18.5	City Zone	7	168.73	65
J-445	18.5	City Zone	7	168.73	65

Woodland Water System 2033 PHD Junction Report

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-446	18.5	City Zone	7	168.74	65
J-447	18.5	City Zone	7	168.75	65
J-448	18.5	City Zone	7	168.75	65
J-449	18.79	City Zone	7	168.75	64.9
J-450	18.8	City Zone	7	168.74	64.9
J-451	18.8	City Zone	7	168.74	64.9
J-453	18.87	City Zone	7	168.75	64.8
J-454	18.8	City Zone	7	168.75	64.9
J-456	24.63	City Zone	7	164.5	60.5
J-457	25.04	City Zone	7	164.5	60.3
J-458	27	City Zone	7	164.43	59.5
J-460	27	City Zone	7	164.4	59.4
J-461	28.85	City Zone	7	164.55	58.7
J-462	28	City Zone	7	164.55	59.1
J-464	25.82	City Zone	7	164.23	59.9
J-465	25	City Zone	7	164.23	60.2
J-466	26	City Zone	7	164.15	59.8
J-467	26	City Zone	7	164.14	59.8
J-468	26	City Zone	7	164.14	59.8
J-469	23	City Zone	7	164.13	61.1
J-470	22.5	City Zone	7	164.12	61.3
J-471	22.25	City Zone	7	164.12	61.4
J-472	24	City Zone	7	164.12	60.6
J-473	21	City Zone	7	162.22	61.1
J-474	27.59	City Zone	7	168.59	61
J-475	30.31	City Zone	7	170.87	60.8
J-476	27.66	City Zone	7	169.18	61.2
J-478	33.2	City Zone	7	171.25	59.7
J-479	33.2	City Zone	7	171.25	59.7
J-480	33	City Zone	7	171.25	59.8
J-481	29.79	City Zone	7	169.33	60.4
J-482	29.5	City Zone	7	165.54	58.9
J-483	29.5	City Zone	7	165.54	58.9
J-484	29.92	City Zone	7	165.42	58.6
J-485	29.9	City Zone	7	165.42	58.6
J-487	29.25	City Zone	7	165.64	59
J-488	29.25	City Zone	7	165.64	59
J-489	28	City Zone	7	165.63	59.5
J-490	30	City Zone	7	166.07	58.9
J-491	30	City Zone	7	165.59	58.7
J-492	28.5	City Zone	7	165.55	59.3
J-493	28	City Zone	7	165.49	59.5
J-494	28	City Zone	7	165.47	59.5
J-495	28	City Zone	7	165.38	59.4
J-496	28	City Zone	7	165.26	59.4
J-497	28	City Zone	7	165.38	59.4
J-498	28	City Zone	7	165.49	59.5
J-499	29	City Zone	7	165.55	59.1
J-500	28	City Zone	7	165.62	59.5

Woodland Water System 2033 PHD Junction Report

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-501	28.5	City Zone	7	165.61	59.3
J-502	28	City Zone	7	165.48	59.5
J-503	28	City Zone	7	165.48	59.5
J-504	31.71	City Zone	7	164.92	57.6
J-507	30.86	City Zone	7	163.99	57.6
J-508	31	City Zone	7	163.99	57.5
J-509	34.36	City Zone	7	163.77	56
J-510	34	City Zone	7	163.77	56.1
J-511	35	City Zone	7	163.77	55.7
J-512	34	City Zone	7	163.76	56.1
J-513	35	City Zone	7	163.77	55.7
J-514	34	City Zone	7	163.76	56.1
J-515	30	City Zone	7	163.45	57.7
J-516	29	City Zone	7	163.45	58.2
J-517	34	City Zone	7	163.45	56
J-518	33	City Zone	7	163.45	56.4
J-519	33.83	City Zone	7	163.54	56.1
J-520	33.03	City Zone	7	163.59	56.5
J-521	32	City Zone	7	163.95	57.1
J-522	32.68	City Zone	7	163.74	56.7
J-523	45	City Zone	7	163.41	51.2
J-524	34	City Zone	7	163.41	56
J-525	33	City Zone	7	163.41	56.4
J-526	33.78	City Zone	7	162.87	55.8
J-527	31	City Zone	7	163.03	57.1
J-528	35	City Zone	7	163.42	55.6
J-529	34	City Zone	7	163.12	55.9
J-530	34	City Zone	7	162.95	55.8
J-531	33	City Zone	7	162.85	56.2
J-532	34	City Zone	7	162.82	55.7
J-533	34	City Zone	7	162.82	55.7
J-534	34.82	City Zone	7	163.47	55.7
J-537	35.01	City Zone	7	163.5	55.6
J-540	33.79	City Zone	7	163.45	56.1
J-541	32	City Zone	7	163.95	57.1
J-542	32.05	City Zone	7	163.94	57.1
J-543	32.14	City Zone	7	163.94	57
J-545	155	Reservoir Area	7	174.92	8.6
J-546	155	Reservoir Area	7	174.84	8.6
J-547	155	Reservoir Area	7	197.77	18.5
J-549	150	Reservoir Area	7	174.92	10.8
J-550	18	City Zone	7	171.14	66.3
J-551	33.73	City Zone	7	169.08	58.6

Project Inventory: Woodland Water 2012 System.wtg

Title	City of Woodland Water System Hydraulic Model
Engineer	Bart Stepp, PE
Company	City of Woodland
Date	11/9/2012
Notes	Calibrated model for Water System Plan

Scenario Summary

ID	75
Label	6 Year MDD + FF 34/20psi
Notes	Created: 03/14/05 03:08:15 PM
Active Topology	Base-Active Topology
Physical	2018 Physical Calibrated II
Demand	2018 MDD
Initial Settings	Base-Initial Settings
Operational	Base-Operational
Age	Base-Age Alternative
Constituent	Base-Constituent
Trace	Base-Trace Alternative
Fire Flow	2018 FF 34/20
Flushing	Base Flushing
Energy Cost	Base-Energy Cost
Transient	Base Transient
Pressure Dependent Demand	Base Pressure Dependent Demand
Failure History	Base Failure History
User Data Extensions	Base-User Data
Steady State/EPS Solver Calculation Options	6 Year MDD + FF 20/20psi
Transient Solver Calculation Options	Base Calculation Options

Network Inventory

Pipes	414	-Constant Speed - No Pump Curve	1
Junctions	339	-Constant Speed - Pump Curve	0
Hydrants	0	-Shut Down After Time Delay	0
Tanks	2	-Variable Speed/Torque	0
-Circular	2	-Pump Start - Variable Speed/Torque	0
-Non-Circular	0	Variable Speed Pump Batteries	0
-Variable Area	0	Pump Stations	0
Reservoirs	1	PRV's	0
Pumps	1	PSV's	0
-Constant Power	0	PBV's	0
-Custom Extended	1	FCV's	0
-Design Point (1 Point)	0	TCV's	0
-Multiple Point	0	GPV's	0
-Standard (3 Point)	0	Isolation Valves	0
-Standard Extended	0	Spot Elevations	0

Transient Network Inventory

Project Inventory: Woodland Water 2012 System.wtg

Transient Network Inventory			
Air Valves	0	Rupture Disks	0
-Double Acting	0	Surge Valves	0
-Slow Closing	0	Surge Tanks	0
-Triple Acting	0	-Simple	0
-Vacuum Breaker	0	-Differential	0
Discharges to Atmosphere	0	-Variable Area	0
Orifice	0	Turbines	0
Rating Curve	0	Valves With Linear Area Change	0
Valve	0	Periodic Head-Flows	0
Check Valves	0	-Sinusoidal (Head)	0
-Towards Wye	0	-Not Sinusoidal (Head)	0
-Away from Wye	0	-Sinusoidal (Flow)	0
Hydropneumatic Tanks	0	-Not Sinusoidal (Flow)	0
Orifices Between Pipes	0		

Pressure Pipes Inventory			
2.0 (in)	458 ft	10.0 (in)	10,884 ft
3.0 (in)	28 ft	12.0 (in)	55,346 ft
4.0 (in)	11,104 ft	16.0 (in)	1,569 ft
6.0 (in)	48,757 ft	All Diameters	184,666 ft
8.0 (in)	56,520 ft		

Scenario Summary Report
Scenario: 6 Year MDD + FF 34/20psi

Scenario Summary	
ID	75
Label	6 Year MDD + FF 34/20psi
Notes	Created: 03/14/05 03:08:15 PM
Active Topology	Base-Active Topology
Physical	2018 Physical Calibrated II
Demand	2018 MDD
Initial Settings	Base-Initial Settings
Operational	Base-Operational
Age	Base-Age Alternative
Constituent	Base-Constituent
Trace	Base-Trace Alternative
Fire Flow	2018 FF 34/20
Flushing	Base Flushing
Energy Cost	Base-Energy Cost
Transient	Base Transient
Pressure Dependent Demand	Base Pressure Dependent Demand
Failure History	Base Failure History
User Data Extensions	Base-User Data
Steady State/EPS Solver Calculation Options	6 Year MDD + FF 20/20psi
Transient Solver Calculation Options	Base Calculation Options

Hydraulic Summary			
Time Analysis Type	Steady State	Use simple controls during steady state?	True
Friction Method	Hazen-Williams	Is EPS Snapshot?	False
Accuracy	0.001	Start Time	12:00:00 AM
Trials	40	Calculation Type	Fire Flow

Woodland Water System 2018 MDD Fire Flow Report (500 gpm minimum)

