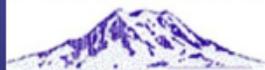


# Town of Eatonville

## Comprehensive Water System Plan

Town of Eatonville

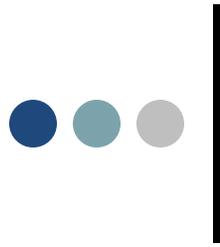


Agency Review  
February 2013



Prepared By:

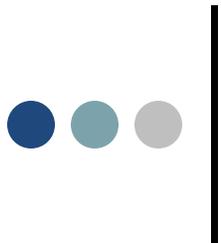




# Abbreviations

- DOH: WA State Department of Health
- ERU: Equivalent Residential Unit
- gpm: gallons per minute
- ADD: Average Day Demand
- PDD: Peak Day Demand
- PHD: Peak Hour Demand
- WUE: Water Use Efficiency or Water Conservation
- DSL: Distribution System Leakage
- O&M: Operations and Maintenance





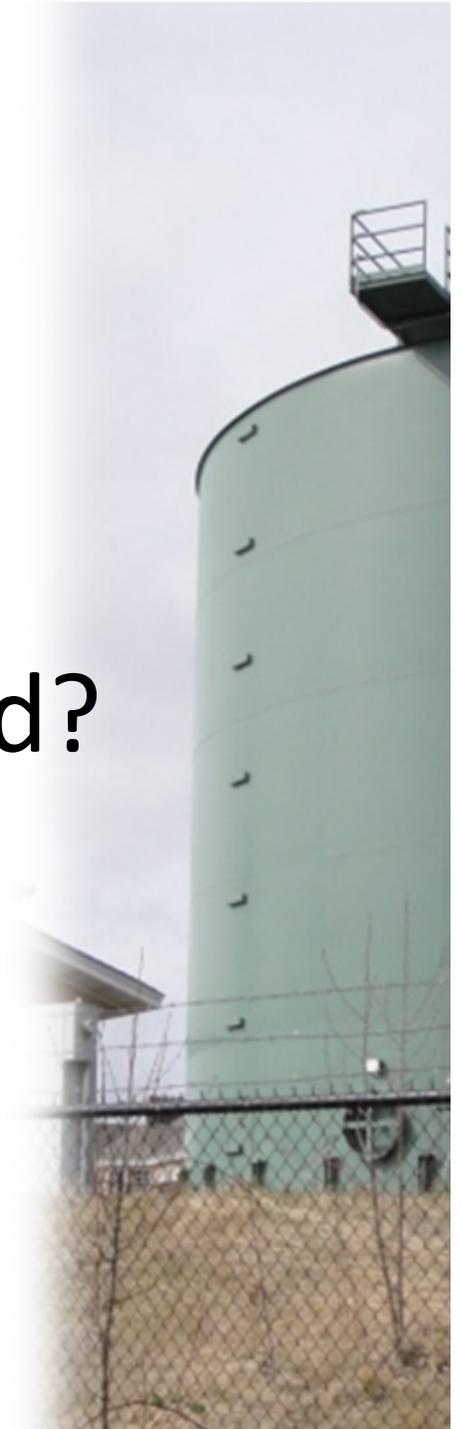
# What is a Comprehensive Water System Plan?

- Guidance Document
- Required by Department of Health  
(every 6 years)
- Dynamic Plan





# What was Accomplished?





# Town Staff Gathered Data



# ●●● Updated Facility Information





# Updated Water System Mapping





# What was Accomplished?

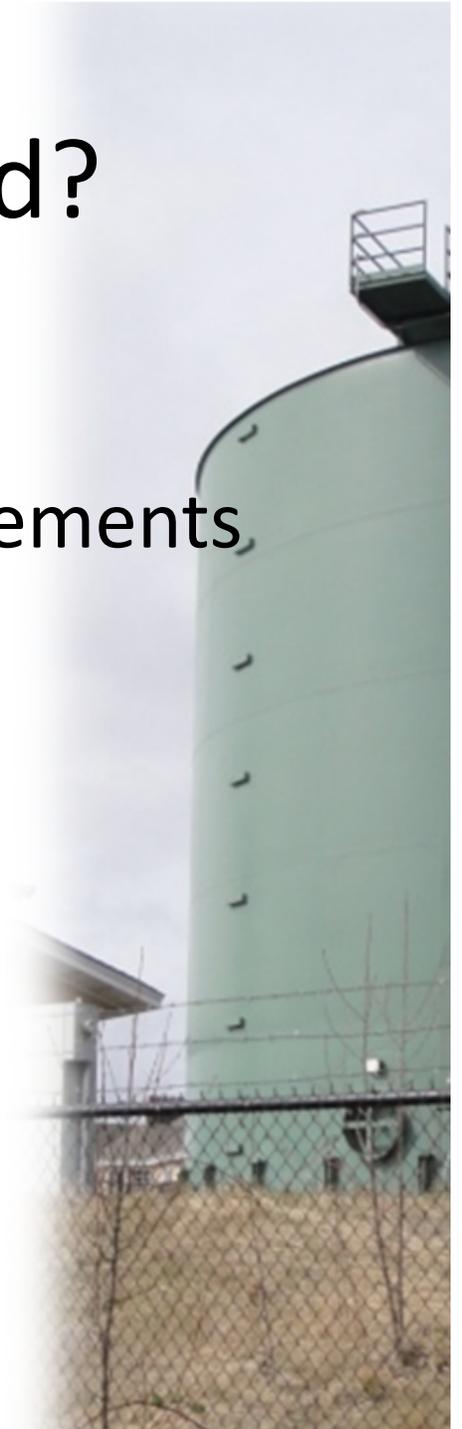
- Tabulated & analyzed past water use data
- Projected future water needs
- Reviewed water quality
- Evaluated water rights
- Documented operations & maintenance program