Label	Zone	Satisfies Fire Flow Constraints?	Fire Flow Available (gpm)	Total Flow Needed (gpm)	Total Available Flow (gpm)
J-100	City Zone	TRUE	1203	502	1206
J-105	City Zone	TRUE	1474	502	1476
J-101	City Zone	TRUE	1246	502	1249
J-102	City Zone	TRUE	1278	502	1280
J-103	City Zone	TRUE	1323	502	1326
J-104	City Zone	TRUE	1436	502	1438
J-106	City Zone	TRUE	1464	502	1467
J-107	City Zone	TRUE	1456	502	1459
J-108	City Zone	TRUE	1460	502	1463
J-109	City Zone	TRUE	1404	502	1406
J-121	City Zone	TRUE	2304	502	2306
J-111	City Zone	TRUE	1470	502	1473
J-112	City Zone	TRUE	1462	502	1464
J-113	City Zone	TRUE	2607	502	2609
J-114	City Zone	TRUE	2938	502	2941
J-115	City Zone	TRUE	3027	502	3029
J-116	City Zone	TRUE	3031	502	3034
J-117	City Zone	TRUE	3001	502	3003
J-118	City Zone	TRUE	3031	502	3034
J-119	City Zone	TRUE	3038	502	3040
J-120	City Zone	TRUE	3053	502	3056
J-122	City Zone	TRUE	2822	502	2825
J-123	City Zone	TRUE	2784	502	2787
J-124	City Zone	TRUE	2667	502	2670
J-125	City Zone	TRUE	1878	502	1881
J-126	City Zone	TRUE	1651	502	1653
J-141	City Zone	TRUE	2704	502	2706
J-128	City Zone	TRUE	2746	502	2748
J-129	City Zone	TRUE	2785	502	2787
J-130	City Zone	TRUE	2923	502	2926
J-131	City Zone	TRUE	3043	502	3045
J-132	City Zone	TRUE	3589	502	3591
J-133	City Zone	TRUE	3673	502	3676
J-134	City Zone	TRUE	5000	502	5002
J-136	City Zone	TRUE	1862	502	1864
J-135	City Zone	TRUE	2144	502	2146
J-137	City Zone	TRUE	5000	502	5002
J-138	City Zone	TRUE	2867	502	2869
J-139	City Zone	TRUE	3548	502	3550
J-140	City Zone	TRUE	3448	502	3450
J-143	City Zone	TRUE	2064	502	2066
J-142	City Zone	TRUE	2318	502	2320
J-144	City Zone	TRUE	2530	502	2532
J-145	City Zone	TRUE	2062	502	2064
J-146	City Zone	TRUE	2315	502	2318
J-200	City Zone	TRUE	913	502	916
J-201	City Zone	TRUE	1226	502	1228
J-202	City Zone	TRUE	1175	502	1177

Woodland Water System 2018 MDD Fire Flow Report (500 gpm minimum)

Label	Zone	Satisfies Fire Flow Constraints?	Fire Flow Available (gpm)	Total Flow Needed (gpm)	Total Available Flow (gpm)
J-203	City Zone	TRUE	1154	502	1156
J-204	City Zone	TRUE	1173	502	1176
J-205	City Zone	TRUE	1088	502	1090
J-211	City Zone	FALSE	276	502	278
J-206	City Zone	TRUE	1455	502	1457
J-207	City Zone	TRUE	1498	502	1500
J-208	City Zone	TRUE	1599	502	1602
J-209	City Zone	TRUE	1430	502	1433
J-210	City Zone	FALSE	289	502	291
J-212	City Zone	FALSE	303	502	305
J-213	City Zone	TRUE	1467	502	1469
J-214	City Zone	TRUE	1457	502	1460
J-215	City Zone	TRUE	1420	502	1422
J-216	City Zone	TRUE	1429	502	1432
J-217	City Zone	TRUE	1720	502	1723
J-218	City Zone	TRUE	1725	502	1728
J-219	City Zone	TRUE	2174	502	2176
J-222	City Zone	TRUE	2146	502	2149
J-221	City Zone	TRUE	2208	502	2211
J-220	City Zone	TRUE	2189	502	2191
J-223	City Zone	TRUE	1873	502	1875
J-224	City Zone	TRUE	1815	502	1818
J-225	City Zone	TRUE	2330	502	2333
J-226	City Zone	TRUE	1718	502	1720
J-227	City Zone	TRUE	2005	502	2008
J-228	City Zone	TRUE	776	502	779
J-229	City Zone	TRUE	1627	502	1629
J-230	City Zone	TRUE	1808	502	1811
J-231	City Zone	TRUE	1667	502	1670
J-232	City Zone	TRUE	865	502	867
J-233	City Zone	TRUE	3102	502	3105
J-234	City Zone	TRUE	2433	502	2435
J-235	City Zone	TRUE	1743	502	1745
J-237	City Zone	TRUE	1601	502	1604
J-238	City Zone	TRUE	2291	502	2294
J-239	City Zone	TRUE	1627	502	1630
J-240	City Zone	TRUE	2401	502	2403
J-241	City Zone	TRUE	2402	502	2404
J-242	City Zone	TRUE	2231	502	2234
J-243	City Zone	TRUE	2330	502	2332
J-244	City Zone	TRUE	1077	502	1080
J-245	City Zone	TRUE	1086	502	1089
J-246	City Zone	TRUE	792	502	795
J-247	City Zone	FALSE	132	502	134
J-248	City Zone	TRUE	620	502	623
J-249	City Zone	TRUE	1154	502	1157
J-250	City Zone	TRUE	1585	502	1587
J-251	City Zone	TRUE	1665	502	1668

Woodland Water System 2018 MDD Fire Flow Report (500 gpm minimum)

Label	Zone	Satisfies Fire Flow Constraints?	Fire Flow Available (gpm)	Total Flow Needed (gpm)	Total Available Flow (gpm)
J-252	City Zone	TRUE	2187	502	2190
J-254	City Zone	TRUE	848	502	850
J-255	City Zone	TRUE	1477	502	1479
J-256	City Zone	TRUE	2243	502	2245
J-257	City Zone	TRUE	2368	502	2370
J-258	City Zone	TRUE	2141	502	2144
J-259	City Zone	TRUE	1877	502	1880
J-300	City Zone	TRUE	1164	502	1166
J-301	City Zone	TRUE	801	502	804
J-302	City Zone	TRUE	1508	502	1510
J-303	City Zone	TRUE	736	502	739
J-304	City Zone	TRUE	1130	502	1132
J-305	City Zone	TRUE	1242	502	1245
J-306	City Zone	TRUE	1179	502	1182
J-307	City Zone	TRUE	1078	502	1081
J-308	City Zone	TRUE	1236	502	1238
J-310	City Zone	TRUE	1147	502	1150
J-311	City Zone	TRUE	1993	502	1996
J-312	City Zone	TRUE	1933	502	1935
J-313	City Zone	TRUE	1454	502	1457
J-314	City Zone	TRUE	1869	502	1871
J-315	City Zone	TRUE	1317	502	1319
J-317	City Zone	TRUE	1618	502	1620
J-318	City Zone	TRUE	1574	502	1577
J-319	City Zone	TRUE	1313	502	1316
J-320	City Zone	TRUE	1617	502	1619
J-321	City Zone	TRUE	1635	502	1638
J-322	City Zone	TRUE	1534	502	1536
J-323	City Zone	TRUE	1350	502	1352
J-324	City Zone	TRUE	1295	502	1297
J-325	City Zone	TRUE	1284	502	1286
J-326	City Zone	TRUE	1811	502	1813
J-327	City Zone	TRUE	1696	502	1698
J-328	City Zone	TRUE	1667	502	1669
J-329	City Zone	TRUE	1843	502	1845
J-330	City Zone	TRUE	1062	502	1064
J-331	City Zone	TRUE	1490	502	1493
J-332	City Zone	TRUE	1304	502	1306
J-333	City Zone	TRUE	782	502	785
J-334	City Zone	TRUE	1311	502	1313
J-335	City Zone	TRUE	1548	502	1550
J-336	City Zone	TRUE	998	502	1000
J-337	City Zone	TRUE	1621	502	1623
J-338	City Zone	TRUE	1260	502	1263
J-339	City Zone	TRUE	1266	502	1268
J-340	City Zone	TRUE	750	502	752
J-341	City Zone	FALSE	103	502	105
J-342	City Zone	TRUE	1959	502	1961

Woodland Water System 2018 MDD Fire Flow Report (500 gpm minimum)

Label	Zone	Satisfies Fire Flow Constraints?	Fire Flow Available (gpm)	Total Flow Needed (gpm)	Total Available Flow (gpm)
J-343	City Zone	TRUE	2029	502	2031
J-344	City Zone	TRUE	2175	502	2177
J-345	City Zone	TRUE	969	502	972
J-346	City Zone	TRUE	1151	502	1153
J-347	City Zone	TRUE	941	502	943
J-348	City Zone	TRUE	1470	502	1473
J-349	City Zone	TRUE	1433	502	1435
J-350	City Zone	TRUE	1224	502	1227
J-351	City Zone	TRUE	1290	502	1293
J-352	City Zone	TRUE	1440	502	1443
J-353	City Zone	TRUE	581	502	584
J-354	City Zone	TRUE	1294	502	1296
J-355	City Zone	TRUE	2336	502	2338
J-356	City Zone	TRUE	1433	502	1436
J-357	City Zone	TRUE	1414	502	1417
J-358	City Zone	TRUE	2632	502	2635
J-359	City Zone	TRUE	3000	502	3002
J-360	City Zone	TRUE	2942	502	2944
J-361	City Zone	TRUE	2676	502	2678
J-362	City Zone	TRUE	2604	502	2607
J-363	City Zone	TRUE	2176	502	2179
J-364	City Zone	TRUE	1760	502	1763
J-367	City Zone	TRUE	1109	502	1112
J-368	City Zone	TRUE	1156	502	1158
J-369	City Zone	TRUE	1831	502	1834
J-370	City Zone	TRUE	881	502	883
J-371	City Zone	TRUE	2396	502	2398
J-372	City Zone	TRUE	1325	502	1327
J-373	City Zone	TRUE	1274	502	1276
J-374	City Zone	TRUE	1448	502	1451
J-376	City Zone	FALSE	452	502	454
J-377	City Zone	FALSE	478	502	480
J-378	City Zone	TRUE	1527	502	1530
J-379	City Zone	TRUE	1511	502	1513
J-380	City Zone	TRUE	1236	502	1238
J-381	City Zone	TRUE	1857	502	1859
J-382	City Zone	TRUE	2334	502	2336
J-383	City Zone	TRUE	2102	502	2104
J-384	City Zone	TRUE	697	502	699
J-385	City Zone	TRUE	698	502	701
J-386	City Zone	TRUE	713	502	715
J-387	City Zone	TRUE	3851	502	3854
J-388	City Zone	TRUE	1118	502	1120
J-309	City Zone	TRUE	1256	502	1258
J-389	City Zone	TRUE	3187	502	3189
J-390	City Zone	TRUE	1309	502	1311
J-391	City Zone	TRUE	1331	502	1333
J-392	City Zone	TRUE	1414	502	1416

Woodland Water System 2018 MDD Fire Flow Report (500 gpm minimum)

Label	Zone	Satisfies Fire Flow Constraints?	Fire Flow Available (gpm)	Total Flow Needed (gpm)	Total Available Flow (gpm)
J-393	City Zone	TRUE	1682	502	1684
J-394	City Zone	TRUE	1241	502	1244
J-395	City Zone	TRUE	2280	502	2283
J-396	City Zone	TRUE	3296	502	3299
J-397	City Zone	TRUE	2344	502	2346
J-398	City Zone	TRUE	2720	502	2722
J-399	City Zone	TRUE	1099	502	1101
J-400	City Zone	TRUE	1412	502	1415
J-401	City Zone	TRUE	1629	502	1631
J-402	City Zone	TRUE	2779	502	2782
J-404	City Zone	TRUE	1730	502	1732
J-405	City Zone	TRUE	3508	502	3510
J-406	City Zone	TRUE	3246	502	3249
J-407	City Zone	TRUE	2781	502	2784
J-408	City Zone	TRUE	2871	502	2873
J-409	City Zone	FALSE	307	502	309
J-316	City Zone	TRUE	1815	502	1817
J-410	City Zone	TRUE	2657	502	2660
J-411	City Zone	FALSE	224	502	226
J-412	City Zone	TRUE	1049	502	1052
J-413	City Zone	TRUE	2641	502	2644
J-414	City Zone	TRUE	2995	502	2998
J-415	City Zone	TRUE	2729	502	2731
J-416	City Zone	TRUE	1339	502	1342
J-417	City Zone	TRUE	1223	502	1225
J-418	City Zone	TRUE	1929	502	1932
J-420	City Zone	TRUE	3151	502	3154
J-421	City Zone	TRUE	1088	502	1090
J-422	City Zone	TRUE	3213	502	3215
J-423	City Zone	TRUE	3175	502	3177
J-424	City Zone	TRUE	3135	502	3138
J-425	City Zone	TRUE	3144	502	3146
J-426	City Zone	TRUE	2660	502	2663
J-427	City Zone	TRUE	3145	502	3147
J-428	City Zone	TRUE	3088	502	3090
J-429	City Zone	TRUE	3023	502	3026
J-430	City Zone	TRUE	3015	502	3017
J-431	City Zone	TRUE	3023	502	3025
J-432	City Zone	TRUE	3076	502	3078
J-433	City Zone	TRUE	3056	502	3058
J-434	City Zone	TRUE	3021	502	3024
J-436	City Zone	TRUE	2837	502	2839
J-437	City Zone	TRUE	2388	502	2391
J-438	City Zone	TRUE	2216	502	2218
J-439	City Zone	TRUE	2081	502	2084
J-440	City Zone	TRUE	1664	502	1667
J-441	City Zone	TRUE	1516	502	1519
J-442	City Zone	TRUE	1492	502	1494

Woodland Water System 2018 MDD Fire Flow Report (500 gpm minimum)

Label	Zone	Satisfies Fire Flow Constraints?	Fire Flow Available (gpm)	Total Flow Needed (gpm)	Total Available Flow (gpm)
J-443	City Zone	TRUE	1970	502	1973
J-444	City Zone	TRUE	1739	502	1742
J-445	City Zone	TRUE	1678	502	1681
J-446	City Zone	TRUE	1860	502	1863
J-447	City Zone	TRUE	2381	502	2383
J-448	City Zone	TRUE	2299	502	2302
J-449	City Zone	TRUE	2236	502	2238
J-450	City Zone	TRUE	1880	502	1882
J-451	City Zone	TRUE	1665	502	1667
J-453	City Zone	TRUE	2198	502	2201
J-454	City Zone	TRUE	1822	502	1825
J-456	City Zone	TRUE	1459	502	1462
J-457	City Zone	TRUE	1469	502	1471
J-458	City Zone	TRUE	661	502	663
J-460	City Zone	TRUE	508	502	510
J-461	City Zone	TRUE	1434	502	1437
J-462	City Zone	TRUE	1293	502	1296
J-464	City Zone	TRUE	1265	502	1268
J-465	City Zone	TRUE	1212	502	1214
J-466	City Zone	TRUE	1143	502	1145
J-467	City Zone	TRUE	977	502	979
J-468	City Zone	TRUE	969	502	971
J-469	City Zone	TRUE	1054	502	1057
J-470	City Zone	TRUE	959	502	961
J-471	City Zone	TRUE	945	502	948
J-472	City Zone	TRUE	647	502	650
J-473	City Zone	FALSE	39	502	41
J-474	City Zone	TRUE	3015	502	3017
J-475	City Zone	TRUE	1775	502	1777
J-476	City Zone	TRUE	3650	502	3653
J-478	City Zone	TRUE	2755	502	2757
J-479	City Zone	TRUE	2577	502	2579
J-480	City Zone	TRUE	1127	502	1129
J-481	City Zone	TRUE	3523	502	3526
J-482	City Zone	TRUE	1961	502	1963
J-483	City Zone	TRUE	1883	502	1885
J-484	City Zone	TRUE	1887	502	1890
J-485	City Zone	TRUE	1009	502	1011
J-487	City Zone	TRUE	1995	502	1997
J-488	City Zone	TRUE	1139	502	1141
J-489	City Zone	TRUE	2355	502	2357
J-490	City Zone	TRUE	2410	502	2412
J-491	City Zone	TRUE	2099	502	2101
J-492	City Zone	TRUE	2015	502	2017
J-493	City Zone	TRUE	2023	502	2025
J-494	City Zone	TRUE	2131	502	2133
J-495	City Zone	TRUE	2158	502	2161
J-496	City Zone	TRUE	2278	502	2280

Woodland Water System 2018 MDD Fire Flow Report (500 gpm minimum)

Label	Zone	Satisfies Fire Flow Constraints?	Fire Flow Available (gpm)	Total Flow Needed (gpm)	Total Available Flow (gpm)
J-497	City Zone	TRUE	2303	502	2306
J-498	City Zone	TRUE	1888	502	1890
J-499	City Zone	TRUE	1728	502	1730
J-500	City Zone	TRUE	2280	502	2282
J-501	City Zone	TRUE	693	502	695
J-502	City Zone	TRUE	2051	502	2053
J-503	City Zone	TRUE	1930	502	1933
J-504	City Zone	TRUE	1869	502	1872
J-507	City Zone	TRUE	1741	502	1743
J-508	City Zone	TRUE	1301	502	1303
J-509	City Zone	TRUE	1248	502	1251
J-510	City Zone	TRUE	797	502	799
J-511	City Zone	TRUE	1267	502	1269
J-512	City Zone	TRUE	698	502	701
J-513	City Zone	TRUE	1285	502	1287
J-514	City Zone	TRUE	721	502	723
J-515	City Zone	TRUE	1122	502	1124
J-516	City Zone	TRUE	1116	502	1119
J-517	City Zone	TRUE	1042	502	1044
J-518	City Zone	TRUE	1077	502	1079
J-519	City Zone	TRUE	1093	502	1095
J-520	City Zone	TRUE	1472	502	1474
J-521	City Zone	TRUE	1885	502	1888
J-522	City Zone	TRUE	1684	502	1687
J-523	City Zone	TRUE	1015	502	1017
J-524	City Zone	TRUE	1215	502	1217
J-525	City Zone	TRUE	1200	502	1202
J-526	City Zone	FALSE	476	502	479
J-527	City Zone	TRUE	530	502	533
J-528	City Zone	TRUE	1254	502	1257
J-529	City Zone	TRUE	642	502	644
J-530	City Zone	TRUE	544	502	547
J-531	City Zone	TRUE	504	502	507
J-532	City Zone	FALSE	409	502	412
J-533	City Zone	FALSE	393	502	396
J-534	City Zone	TRUE	1597	502	1600
J-537	City Zone	TRUE	1626	502	1628
J-540	City Zone	TRUE	1458	502	1461
J-541	City Zone	TRUE	1621	502	1623
J-542	City Zone	TRUE	1877	502	1880
J-543	City Zone	TRUE	1839	502	1841
J-550	City Zone	TRUE	3508	502	3511
J-551	City Zone	TRUE	1916	502	1918

Woodland Water System 2018 MDD Fire Flow Report (500 gpm minimum)

Label	Pressure Residual	Calculated Residual	Zone Pressure	Calculated Zone	Minimum Pressure
	Limit (psi)	Pressure (psi)	Limit (psi)	Low Pressure (psi)	Junction (Zone)
J-100	34	34	20	35.7	J-412
J-105	34	34	20	33.2	J-109
J-101	34	34	20	34	J-412
J-102	34	34	20	33.9	J-412
J-103	34	34	20	33.5	J-412
J-104	34	34	20	33.3	J-200
J-106	34	34	20	33.4	J-109
J-107	34	34	20	33.5	J-109
J-108	34	34	20	33.2	J-109
J-109	34	34	20	35.6	J-461
J-121	34	34	20	44.8	J-474
J-111	34	34	20	33.2	J-460
J-112	34	34	20	33.6	J-460
J-113	34	34	20	35.7	J-355
J-114	34	34	20	34.3	J-113
J-115	34	34	20	34	J-114
J-116	34	34	20	34.2	J-114
J-117	34	34	20	35	J-414
J-118	34	34	20	33.9	J-245
J-119	34	34	20	35.1	J-245
J-120	34	34	20	34.1	J-474
J-122	34	34	20	34.9	J-125
J-123	34	34	20	34.2	J-126
J-124	34	34	20	37.3	J-256
J-125	34	34	20	49.2	J-122
J-126	34	34	20	50.7	J-362
J-141	34	34	20	34.9	J-248
J-128	34	34	20	32.8	J-256
J-129	34	34	20	33.6	J-257
J-130	34	34	20	33.5	J-258
J-131	34	34	20	34	J-259
J-132	34	34	20	34.2	J-405
J-133	34	34	20	35.8	J-405
J-134	34	53.6	20	51.4	J-250
J-136	34	34	20	29.4	J-523
J-135	34	34	20	28.2	J-523
J-137	34	38.6	20	41.5	J-144
J-138	34	34	20	35.9	J-252
J-139	34	34	20	33	J-248
J-140	34	34	20	32.9	J-410
J-143	34	34	20	39.3	J-229
J-142	34	34	20	33.7	J-248
J-144	34	34	20	41.6	J-404
J-145	34	34	20	35.8	J-254
J-146	34	34	20	34.4	J-551
J-200	34	34	20	48.6	J-109
J-201	34	34	20	34	J-412
J-202	34	34	20	34.6	J-203

Woodland Water System 2018 MDD Fire Flow Report (500 gpm minimum)