# What was Accomplished?

- Calibrated hydraulic model
- Analyzed system & identified improvements
- Documented financial program
- Updated supplemental documents





# What were the Findings?





# Existing System 2011 Data

Description	Data
Town Population	2,775
<b>Population Served</b>	<b>2,835</b>
Water Service Area	3.3 square miles
Total Connections	1,036
Total ERUs	1,237
Demand per ERU	274 gallons per day
<b>Demand per Capita</b>	<b>120 gallons per day</b>
Annual Supply	123,773,000 gallons
Average Day Demand	235 gpm
<b>Distribution System Leakage</b>	<b>16%</b>
Peak Day/Average Day Demand Factor <sup>1</sup>	2.50
Peak Hour/Peak Day Demand Factor <sup>1</sup>	1.80
Number of Pressure Zones	3
Number of Wells & Total Capacity	4 (955 gpm)
Mashel River Diversion Capacity	400 gpm
Treatment Plant Capacity	1.0 MGD
Number of Pump Stations & Total Capacity	3 (2,675 gpm)
Number of Reservoirs & Total Capacity	3 (1.0 MG)
Number of Pressure Reducing Valve Stations	6
<b>Total Length of Water Main</b>	<b>19 miles</b>

1: Sufficient data unavailable. Estimated values shown.





# Water System Population

Year	Population
<b>Historical</b>	
1980	998
1990	1,374
2000	2,012
2001	2,087
2002	2,161
2003	2,236
2004	2,310
2005	2,385
2006	2,460
2007	2,534
2008	2,609
2009	2,683
2010	2,758
2011	2,775
<b>Projected</b>	
2012	2,785
2013	2,792
2014	2,848
2015	2,919
2016	3,007
2017	3,112
2018 (+ 6 years)	3,236
2022 (+ 10 years)	4,120
2032 (+ 20 years)	5,770

NOTE: The historical population represents the population within the Town limits. The projected population is based on estimated growth rates within the current Town limits and the UGA.

Average of 2.7% growth per year

2022 population set by Comprehensive Plan and County Ord. 2003-104s.

20-year is a continuation of average growth rates based on 2022 population.

Average of 2.3% growth per year (starts slow and increases)