Label	Pressure Residual Limit (psi)	Calculated Residual Pressure (psi)	Zone Pressure Limit (psi)	Calculated Zone Low Pressure (psi)	Minimum Pressure Junction (Zone)
J-203	34	34	20	34.9	J-367
J-204	34	34	20	34	J-412
J-205	34	34	20	34	J-412
J-211	34	34	20	36.3	J-210
J-206	34	34	20	33.9	J-460
J-207	34	34	20	33.9	J-246
J-208	34	34	20	33	J-109
J-209	34	34	20	35.1	J-211
J-210	34	34	20	34	J-211
J-212	34	34	20	31.6	J-211
J-213	34	34	20	33.3	J-460
J-214	34	34	20	33.8	J-215
J-215	34	34	20	34.8	J-109
J-216	34	34	20	34.7	J-109
J-217	34	34	20	36.5	J-109
J-218	34	34	20	37.4	J-232
J-219	34	34	20	32.8	J-394
J-222	34	34	20	36.6	J-209
J-221	34	34	20	34.2	J-394
J-220	34	34	20	33	J-394
J-223	34	34	20	42.4	J-226
J-224	34	34	20	43	J-394
J-225	34	34	20	37	J-222
J-226	34	34	20	44.9	J-394
J-227	34	34	20	34	J-228
J-228	34	34	20	55.3	J-523
J-229	34	34	20	42.7	J-209
J-230	34	34	20	34.5	J-232
J-231	34	34	20	33.9	J-232
J-232	34	34	20	53.3	J-231
J-233	34	34	20	32.5	J-410
J-234	34	34	20	36.1	J-395
J-235	34	34	20	45.9	J-228
J-237	34	34	20	52.1	J-222
J-238	34	34	20	38	J-239
J-239	34	34	20	34.6	J-244
J-240	34	34	20	35.1	J-241
J-241	34	34	20	35.1	J-240
J-242	34	34	20	39.1	J-223
J-243	34	34	20	37.4	J-242
J-244	34	34	20	49.2	J-239
J-245	34	34	20	55.2	J-250
J-246	34	34	20	51.7	J-109
J-247	34	34	20	55.4	J-523
J-248	34	34	20	52.1	J-249
J-249	34	34	20	31.5	J-248
J-250	34	34	20	36.8	J-248
J-251	34	34	20	41.6	J-250

Woodland Water System 2018 MDD Fire Flow Report (500 gpm minimum)

Label	Pressure Residual	Calculated Residual	Zone Pressure	Calculated Zone	Minimum Pressure
	Limit (psi)	Pressure (psi)	Limit (psi)	Low Pressure (psi)	Junction (Zone)
J-252	34	34	20	34.3	J-475
J-254	34	34	20	54.9	J-145
J-255	34	34	20	41.9	J-475
J-256	34	34	20	43.4	J-128
J-257	34	34	20	41.6	J-256
J-258	34	34	20	35.5	J-453
J-259	34	34	20	49.4	J-358
J-300	34	34	20	34.8	J-330
J-301	34	34	20	40.1	J-341
J-302	34	34	20	40.6	J-303
J-303	34	34	20	34.3	J-384
J-304	34	34	20	40.5	J-303
J-305	34	34	20	35.8	J-339
J-306	34	34	20	37.4	J-307
J-307	34	34	20	35.4	J-340
J-308	34	34	20	38.2	J-388
J-310	34	34	20	34.1	J-345
J-311	34	34	20	28.1	J-523
J-312	34	34	20	28.3	J-523
J-313	34	34	20	34	J-346
J-314	34	34	20	35.2	J-523
J-315	34	34	20	35.4	J-353
J-317	34	34	20	33.5	J-523
J-318	34	34	20	33.4	J-523
J-319	34	34	20	38.9	J-523
J-320	34	34	20	31.4	J-523
J-321	34	34	20	30.2	J-523
J-322	34	34	20	30.4	J-523
J-323	34	34	20	33.9	J-324
J-324	34	34	20	34.3	J-353
J-325	34	34	20	34	J-353
J-326	34	34	20	29.7	J-523
J-327	34	34	20	30.2	J-523
J-328	34	34	20	30.4	J-523
J-329	34	34	20	30.1	J-523
J-330	34	34	20	37.5	J-300
J-331	34	34	20	33.4	J-333
J-332	34	34	20	33.4	J-333
J-333	34	34	20	48.4	J-523
J-334	34	34	20	34.3	J-513
J-335	34	34	20	36.1	J-336
J-336	34	34	20	46	J-523
J-337	34	34	20	32.3	J-336
J-338	34	34	20	34.5	J-511
J-339	34	34	20	34.1	J-509
J-340	34	34	20	45.3	J-307
J-341	34	34.3	20	55.1	J-523
J-342	34	34	20	33.7	J-523

Woodland Water System 2018 MDD Fire Flow Report (500 gpm minimum)

Label	Pressure Residual	Calculated Residual	Zone Pressure	Calculated Zone	Minimum Pressure
	Limit (psi)	Pressure (psi)	Limit (psi)	Low Pressure (psi)	Junction (Zone)
J-343	34	34	20	32.9	J-523
J-344	34	34	20	31.2	J-523
J-345	34	34	20	40.2	J-310
J-346	34	34	20	40.3	J-523
J-347	34	34	20	37.2	J-523
J-348	34	34	20	30.5	J-523
J-349	34	34	20	29.5	J-523
J-350	34	34	20	34.4	J-525
J-351	34	34	20	34	J-350
J-352	34	34	20	31.1	J-523
J-353	34	34	20	50.3	J-523
J-354	34	34	20	44.8	J-523
J-355	34	34	20	39.2	J-113
J-356	34	34	20	34.5	J-460
J-357	34	34	20	35.2	J-460
J-358	34	34	20	34	J-259
J-359	34	34	20	34	J-259
J-360	34	34	20	35.2	J-259
J-361	34	34	20	34	J-126
J-362	34	34	20	34	J-126
J-363	34	34	20	43.2	J-126
J-364	34	34	20	31.1	J-523
J-367	34	34	20	36	J-368
J-368	34	34	20	34	J-367
J-369	34	34	20	34	J-370
J-370	34	34	20	49.5	J-523
J-371	34	34	20	27	J-523
J-372	34	34	20	35.9	J-523
J-373	34	34	20	37.2	J-523
J-374	34	34	20	33	J-523
J-376	34	34	20	39.4	J-532
J-377	34	34	20	36.2	J-533
J-378	34	34	20	31.4	J-523
J-379	34	34	20	30.6	J-523
J-380	34	34	20	45	J-523
J-381	34	34	20	34	J-380
J-382	34	34	20	26.6	J-523
J-383	34	34	20	31.3	J-523
J-384	34	34	20	35	J-385
J-385	34	34	20	34.9	J-384
J-386	34	34	20	34	J-384
J-387	34	34	20	36.4	J-133
J-388	34	34	20	34.3	J-421
J-309	34	34	20	36.5	J-388
J-389	34	34	20	34.3	J-436
J-390	34	34	20	38.1	J-109
J-391	34	34	20	37.5	J-109
J-392	34	34	20	32.7	J-346

Woodland Water System 2018 MDD Fire Flow Report (500 gpm minimum)

Label	Pressure Residual	Calculated Residual	Zone Pressure	Calculated Zone	Minimum Pressure
	Limit (psi)	Pressure (psi)	Limit (psi)	Low Pressure (psi)	Junction (Zone)
J-393	34	34	20	36.7	J-209
J-394	34	34	20	43.3	J-209
J-395	34	34	20	39.3	J-234
J-396	34	34	20	43.9	J-248
J-397	34	34	20	38.2	J-251
J-398	34	34	20	22.2	J-523
J-399	34	34	20	31.8	J-523
J-400	34	34	20	34.3	J-324
J-401	34	34	20	31.2	J-523
J-402	34	34	20	34.8	J-141
J-404	34	34	20	51.5	J-144
J-405	34	34	20	36.3	J-132
J-406	34	34	20	33.5	J-389
J-407	34	34	20	35.3	J-123
J-408	34	34	20	34.8	J-402
J-409	34	34	20	30.9	J-211
J-316	34	34	20	29.9	J-523
J-410	34	34	20	35.7	J-415
J-411	34	34	20	55.4	J-523
J-412	34	34	20	34.9	J-472
J-413	34	34	20	39.9	J-474
J-414	34	34	20	35.2	J-117
J-415	34	34	20	34.1	J-410
J-416	34	34	20	34	J-417
J-417	34	34	20	38.5	J-416
J-418	34	34	20	32.8	J-523
J-420	34	34	20	35.5	J-389
J-421	34	34	20	34.9	J-517
J-422	34	34	20	33.5	J-389
J-423	34	34	20	33.7	J-436
J-424	34	34	20	33.6	J-436
J-425	34	34	20	33	J-436
J-426	34	34	20	41.8	J-436
J-427	34	34	20	34	J-436
J-428	34	34	20	33.9	J-436
J-429	34	34	20	34.2	J-430
J-430	34	34	20	34.4	J-429
J-431	34	34	20	33.6	J-436
J-432	34	34	20	33.8	J-436
J-433	34	34	20	34.3	J-436
J-434	34	34	20	35.3	J-436
J-436	34	34	20	37.6	J-431
J-437	34	34	20	33.8	J-258
J-438	34	34	20	34	J-442
J-439	34	34	20	34	J-442
J-440	34	34	20	34	J-442
J-441	34	34	20	34	J-442
J-442	34	34	20	34.9	J-441

Woodland Water System 2018 MDD Fire Flow Report (500 gpm minimum)