# Water System Demands

## Historic Water Demand

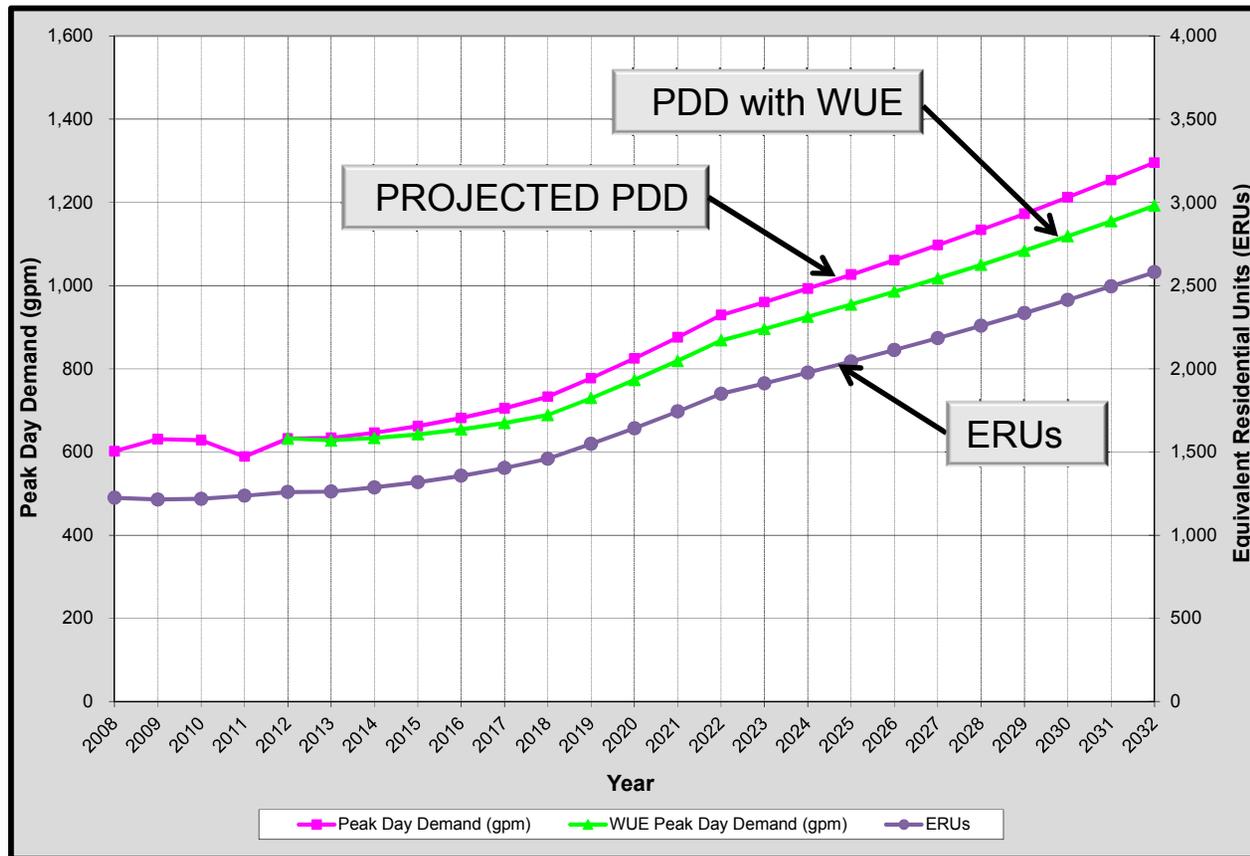
Year	Population in Town Limits	Population Outside Town	Total Population Served	Annual Supply (gal)	Average Daily Demand (gpm)	Average Demand Per Capita (gpd)
2004	2,310	60	2,370	106,102,043	202	123
2005	2,385	60	2,445	109,419,274	208	123
2006 <sup>1</sup>	2,460	60	2,520	126,053,920	240	137
2007	2,534	60	2,594	164,323,600	313	174
2008	2,609	60	2,669	126,539,000	241	130
2009	2,683	60	2,743	132,585,000	252	132
2010	2,758	60	2,818	132,098,000	251	128
2011	2,775	60	2,835	123,773,000	235	120
Average 2008 - 2011						128

<sup>1</sup> = River supply data is missing for 2006 and the annual supply quantity is lower than the actual amount supplied.





# Projected Demands





# Water Use Efficiency Goals

- Must be adopted every 6 years or with WSP update (Town adopted December 2012)
- Based on implementation of WUE measures
  - Customer education
  - Bill showing consumption history
  - Leak detection

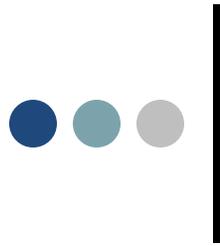




# Water Use Efficiency Goals

- Reducing the 4-year rolling average per capita demands by 6 percent by 2018, and by 8 percent by 2032
- Reducing DSL to 10 percent or less by 2015





# Water Quality

- Source water quality meets or exceeds drinking water standards
- All sources treated at the membrane filtration treatment plant
- Water quality within the distribution system also met compliance requirements



# Operations & Maintenance

- System operated by certified personnel
- Additional staff needed for optimal O & M

Total Staff Available	
Total Available Hours	3,065
Total Full Time Staff Available (based on 1,540 hours per year per person)	2.0
Total Staff Recommended	
Preventive Maintenance Hours	2,116
Operations Hours	4,559
Total Hours	6,675
Total Full Time Staff Required (based on 1,540 hours per year per person)	4.3
Surplus or Deficient Staffing	
Surplus or Deficient Staff	-2.3





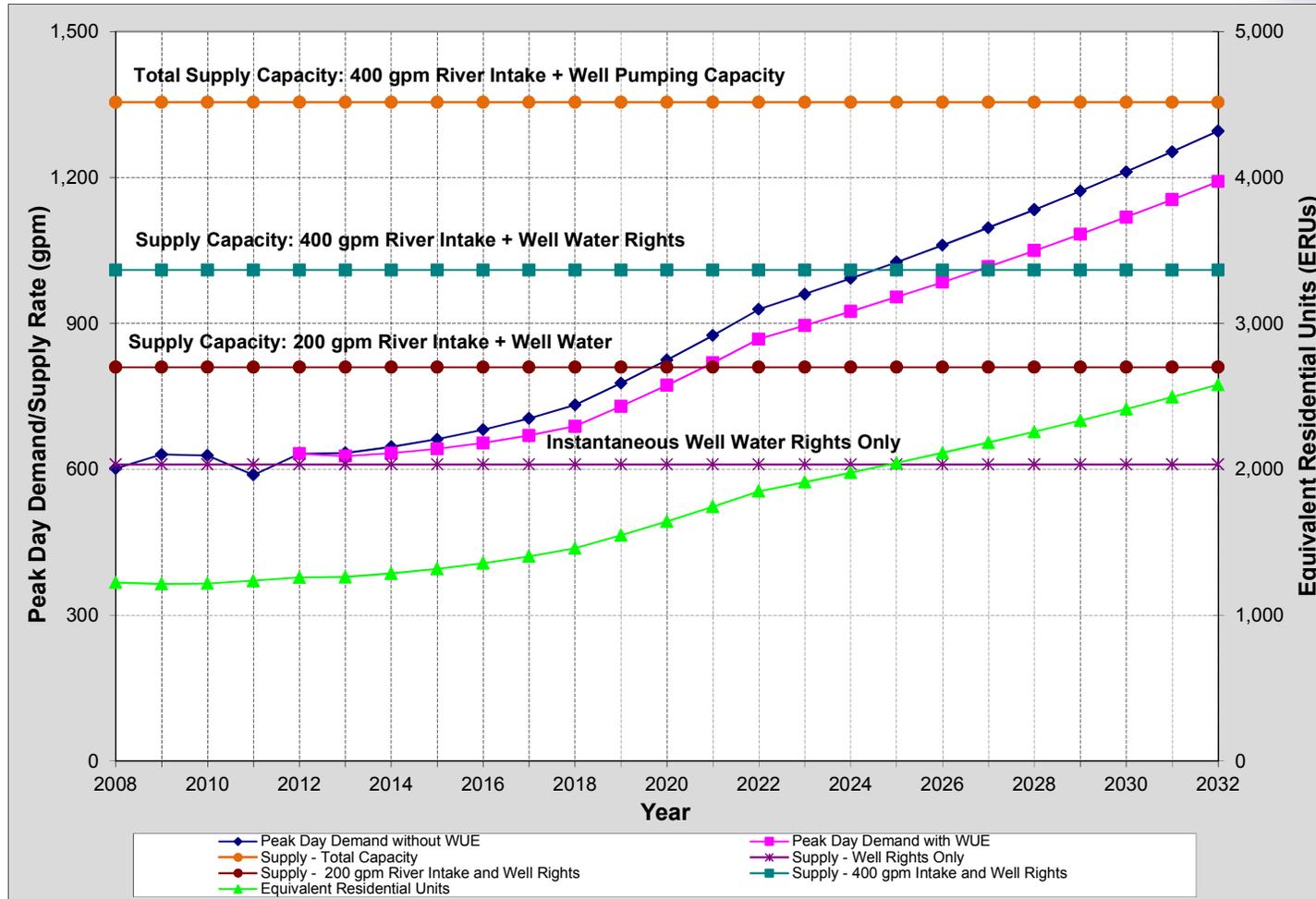
# Water Rights Analysis

Description	Instantaneous Rights/ Peak Day Demand (gpm)	Annual Rights/ Average Day Demand	
		(acre-ft)	(gpm)
<b>Year 2018 Without WUE Measures</b>			
Total Certificated Water Rights	1,642	525	325
Projected (2018) Water Demand	733	473	293
Surplus (or Deficient) Rights	909	52	32
<b>Year 2032 Without WUE Measures</b>			
Total Certificated Water Rights	1,642	525	325
Projected (2032) Water Demand	1,296	836	518
Surplus (or Deficient) Rights	346	-311	-193
<b>Year 2018 With WUE Measures</b>			
Total Certificated Water Rights	1,642	525	325
Projected (2018) Water Demand	689	444	275
Surplus (or Deficient) Rights	953	81	50
<b>Year 2032 With WUE Measures</b>			
Total Certificated Water Rights	1,642	525	325
Projected (2032) Water Demand	1,192	769	477
Surplus (or Deficient) Rights	450	-244	-152