Label	Pressure Residual Limit (psi)	Calculated Residual Pressure (psi)	Zone Pressure Limit (psi)	Calculated Zone Low Pressure (psi)	Minimum Pressure Junction (Zone)
J-443	34	34	20	34	J-445
J-444	34	34	20	34	J-445
J-445	34	34	20	36	J-444
J-446	34	34	20	42.8	J-442
J-447	34	34	20	33.8	J-258
J-448	34	34	20	35.8	J-258
J-449	34	34	20	33.9	J-258
J-450	34	34	20	34	J-451
J-451	34	34	20	40.4	J-450
J-453	34	34	20	33.9	J-258
J-454	34	34	20	43.2	J-258
J-456	34	34	20	33	J-460
J-457	34	34	20	33.1	J-460
J-458	34	34	20	34	J-460
J-460	34	34	20	36.9	J-247
J-461	34	34	20	33.7	J-109
J-462	34	34	20	38.1	J-109
J-464	34	34	20	33.9	J-412
J-465	34	34	20	36	J-412
J-466	34	34	20	34	J-412
J-467	34	34	20	34	J-468
J-468	34	34	20	34.4	J-467
J-469	34	34	20	33.8	J-412
J-470	34	34	20	34.1	J-471
J-471	34	34	20	34.7	J-470
J-472	34	34	20	50.4	J-412
J-473	34	34.5	20	55.5	J-523
J-474	34	34	20	34.3	J-413
J-475	34	34	20	34.1	J-255
J-476	34	34	20	32.6	J-410
J-478	34	34	20	34	J-479
J-479	34	34	20	34.1	J-480
J-480	34	34	20	54.7	J-479
J-481	34	34	20	35	J-248
J-482	34	34	20	34	J-483
J-483	34	34	20	35.7	J-523
J-484	34	34	20	34	J-485
J-485	34	34	20	47.8	J-523
J-487	34	34	20	34	J-488
J-488	34	34	20	46.6	J-523
J-489	34	34	20	26.6	J-523
J-490	34	34	20	27.4	J-523
J-491	34	34	20	31.8	J-523
J-492	34	34	20	33.2	J-523
J-493	34	34	20	33	J-523
J-494	34	34	20	30.9	J-523
J-495	34	34	20	30	J-523
J-496	34	34	20	26.6	J-523

Woodland Water System 2018 MDD Fire Flow Report (500 gpm minimum)

Label	Pressure Residual	Calculated Residual	Zone Pressure	Calculated Zone	Minimum Pressure
	Limit (psi)	Pressure (psi)	Limit (psi)	Low Pressure (psi)	Junction (Zone)
J-497	34	34	20	26.7	J-523
J-498	34	34	20	35.4	J-523
J-499	34	34	20	38.1	J-523
J-500	34	34	20	28.1	J-523
J-501	34	34	20	51.1	J-523
J-502	34	34	20	32.5	J-523
J-503	34	34	20	34.7	J-523
J-504	34	34	20	32.8	J-523
J-507	34	34	20	32.6	J-523
J-508	34	34	20	41.1	J-523
J-509	34	34	20	34.2	J-510
J-510	34	34	20	47.7	J-509
J-511	34	34	20	34.2	J-338
J-512	34	34	20	50	J-523
J-513	34	34	20	34.4	J-511
J-514	34	34	20	49.8	J-523
J-515	34	34	20	32.6	J-421
J-516	34	34	20	32.4	J-517
J-517	34	34	20	35.5	J-518
J-518	34	34	20	33.6	J-517
J-519	34	34	20	42.2	J-333
J-520	34	34	20	33.5	J-333
J-521	34	34	20	29	J-523
J-522	34	34	20	32.4	J-523
J-523	34	34	20	36.9	J-399
J-524	34	34	20	35.6	J-350
J-525	34	34	20	34.9	J-350
J-526	34	34	20	36.8	J-377
J-527	34	34	20	38.2	J-526
J-528	34	34	20	34.2	J-376
J-529	34	34	20	35.7	J-530
J-530	34	34	20	36.5	J-531
J-531	34	34	20	34.3	J-376
J-532	34	34	20	38	J-533
J-533	34	34	20	39.8	J-532
J-534	34	34	20	30.1	J-523
J-537	34	34	20	30.2	J-523
J-540	34	34	20	32.6	J-523
J-541	34	34	20	34.7	J-523
J-542	34	34	20	29.1	J-523
J-543	34	34	20	30	J-523
J-550	34	34	20	37	J-133
J-551	34	34	20	35.3	J-251

Project Inventory: Woodland Water Fire Flows.wtg

Title	City of Woodland Water System Hydraulic Model
Engineer	Bart Stepp, PE
Company	City of Woodland
Date	11/9/2012
Notes	Calibrated model for Water System Plan

Scenario Summary

ID	76
Label	20 Year MDD + FF 34/20psi
Notes	Created: 03/14/05 03:08:40 PM
Active Topology	Base-Active Topology
Physical	2033 Physical Calibrated II Fire Flow
Demand	2033 MDD
Initial Settings	Base-Initial Settings
Operational	Base-Operational
Age	Base-Age Alternative
Constituent	Base-Constituent
Trace	Base-Trace Alternative
Fire Flow	2033 FF 34/20
Flushing	Base Flushing
Energy Cost	Base-Energy Cost
Transient	Base Transient
Pressure Dependent Demand	Base Pressure Dependent Demand
Failure History	Base Failure History
User Data Extensions	Base-User Data
Steady State/EPS Solver Calculation Options	20 Year MDD + FF 20/20psi
Transient Solver Calculation Options	Base Calculation Options

Network Inventory

Pipes	416	-Constant Speed - No Pump Curve	1
Junctions	339	-Constant Speed - Pump Curve	0
Hydrants	0	-Shut Down After Time Delay	0
Tanks	2	-Variable Speed/Torque	0
-Circular	2	-Pump Start - Variable Speed/Torque	0
-Non-Circular	0	Variable Speed Pump Batteries	0
-Variable Area	0	Pump Stations	0
Reservoirs	1	PRV's	0
Pumps	1	PSV's	0
-Constant Power	0	PBV's	0
-Custom Extended	1	FCV's	0
-Design Point (1 Point)	0	TCV's	0
-Multiple Point	0	GPV's	0
-Standard (3 Point)	0	Isolation Valves	0
-Standard Extended	0	Spot Elevations	0

Transient Network Inventory

Project Inventory: Woodland Water Fire Flows.wtg

Transient Network Inventory			
Air Valves	0	Rupture Disks	0
-Double Acting	0	Surge Valves	0
-Slow Closing	0	Surge Tanks	0
-Triple Acting	0	-Simple	0
-Vacuum Breaker	0	-Differential	0
Discharges to Atmosphere	0	-Variable Area	0
Orifice	0	Turbines	0
Rating Curve	0	Valves With Linear Area Change	0
Valve	0	Periodic Head-Flows	0
Check Valves	0	-Sinusoidal (Head)	0
-Towards Wye	0	-Not Sinusoidal (Head)	0
-Away from Wye	0	-Sinusoidal (Flow)	0
Hydropneumatic Tanks	0	-Not Sinusoidal (Flow)	0
Orifices Between Pipes	0		

Pressure Pipes Inventory			
3.0 (in)	28 ft	10.0 (in)	9,987 ft
4.0 (in)	11,104 ft	12.0 (in)	65,860 ft
6.0 (in)	38,683 ft	16.0 (in)	1,569 ft
8.0 (in)	58,239 ft	All Diameters	185,470 ft

Scenario Summary Report
Scenario: 20 Year MDD + FF 34/20psi

Scenario Summary	
ID	76
Label	20 Year MDD + FF 34/20psi
Notes	Created: 03/14/05 03:08:40 PM
Active Topology	Base-Active Topology
Physical	2033 Physical Calibrated II Fire Flow
Demand	2033 MDD
Initial Settings	Base-Initial Settings
Operational	Base-Operational
Age	Base-Age Alternative
Constituent	Base-Constituent
Trace	Base-Trace Alternative
Fire Flow	2033 FF 34/20
Flushing	Base Flushing
Energy Cost	Base-Energy Cost
Transient	Base Transient
Pressure Dependent Demand	Base Pressure Dependent Demand
Failure History	Base Failure History
User Data Extensions	Base-User Data
Steady State/EPS Solver Calculation Options	20 Year MDD + FF 20/20psi
Transient Solver Calculation Options	Base Calculation Options

Hydraulic Summary			
Time Analysis Type	Steady State	Use simple controls during steady state?	True
Friction Method	Hazen-Williams	Is EPS Snapshot?	False
Accuracy	0.001	Start Time	12:00:00 AM
Trials	40	Calculation Type	Fire Flow

Woodland Water System 2033 MDD Fire Flow Report (1000 gpm minimum)

Label	Zone	Satisfies Fire Flow Constraints?	Fire Flow Available (gpm)	Total Flow Needed (gpm)	Total Available Flow (gpm)
J-100	City Zone	TRUE	1197	1004	1201
J-105	City Zone	TRUE	1371	1004	1375
J-101	City Zone	TRUE	1209	1004	1213
J-102	City Zone	TRUE	1243	1004	1247
J-103	City Zone	TRUE	1291	1004	1295
J-104	City Zone	TRUE	1336	1004	1340
J-106	City Zone	TRUE	1361	1004	1365
J-107	City Zone	TRUE	1354	1004	1358
J-108	City Zone	TRUE	1359	1004	1363
J-109	City Zone	TRUE	1303	1004	1307
J-121	City Zone	TRUE	2271	1004	2276
J-111	City Zone	TRUE	1371	1004	1375
J-112	City Zone	TRUE	1363	1004	1367
J-113	City Zone	TRUE	2551	1004	2555
J-114	City Zone	TRUE	2886	1004	2890
J-115	City Zone	TRUE	2976	1004	2980
J-116	City Zone	TRUE	2982	1004	2986
J-117	City Zone	TRUE	2961	1004	2965
J-118	City Zone	TRUE	3004	1004	3008
J-119	City Zone	TRUE	3015	1004	3019
J-120	City Zone	TRUE	3046	1004	3050
J-122	City Zone	TRUE	2751	1004	2755
J-123	City Zone	TRUE	2709	1004	2713
J-124	City Zone	TRUE	2583	1004	2587
J-125	City Zone	TRUE	1827	1004	1831
J-126	City Zone	TRUE	1604	1004	1608
J-141	City Zone	TRUE	2844	1004	2848
J-128	City Zone	TRUE	2658	1004	2662
J-129	City Zone	TRUE	2694	1004	2698
J-130	City Zone	TRUE	2826	1004	2830
J-131	City Zone	TRUE	2946	1004	2950
J-132	City Zone	TRUE	3495	1004	3499
J-133	City Zone	TRUE	3580	1004	3584
J-134	City Zone	TRUE	5000	1004	5004
J-136	City Zone	TRUE	3062	1004	3066
J-135	City Zone	TRUE	3774	1004	3778
J-137	City Zone	TRUE	5000	1004	5004
J-138	City Zone	TRUE	2933	1004	2937
J-139	City Zone	TRUE	3677	1004	3681
J-140	City Zone	TRUE	3502	1004	3506
J-143	City Zone	TRUE	2025	1004	2029
J-142	City Zone	TRUE	2357	1004	2361
J-144	City Zone	TRUE	3197	1004	3201
J-145	City Zone	TRUE	2548	1004	2552
J-146	City Zone	TRUE	2558	1004	2562
J-200	City Zone	TRUE	1142	1004	1146
J-201	City Zone	TRUE	1196	1004	1200
J-202	City Zone	TRUE	1149	1004	1153

Woodland Water System 2033 MDD Fire Flow Report (1000 gpm minimum)

Label	Zone	Satisfies Fire Flow Constraints?	Fire Flow Available (gpm)	Total Flow Needed (gpm)	Total Available Flow (gpm)
J-203	City Zone	TRUE	1135	1004	1139
J-204	City Zone	TRUE	1181	1004	1185
J-205	City Zone	TRUE	1173	1004	1177
J-211	City Zone	TRUE	1079	1004	1083
J-206	City Zone	TRUE	1357	1004	1361
J-207	City Zone	TRUE	1400	1004	1404
J-208	City Zone	TRUE	1496	1004	1500
J-209	City Zone	TRUE	1348	1004	1353
J-210	City Zone	TRUE	1293	1004	1297
J-212	City Zone	FALSE	991	1004	995
J-213	City Zone	TRUE	1367	1004	1371
J-214	City Zone	TRUE	1355	1004	1359
J-215	City Zone	TRUE	1319	1004	1323
J-216	City Zone	TRUE	1329	1004	1333
J-217	City Zone	TRUE	1630	1004	1634
J-218	City Zone	TRUE	1646	1004	1650
J-219	City Zone	TRUE	2086	1004	2090
J-222	City Zone	TRUE	2067	1004	2071
J-221	City Zone	TRUE	2126	1004	2131
J-220	City Zone	TRUE	2103	1004	2107
J-223	City Zone	TRUE	1806	1004	1810
J-224	City Zone	TRUE	1747	1004	1751
J-225	City Zone	TRUE	2263	1004	2267
J-226	City Zone	TRUE	1653	1004	1657
J-227	City Zone	TRUE	1944	1004	1948
J-229	City Zone	TRUE	1566	1004	1570
J-230	City Zone	TRUE	1723	1004	1727
J-231	City Zone	TRUE	1587	1004	1591
J-233	City Zone	TRUE	3110	1004	3114
J-234	City Zone	TRUE	2386	1004	2390
J-235	City Zone	TRUE	1685	1004	1689
J-237	City Zone	TRUE	1560	1004	1564
J-238	City Zone	TRUE	2239	1004	2243
J-239	City Zone	TRUE	1582	1004	1586
J-240	City Zone	TRUE	2342	1004	2346
J-241	City Zone	TRUE	2342	1004	2346
J-242	City Zone	TRUE	2170	1004	2174
J-243	City Zone	TRUE	2268	1004	2272
J-244	City Zone	TRUE	1048	1004	1052
J-245	City Zone	TRUE	1060	1004	1064
J-246	City Zone	TRUE	1106	1004	1110
J-248	City Zone	TRUE	1045	1004	1049
J-249	City Zone	TRUE	1137	1004	1141
J-250	City Zone	TRUE	1584	1004	1588
J-251	City Zone	TRUE	1698	1004	1702
J-252	City Zone	TRUE	2221	1004	2225
J-254	City Zone	FALSE	862	1004	866
J-255	City Zone	TRUE	1473	1004	1477

Woodland Water System 2033 MDD Fire Flow Report (1000 gpm minimum)

Label	Zone	Satisfies Fire Flow Constraints?	Fire Flow Available (gpm)	Total Flow Needed (gpm)	Total Available Flow (gpm)
J-256	City Zone	TRUE	2170	1004	2174
J-257	City Zone	TRUE	2291	1004	2296
J-258	City Zone	TRUE	2067	1004	2071
J-259	City Zone	TRUE	1825	1004	1829
J-300	City Zone	TRUE	1398	1004	1402
J-301	City Zone	TRUE	5000	1004	5004
J-302	City Zone	TRUE	5000	1004	5004
J-303	City Zone	TRUE	4240	1004	4244
J-304	City Zone	TRUE	3956	1004	3960
J-305	City Zone	TRUE	3750	1004	3754
J-306	City Zone	TRUE	3328	1004	3332
J-307	City Zone	TRUE	1574	1004	1578
J-308	City Zone	TRUE	1731	1004	1735
J-310	City Zone	TRUE	1376	1004	1380
J-311	City Zone	TRUE	3397	1004	3401
J-312	City Zone	TRUE	3277	1004	3281
J-313	City Zone	TRUE	1859	1004	1863
J-314	City Zone	TRUE	2773	1004	2777
J-315	City Zone	TRUE	1672	1004	1676
J-317	City Zone	TRUE	2292	1004	2296
J-318	City Zone	TRUE	2174	1004	2178
J-319	City Zone	TRUE	1641	1004	1645
J-320	City Zone	TRUE	2265	1004	2270
J-321	City Zone	TRUE	2343	1004	2347
J-322	City Zone	TRUE	2067	1004	2071
J-323	City Zone	TRUE	1698	1004	1702
J-324	City Zone	TRUE	1624	1004	1628
J-325	City Zone	TRUE	1610	1004	1615
J-326	City Zone	TRUE	2852	1004	2856
J-327	City Zone	TRUE	2511	1004	2515
J-328	City Zone	TRUE	2437	1004	2441
J-329	City Zone	TRUE	2895	1004	2899
J-330	City Zone	TRUE	1227	1004	1231
J-331	City Zone	TRUE	2085	1004	2089
J-332	City Zone	TRUE	1797	1004	1801
J-333	City Zone	TRUE	1672	1004	1676
J-334	City Zone	TRUE	2682	1004	2686
J-335	City Zone	TRUE	2341	1004	2345
J-336	City Zone	TRUE	1155	1004	1159
J-337	City Zone	TRUE	2413	1004	2417
J-338	City Zone	TRUE	2751	1004	2755
J-339	City Zone	TRUE	2889	1004	2893
J-341	City Zone	TRUE	5000	1004	5004
J-342	City Zone	TRUE	2975	1004	2979
J-343	City Zone	TRUE	3089	1004	3093
J-344	City Zone	TRUE	3738	1004	3742
J-345	City Zone	TRUE	1101	1004	1105
J-346	City Zone	TRUE	1354	1004	1358

Woodland Water System 2033 MDD Fire Flow Report (1000 gpm minimum)

Label	Zone	Satisfies Fire Flow Constraints?	Fire Flow Available (gpm)	Total Flow Needed (gpm)	Total Available Flow (gpm)
J-347	City Zone	TRUE	1042	1004	1046
J-348	City Zone	TRUE	1922	1004	1926
J-349	City Zone	TRUE	1847	1004	1851
J-350	City Zone	TRUE	1459	1004	1463
J-351	City Zone	TRUE	1571	1004	1575
J-352	City Zone	TRUE	1867	1004	1871
J-353	City Zone	TRUE	1472	1004	1477
J-354	City Zone	TRUE	1511	1004	1515
J-355	City Zone	TRUE	2284	1004	2288
J-356	City Zone	TRUE	1340	1004	1344
J-357	City Zone	TRUE	1320	1004	1324
J-358	City Zone	TRUE	2550	1004	2555
J-359	City Zone	TRUE	2904	1004	2908
J-360	City Zone	TRUE	2848	1004	2852
J-361	City Zone	TRUE	2602	1004	2606
J-362	City Zone	TRUE	2532	1004	2536
J-363	City Zone	TRUE	2114	1004	2118
J-364	City Zone	TRUE	2736	1004	2740
J-367	City Zone	TRUE	1096	1004	1100
J-368	City Zone	TRUE	1146	1004	1150
J-369	City Zone	TRUE	2562	1004	2566
J-371	City Zone	TRUE	4304	1004	4308
J-372	City Zone	TRUE	1631	1004	1635
J-373	City Zone	TRUE	1533	1004	1537
J-374	City Zone	TRUE	1867	1004	1871
J-378	City Zone	TRUE	2048	1004	2052
J-379	City Zone	TRUE	1999	1004	2003
J-380	City Zone	TRUE	1425	1004	1429
J-381	City Zone	TRUE	2640	1004	2644
J-382	City Zone	TRUE	4179	1004	4183
J-383	City Zone	TRUE	3375	1004	3379
J-384	City Zone	TRUE	1997	1004	2001
J-385	City Zone	TRUE	2026	1004	2030
J-386	City Zone	TRUE	2397	1004	2401
J-387	City Zone	TRUE	3760	1004	3764
J-388	City Zone	TRUE	1391	1004	1396
J-309	City Zone	TRUE	1588	1004	1593
J-389	City Zone	TRUE	3087	1004	3091
J-390	City Zone	TRUE	1220	1004	1224
J-391	City Zone	TRUE	1244	1004	1248
J-392	City Zone	TRUE	1800	1004	1804
J-393	City Zone	TRUE	1591	1004	1595
J-394	City Zone	TRUE	1166	1004	1170
J-395	City Zone	TRUE	2226	1004	2230
J-396	City Zone	TRUE	3287	1004	3291
J-397	City Zone	TRUE	2484	1004	2489
J-398	City Zone	TRUE	4782	1004	4786
J-399	City Zone	TRUE	1287	1004	1291

Woodland Water System 2033 MDD Fire Flow Report (1000 gpm minimum)