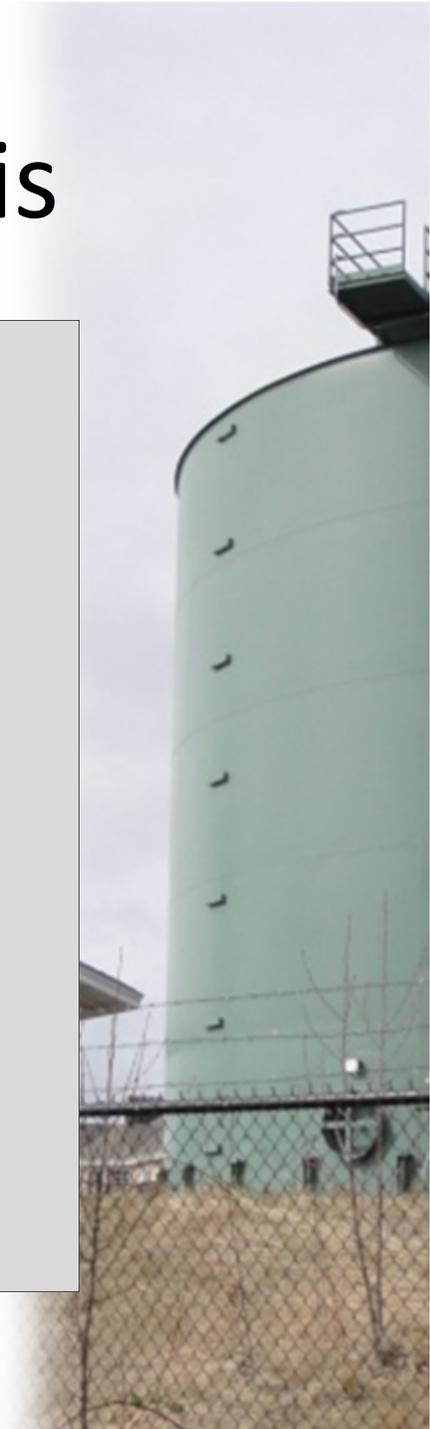
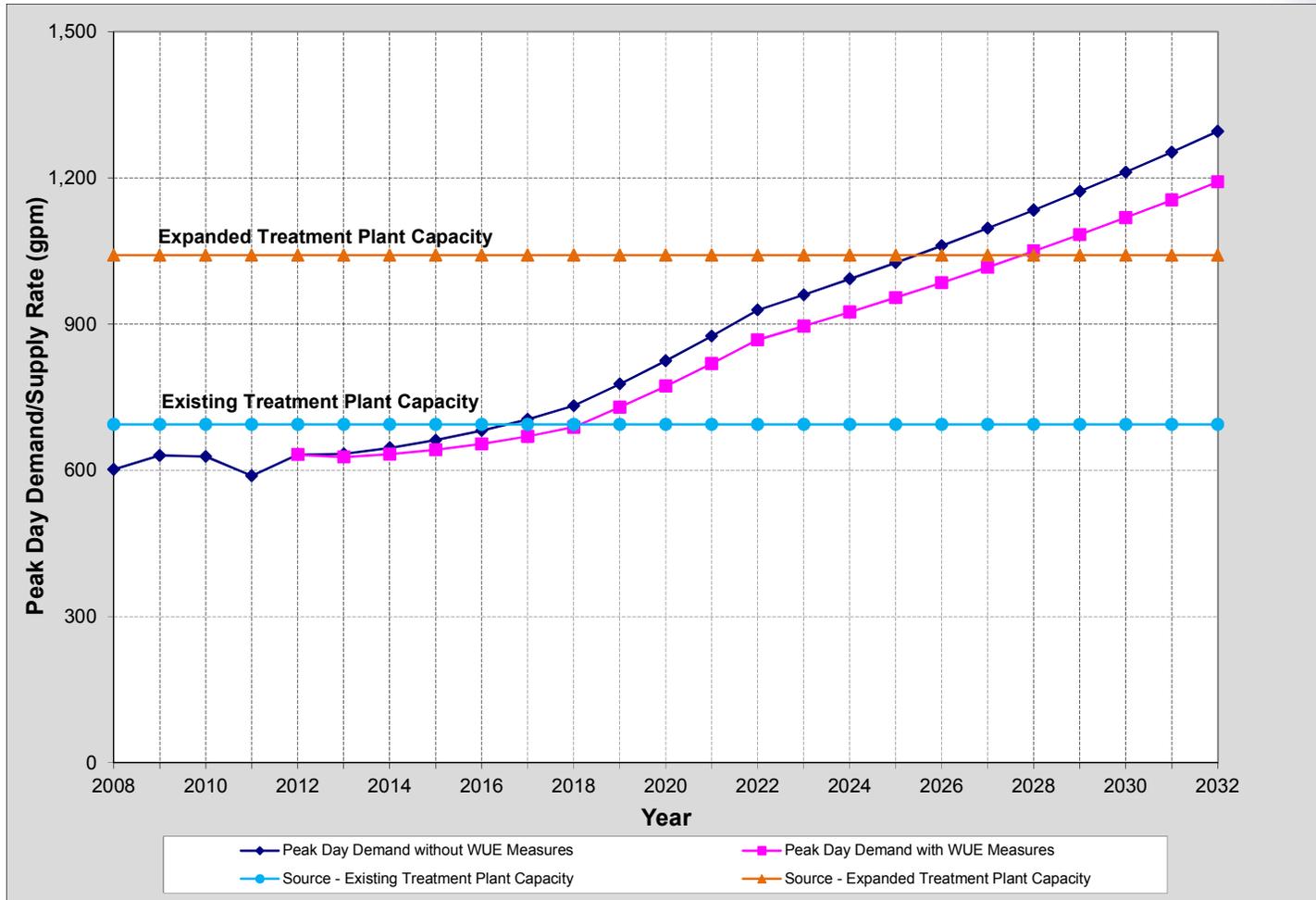