Label	Zone	Satisfies Fire Flow Constraints?	Fire Flow Available (gpm)	Total Flow Needed (gpm)	Total Available Flow (gpm)
J-400	City Zone	TRUE	1804	1004	1808
J-401	City Zone	TRUE	2240	1004	2244
J-402	City Zone	TRUE	2910	1004	2914
J-404	City Zone	TRUE	1785	1004	1789
J-405	City Zone	TRUE	3416	1004	3420
J-406	City Zone	TRUE	3147	1004	3151
J-407	City Zone	TRUE	2705	1004	2709
J-408	City Zone	TRUE	2991	1004	2995
J-409	City Zone	TRUE	1152	1004	1156
J-316	City Zone	TRUE	2837	1004	2842
J-410	City Zone	TRUE	2628	1004	2632
J-412	City Zone	TRUE	1121	1004	1125
J-413	City Zone	TRUE	2615	1004	2619
J-414	City Zone	TRUE	2960	1004	2964
J-415	City Zone	TRUE	2705	1004	2709
J-416	City Zone	TRUE	1307	1004	1311
J-417	City Zone	TRUE	1193	1004	1197
J-418	City Zone	TRUE	2919	1004	2923
J-420	City Zone	TRUE	3052	1004	3056
J-421	City Zone	TRUE	1332	1004	1336
J-422	City Zone	TRUE	3114	1004	3118
J-423	City Zone	TRUE	3078	1004	3082
J-424	City Zone	TRUE	3041	1004	3045
J-425	City Zone	TRUE	3050	1004	3054
J-426	City Zone	TRUE	2584	1004	2588
J-427	City Zone	TRUE	3048	1004	3052
J-428	City Zone	TRUE	2992	1004	2997
J-429	City Zone	TRUE	2930	1004	2934
J-430	City Zone	TRUE	2922	1004	2926
J-431	City Zone	TRUE	2930	1004	2934
J-432	City Zone	TRUE	2981	1004	2985
J-433	City Zone	TRUE	2962	1004	2966
J-434	City Zone	TRUE	2933	1004	2937
J-436	City Zone	TRUE	2750	1004	2754
J-437	City Zone	TRUE	2303	1004	2307
J-438	City Zone	TRUE	2137	1004	2141
J-439	City Zone	TRUE	2008	1004	2012
J-440	City Zone	TRUE	1609	1004	1613
J-441	City Zone	TRUE	1468	1004	1472
J-442	City Zone	TRUE	1444	1004	1449
J-443	City Zone	TRUE	1902	1004	1906
J-444	City Zone	TRUE	1681	1004	1685
J-445	City Zone	TRUE	1624	1004	1628
J-446	City Zone	TRUE	1798	1004	1802
J-447	City Zone	TRUE	2296	1004	2300
J-448	City Zone	TRUE	2218	1004	2222
J-449	City Zone	TRUE	2157	1004	2161
J-450	City Zone	TRUE	1817	1004	1821

Woodland Water System 2033 MDD Fire Flow Report (1000 gpm minimum)

Label	Zone	Satisfies Fire Flow Constraints?	Fire Flow Available (gpm)	Total Flow Needed (gpm)	Total Available Flow (gpm)
J-451	City Zone	TRUE	1612	1004	1616
J-453	City Zone	TRUE	2121	1004	2125
J-454	City Zone	TRUE	1762	1004	1766
J-456	City Zone	TRUE	1361	1004	1365
J-457	City Zone	TRUE	1369	1004	1373
J-461	City Zone	TRUE	1333	1004	1337
J-462	City Zone	TRUE	1207	1004	1211
J-464	City Zone	TRUE	1229	1004	1234
J-465	City Zone	TRUE	1175	1004	1179
J-466	City Zone	TRUE	1180	1004	1184
J-469	City Zone	TRUE	1123	1004	1127
J-470	City Zone	TRUE	1001	1004	1005
J-474	City Zone	TRUE	3006	1004	3010
J-475	City Zone	TRUE	1782	1004	1786
J-476	City Zone	TRUE	3751	1004	3755
J-478	City Zone	TRUE	2785	1004	2789
J-479	City Zone	TRUE	2594	1004	2598
J-480	City Zone	TRUE	1111	1004	1115
J-481	City Zone	TRUE	3596	1004	3600
J-482	City Zone	TRUE	2873	1004	2877
J-483	City Zone	TRUE	2656	1004	2660
J-484	City Zone	TRUE	2683	1004	2687
J-485	City Zone	TRUE	1107	1004	1111
J-487	City Zone	TRUE	2987	1004	2991
J-488	City Zone	TRUE	1281	1004	1285
J-489	City Zone	TRUE	4205	1004	4210
J-490	City Zone	TRUE	4300	1004	4304
J-491	City Zone	TRUE	3176	1004	3180
J-492	City Zone	TRUE	2891	1004	2895
J-493	City Zone	TRUE	2905	1004	2909
J-494	City Zone	TRUE	3242	1004	3246
J-495	City Zone	TRUE	3384	1004	3388
J-496	City Zone	TRUE	4047	1004	4051
J-497	City Zone	TRUE	4100	1004	4104
J-498	City Zone	TRUE	2560	1004	2564
J-499	City Zone	TRUE	2223	1004	2228
J-500	City Zone	TRUE	3844	1004	3848
J-502	City Zone	TRUE	2988	1004	2992
J-503	City Zone	TRUE	2665	1004	2669
J-504	City Zone	TRUE	2744	1004	2748
J-507	City Zone	TRUE	2681	1004	2685
J-508	City Zone	TRUE	1611	1004	1615
J-509	City Zone	TRUE	2680	1004	2684
J-511	City Zone	TRUE	2704	1004	2708
J-513	City Zone	TRUE	2658	1004	2662
J-515	City Zone	TRUE	1357	1004	1361
J-516	City Zone	TRUE	1343	1004	1347
J-517	City Zone	TRUE	1242	1004	1246

Woodland Water System 2033 MDD Fire Flow Report (1000 gpm minimum)

Label	Zone	Satisfies Fire Flow Constraints?	Fire Flow Available (gpm)	Total Flow Needed (gpm)	Total Available Flow (gpm)
J-518	City Zone	TRUE	1296	1004	1300
J-519	City Zone	TRUE	1308	1004	1312
J-520	City Zone	TRUE	2046	1004	2050
J-521	City Zone	TRUE	3146	1004	3150
J-522	City Zone	TRUE	2484	1004	2488
J-523	City Zone	TRUE	1180	1004	1184
J-524	City Zone	TRUE	1443	1004	1447
J-525	City Zone	TRUE	1413	1004	1417
J-528	City Zone	TRUE	1512	1004	1516
J-534	City Zone	TRUE	2234	1004	2238
J-537	City Zone	TRUE	2315	1004	2319
J-540	City Zone	TRUE	1888	1004	1892
J-541	City Zone	TRUE	2270	1004	2274
J-542	City Zone	TRUE	3117	1004	3121
J-543	City Zone	TRUE	2970	1004	2974
J-550	City Zone	TRUE	3422	1004	3426
J-551	City Zone	TRUE	2005	1004	2009

Woodland Water System 2033 MDD Fire Flow Report (1000 gpm minimum)

Label	Pressure Residual Limit (psi)	Calculated Residual Pressure (psi)	Zone Pressure Limit (psi)	Calculated Zone Low Pressure (psi)	Minimum Pressure Junction (Zone)
J-100	34	34	20	34	J-412
J-105	34	34	20	33.1	J-109
J-101	34	34	20	34	J-412
J-102	34	34	20	33.9	J-412
J-103	34	34	20	33.5	J-412
J-104	34	34	20	33.3	J-200
J-106	34	34	20	33.4	J-109
J-107	34	34	20	33.5	J-109
J-108	34	34	20	33.2	J-109
J-109	34	34	20	35.5	J-461
J-121	34	34	20	44.4	J-474
J-111	34	34	20	33.1	J-460
J-112	34	34	20	33.5	J-460
J-113	34	34	20	35.7	J-355
J-114	34	34	20	34.3	J-113
J-115	34	34	20	34	J-114
J-116	34	34	20	34.2	J-114
J-117	34	34	20	35.1	J-414
J-118	34	34	20	33.9	J-245
J-119	34	34	20	35.1	J-245
J-120	34	34	20	34.1	J-474
J-122	34	34	20	34.9	J-125
J-123	34	34	20	34.2	J-126
J-124	34	34	20	37.1	J-256
J-125	34	34	20	48.4	J-122
J-126	34	34	20	49.9	J-362
J-141	34	34	20	35.4	J-248
J-128	34	34	20	32.8	J-256
J-129	34	34	20	33.6	J-257
J-130	34	34	20	33.5	J-258
J-131	34	34	20	33.9	J-258
J-132	34	34	20	34.2	J-405
J-133	34	34	20	35.7	J-405
J-134	34	53.4	20	50.2	J-523
J-136	34	34	20	30.6	J-523
J-135	34	34	20	28.8	J-523
J-137	34	43.1	20	42.5	J-523
J-138	34	34	20	36.3	J-252
J-139	34	34	20	33.9	J-248
J-140	34	34	20	32.8	J-410
J-143	34	34	20	38.5	J-229
J-142	34	34	20	34	J-248
J-144	34	34	20	41.3	J-404
J-145	34	34	20	35.8	J-254
J-146	34	34	20	34.3	J-551
J-200	34	34	20	39.9	J-109
J-201	34	34	20	34	J-202
J-202	34	34	20	34.7	J-203

Woodland Water System 2033 MDD Fire Flow Report (1000 gpm minimum)

Label	Pressure Residual Limit (psi)	Calculated Residual Pressure (psi)	Zone Pressure Limit (psi)	Calculated Zone Low Pressure (psi)	Minimum Pressure Junction (Zone)
J-203	34	34	20	35.1	J-367
J-204	34	34	20	34.2	J-367
J-205	34	34	20	34	J-412
J-211	34	34	20	40.9	J-210
J-206	34	34	20	33.8	J-460
J-207	34	34	20	33.8	J-109
J-208	34	34	20	32.8	J-109
J-209	34	34	20	35.2	J-211
J-210	34	34	20	34	J-211
J-212	34	34	20	34	J-473
J-213	34	34	20	33.3	J-460
J-214	34	34	20	33.7	J-215
J-215	34	34	20	34.7	J-109
J-216	34	34	20	34.5	J-109
J-217	34	34	20	35.7	J-109
J-218	34	34	20	37	J-232
J-219	34	34	20	32.4	J-394
J-222	34	34	20	36.1	J-394
J-221	34	34	20	33.8	J-394
J-220	34	34	20	32.6	J-394
J-223	34	34	20	41.6	J-394
J-224	34	34	20	42.1	J-394
J-225	34	34	20	36.5	J-222
J-226	34	34	20	43.9	J-394
J-227	34	34	20	34	J-228
J-229	34	34	20	41.6	J-209
J-230	34	34	20	34.4	J-232
J-231	34	34	20	33.9	J-232
J-233	34	34	20	32.4	J-410
J-234	34	34	20	35.9	J-395
J-235	34	34	20	45.1	J-226
J-237	34	34	20	50.9	J-394
J-238	34	34	20	37.8	J-239
J-239	34	34	20	34.6	J-244
J-240	34	34	20	35	J-241
J-241	34	34	20	35	J-240
J-242	34	34	20	38.6	J-223
J-243	34	34	20	37.2	J-242
J-244	34	34	20	48.4	J-239
J-245	34	34	20	54.2	J-523
J-246	34	34	20	41.9	J-109
J-248	34	34	20	37.6	J-249
J-249	34	34	20	31.5	J-248
J-250	34	34	20	36.7	J-248
J-251	34	34	20	41.4	J-250
J-252	34	34	20	34.3	J-475
J-254	34	34	20	54.1	J-523
J-255	34	34	20	41.9	J-475

Woodland Water System 2033 MDD Fire Flow Report (1000 gpm minimum)