# Supply Analysis



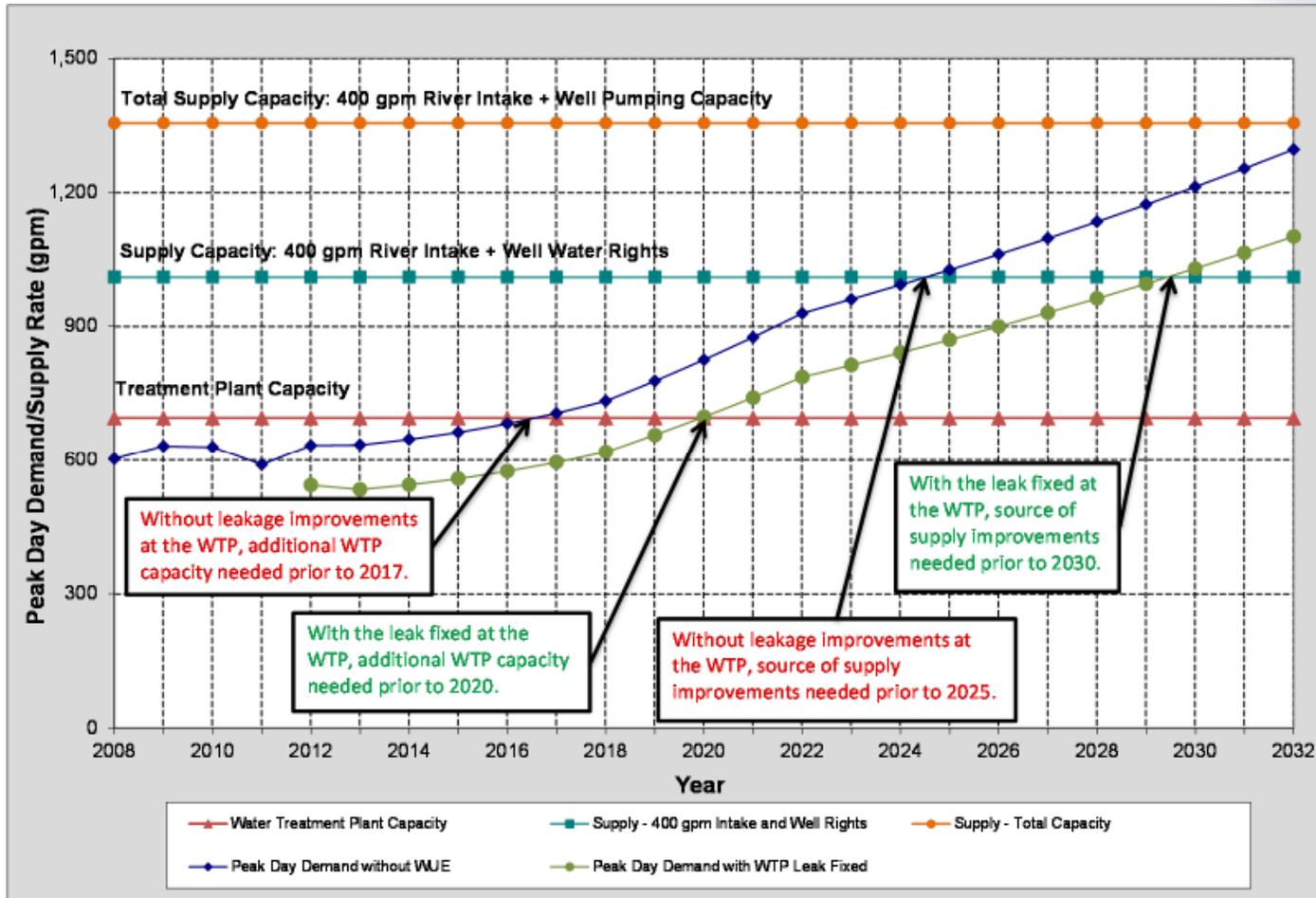


# Treatment Plant Analysis





# Treatment Plant Analysis





# Existing Storage Analysis

Description	Supply Area			Totals
	996 Zone	1050 Zone	1077 Zone	
<b>Available/Usable Storage (MG)</b>				
Maximum Storage Capacity	0.51	0.22	0.50	1.23
Dead (Non-usable Storage)	-0.15	-0.02	0.00	-0.17
Total Available Storage	0.36	0.20	0.50	1.06
<b>Required Storage (MG)</b>				
Operational Storage	0.12	0.01	0.03	0.16
Equalizing Storage	0.01	0.00	0.00	0.01
Standby Storage	0.21	0.07	0.03	0.31
Fire Flow Storage	0.00	0.18	0.27	0.45
Totals	0.33	0.26	0.33	0.93
<b>Surplus or Deficient Storage (MG)</b>				
Surplus or Deficient Amt.	0.02	-0.06	0.17	0.12

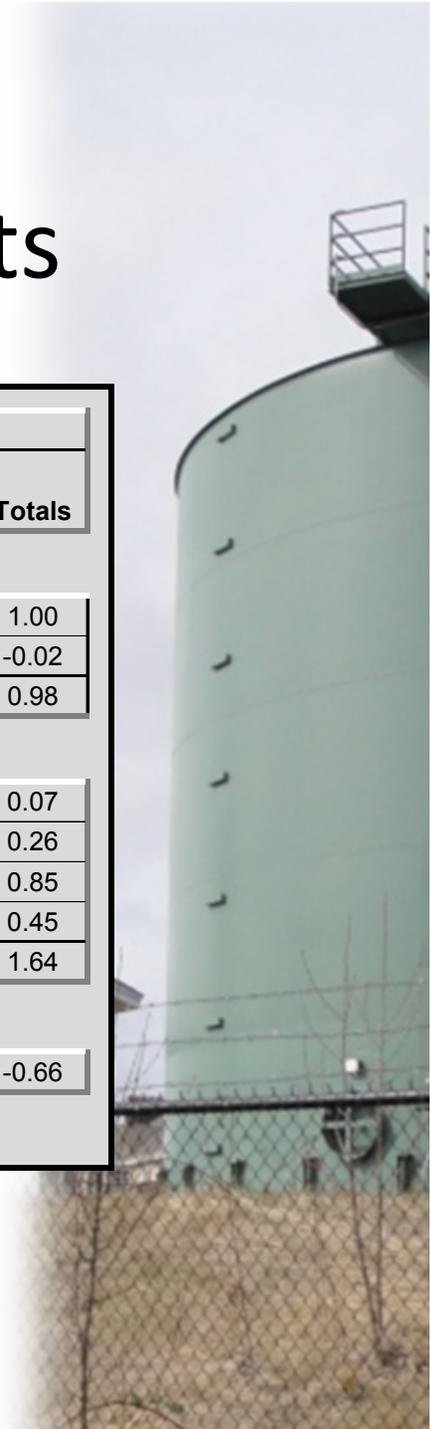
Note: Fire flow for the 996 Zone is provided by the 1050 and 1077 Zones through various PRVs.



# Future Storage Analysis with System Improvements

Description	2018 Supply Area				2032 Supply Area			
	996 Zone	1050 Zone	1077 Zone	Totals	996 Zone	1050 Zone	1077 Zone	Totals
<b>Available/Usable Storage (MG)</b>								
Maximum Storage Capacity	0.51	0.22	0.50	1.23	0.28	0.22	0.50	1.00
Dead (Non-usable Storage)	0.00	-0.02	0.00	-0.02	0.00	-0.02	0.00	-0.02
Total Available Storage	0.51	0.20	0.50	1.21	0.28	0.20	0.50	0.98
<b>Required Storage (MG)</b>								
Operational Storage	0.12	0.01	0.03	0.16	0.03	0.01	0.03	0.07
Equalizing Storage	0.05	0.00	0.00	0.05	0.20	0.06	0.00	0.26
Standby Storage	0.24	0.10	0.06	0.40	0.34	0.42	0.10	0.85
Fire Flow Storage	0.00	0.18	0.27	0.45	0.00	0.18	0.27	0.45
Totals	0.40	0.29	0.37	1.06	0.56	0.67	0.40	1.64
<b>Surplus or Deficient Storage (MG)</b>								
Surplus or Deficient Amt.	0.11	-0.09	0.13	0.15	-0.28	-0.47	0.10	-0.66

Note: Fire flow for the 996 Zone is provided by the 1050 and 1077 Zones through various PRVs.