Label	Pressure Residual Limit (psi)	Calculated Residual Pressure (psi)	Zone Pressure Limit (psi)	Calculated Zone Low Pressure (psi)	Minimum Pressure Junction (Zone)
J-256	34	34	20	42.9	J-128
J-257	34	34	20	41.1	J-256
J-258	34	34	20	35.4	J-453
J-259	34	34	20	48.7	J-358
J-300	34	34	20	34.8	J-330
J-301	34	39.3	20	38.2	J-523
J-302	34	35.5	20	34.4	J-306
J-303	34	34	20	33.9	J-306
J-304	34	34	20	33.4	J-306
J-305	34	34	20	33.5	J-306
J-306	34	34	20	36.6	J-307
J-307	34	34	20	35.4	J-340
J-308	34	34	20	38.7	J-333
J-310	34	34	20	34.1	J-345
J-311	34	34	20	29	J-523
J-312	34	34	20	28.9	J-523
J-313	34	34	20	35.3	J-346
J-314	34	34	20	39.1	J-342
J-315	34	34	20	36.4	J-353
J-317	34	34	20	37.5	J-523
J-318	34	34	20	36.7	J-523
J-319	34	34	20	43.2	J-315
J-320	34	34	20	33.2	J-523
J-321	34	34	20	30.6	J-523
J-322	34	34	20	31.2	J-523
J-323	34	34	20	34.6	J-324
J-324	34	34	20	34.7	J-353
J-325	34	34	20	34	J-353
J-326	34	34	20	30.9	J-523
J-327	34	34	20	31	J-523
J-328	34	34	20	31.1	J-523
J-329	34	34	20	32.9	J-523
J-330	34	34	20	38.9	J-300
J-331	34	34	20	34.1	J-520
J-332	34	34	20	36.9	J-309
J-333	34	34	20	36.5	J-388
J-334	34	34	20	36.5	J-513
J-335	34	34	20	37.9	J-336
J-336	34	34	20	50.3	J-523
J-337	34	34	20	32.3	J-336
J-338	34	34	20	34.9	J-511
J-339	34	34	20	34.3	J-509
J-341	34	42.2	20	36.4	J-553
J-342	34	34	20	35.2	J-314
J-343	34	34	20	35.3	J-484
J-344	34	34	20	34	J-370
J-345	34	34	20	41.9	J-310
J-346	34	34	20	43.7	J-523

Woodland Water System 2033 MDD Fire Flow Report (1000 gpm minimum)

Label	Pressure Residual Limit (psi)	Calculated Residual Pressure (psi)	Zone Pressure Limit (psi)	Calculated Zone Low Pressure (psi)	Minimum Pressure Junction (Zone)
J-347	34	34	20	38.8	J-523
J-348	34	34	20	31.2	J-523
J-349	34	34	20	29.5	J-523
J-350	34	34	20	34.4	J-525
J-351	34	34	20	34	J-350
J-352	34	34	20	32	J-523
J-353	34	34	20	37.3	J-325
J-354	34	34	20	50.3	J-523
J-355	34	34	20	38.9	J-113
J-356	34	34	20	34.2	J-460
J-357	34	34	20	34.9	J-460
J-358	34	34	20	34	J-259
J-359	34	34	20	34	J-259
J-360	34	34	20	35.1	J-259
J-361	34	34	20	34	J-126
J-362	34	34	20	34	J-126
J-363	34	34	20	42.8	J-126
J-364	34	34	20	33.8	J-523
J-367	34	34	20	35.9	J-368
J-368	34	34	20	34	J-367
J-369	34	34	20	34	J-370
J-371	34	34	20	28.7	J-523
J-372	34	34	20	39	J-523
J-373	34	34	20	40.7	J-523
J-374	34	34	20	34.4	J-373
J-378	34	34	20	32.9	J-523
J-379	34	34	20	31.8	J-523
J-380	34	34	20	50.3	J-523
J-381	34	34	20	34	J-380
J-382	34	34	20	28.2	J-523
J-383	34	34	20	36.6	J-342
J-384	34	34	20	41.1	J-385
J-385	34	34	20	40.6	J-384
J-386	34	34	20	34	J-384
J-387	34	34	20	36.3	J-133
J-388	34	34	20	34.3	J-421
J-309	34	34	20	37.7	J-388
J-389	34	34	20	34.3	J-436
J-390	34	34	20	37.5	J-109
J-391	34	34	20	36.9	J-109
J-392	34	34	20	32.7	J-346
J-393	34	34	20	36.1	J-209
J-394	34	34	20	42.1	J-109
J-395	34	34	20	39.2	J-234
J-396	34	34	20	44.6	J-248
J-397	34	34	20	39.3	J-250
J-398	34	34	20	25	J-523
J-399	34	34	20	31.8	J-523

Woodland Water System 2033 MDD Fire Flow Report (1000 gpm minimum)

Label	Pressure Residual Limit (psi)	Calculated Residual Pressure (psi)	Zone Pressure Limit (psi)	Calculated Zone Low Pressure (psi)	Minimum Pressure Junction (Zone)
J-400	34	34	20	35.5	J-323
J-401	34	34	20	33.7	J-523
J-402	34	34	20	35.1	J-141
J-404	34	34	20	51.6	J-252
J-405	34	34	20	36.1	J-132
J-406	34	34	20	33.5	J-389
J-407	34	34	20	35.3	J-123
J-408	34	34	20	35.1	J-402
J-409	34	34	20	34	J-473
J-316	34	34	20	32	J-523
J-410	34	34	20	35.8	J-415
J-412	34	34	20	34.9	J-472
J-413	34	34	20	39.8	J-474
J-414	34	34	20	35.1	J-117
J-415	34	34	20	34	J-410
J-416	34	34	20	34	J-417
J-417	34	34	20	38.3	J-416
J-418	34	34	20	38.3	J-523
J-420	34	34	20	35.4	J-389
J-421	34	34	20	34.9	J-517
J-422	34	34	20	33.5	J-389
J-423	34	34	20	33.7	J-436
J-424	34	34	20	33.5	J-436
J-425	34	34	20	32.9	J-436
J-426	34	34	20	41.4	J-436
J-427	34	34	20	34	J-436
J-428	34	34	20	33.9	J-436
J-429	34	34	20	34.2	J-430
J-430	34	34	20	34.4	J-429
J-431	34	34	20	33.6	J-436
J-432	34	34	20	33.8	J-436
J-433	34	34	20	34.3	J-436
J-434	34	34	20	35.2	J-436
J-436	34	34	20	37.5	J-431
J-437	34	34	20	33.8	J-258
J-438	34	34	20	34	J-442
J-439	34	34	20	34	J-442
J-440	34	34	20	34	J-442
J-441	34	34	20	34	J-442
J-442	34	34	20	34.9	J-441
J-443	34	34	20	34	J-445
J-444	34	34	20	34	J-445
J-445	34	34	20	35.9	J-444
J-446	34	34	20	42.2	J-442
J-447	34	34	20	33.8	J-258
J-448	34	34	20	35.6	J-258
J-449	34	34	20	33.9	J-258
J-450	34	34	20	34	J-451

Woodland Water System 2033 MDD Fire Flow Report (1000 gpm minimum)

Label	Pressure Residual Limit (psi)	Calculated Residual Pressure (psi)	Zone Pressure Limit (psi)	Calculated Zone Low Pressure (psi)	Minimum Pressure Junction (Zone)
J-451	34	34	20	40	J-450
J-453	34	34	20	33.9	J-258
J-454	34	34	20	42.7	J-258
J-456	34	34	20	33	J-460
J-457	34	34	20	33.1	J-460
J-461	34	34	20	33.6	J-109
J-462	34	34	20	37.5	J-109
J-464	34	34	20	33.9	J-412
J-465	34	34	20	35.9	J-412
J-466	34	34	20	34	J-468
J-469	34	34	20	33.9	J-412
J-470	34	34	20	34.1	J-471
J-474	34	34	20	34.3	J-413
J-475	34	34	20	34.1	J-255
J-476	34	34	20	32.5	J-410
J-478	34	34	20	34	J-479
J-479	34	34	20	34.1	J-480
J-480	34	34	20	53.8	J-523
J-481	34	34	20	35.2	J-410
J-482	34	34	20	34	J-483
J-483	34	34	20	37.5	J-482
J-484	34	34	20	34	J-485
J-485	34	34	20	51.8	J-523
J-487	34	34	20	34	J-488
J-488	34	34	20	51.2	J-523
J-489	34	34	20	28.6	J-523
J-490	34	34	20	29.1	J-523
J-491	34	34	20	35.1	J-499
J-492	34	34	20	33.8	J-499
J-493	34	34	20	34	J-498
J-494	34	34	20	34.4	J-503
J-495	34	34	20	35.7	J-523
J-496	34	34	20	27.5	J-523
J-497	34	34	20	28	J-523
J-498	34	34	20	39.6	J-493
J-499	34	34	20	44.3	J-492
J-500	34	34	20	32.2	J-523
J-502	34	34	20	34	J-503
J-503	34	34	20	39.1	J-502
J-504	34	34	20	38.2	J-523
J-507	34	34	20	33.9	J-508
J-508	34	34	20	46.9	J-523
J-509	34	34	20	34.2	J-510
J-511	34	34	20	34.4	J-512
J-513	34	34	20	34.4	J-514
J-515	34	34	20	33.2	J-421
J-516	34	34	20	32.6	J-517
J-517	34	34	20	35.9	J-518

Woodland Water System 2033 MDD Fire Flow Report (1000 gpm minimum)

Label	Pressure Residual Limit (psi)	Calculated Residual Pressure (psi)	Zone Pressure Limit (psi)	Calculated Zone Low Pressure (psi)	Minimum Pressure Junction (Zone)
J-518	34	34	20	33.6	J-517
J-519	34	34	20	46.8	J-332
J-520	34	34	20	34.7	J-519
J-521	34	34	20	29.8	J-523
J-522	34	34	20	35.3	J-317
J-523	34	34	20	37.2	J-399
J-524	34	34	20	36.2	J-350
J-525	34	34	20	35.4	J-350
J-528	34	34	20	34.1	J-376
J-534	34	34	20	30.5	J-523
J-537	34	34	20	30.7	J-523
J-540	34	34	20	33.9	J-372
J-541	34	34	20	40.1	J-523
J-542	34	34	20	30	J-523
J-543	34	34	20	32.2	J-523
J-550	34	34	20	36.8	J-405
J-551	34	34	20	35.2	J-251