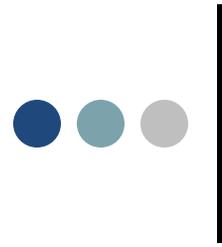


# Existing System Capacity

Demands Per ERU Basis	
Average Day Demand Per ERU (gal/day)	289
Peak Day Demand Per ERU (gal/day)	723
Peak Hour Demand Per ERU (gal/day)	1,301
Supply	
Limiting Supply Rate - Main BPS Capacity (gal/day)	3,240,000
Peak Day Demand Per ERU (gal/day)	723
Maximum Supply Capacity (ERUs)	4,481
Water Treatment Plant	
Limiting Supply Rate - 1.0 MGD Facility (gal/day)	1,000,000
Peak Day Demand Per ERU (gal/day)	723
Maximum Supply Capacity (ERUs)	1,383
Storage Capacity	
Maximum Available Equalizing & Standby Storage Capacity (gal)	444,044
Existing ES & SB Storage Requirements (gal)	319,800
ES & SB Storage Requirement Per ERU (gal)	254
Maximum Storage Capacity (ERUs)	1,748
Transmission Capacity	
Limiting Transmission Capacity (gal/day)	2,538,100
Peak Day Demand Per ERU (gal/day)	723
Maximum Transmission Capacity (ERUs)	3,511
Annual Water Rights Capacity	
Annual Water Right Capacity (gal/day)	468,000
Average Day Demand Per ERU (gal/day)	289
Maximum Annual Water Right Capacity (ERUs)	1,619
Instantaneous Water Rights Capacity	
Instantaneous Water Right Capacity (gal/day)	2,364,480
Peak Day Demand Per ERU (gal/day)	723
Maximum Instantaneous Capacity (ERUs)	3,270
Instantaneous Water Rights Capacity with Limited Maximum River Supply	
Instantaneous Water Right Capacity (gal/day)	1,454,400
Peak Day Demand Per ERU (gal/day)	723
Maximum Instantaneous Capacity (ERUs)	2,012
Maximum System Capacity	
Based on Limiting Facility - Water Treatment Plant	1,383
Unused Available System Capacity	
Maximum System Capacity (ERUs)	1,383
Existing (2012) ERUs	1,259
Surplus Capacity (ERUs)	124

Capacity will increase when leak at treatment plant is fixed.





# Hydraulic Analyses

- Low pressures found near tanks
- Low fire flow availability in areas with undersized water main

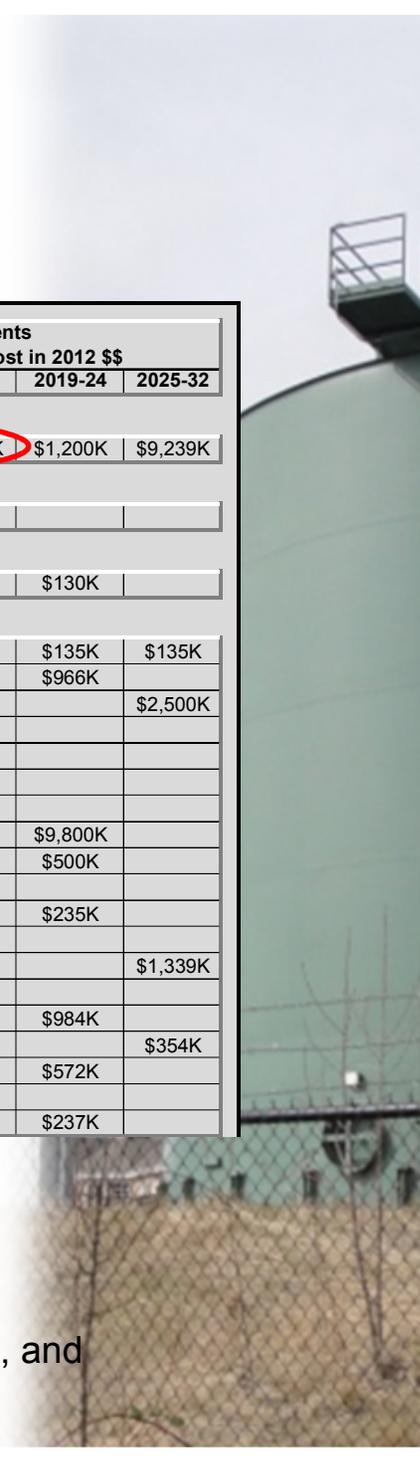




# Water System CIP

No.	Description	Estimated Cost (2012 \$\$)	20-Year Schedule of Improvements							2019-24	2025-32
			Planned Year of Project and Estimated Cost in 2012 \$\$								
			2013	2014	2015	2016	2017	2018			
<b>Water Main Improvements</b>											
WM1	Annual Water Main Replacement Program	\$10,639,000	\$0K	\$0K	\$0K	\$0K	\$0K	\$200K	\$1,200K	\$9,239K	
<b>Pressure Zone Improvements</b>											
PZ1	1077 Zone Improvements	\$135,000					\$135K				
<b>Pressure Reducing Station Improvements</b>											
PRV1	Ridge Road PRV and Water Main Replacement	\$130,000							\$130K		
<b>Facility Improvements</b>											
F1	Water Treatment Plant Replacement Membranes	\$405,000		\$135K					\$135K	\$135K	
F2	Water Treatment Facility Third Skid	\$966,000							\$966K		
F3	Water Treatment Facility Expansion	\$2,500,000								\$2,500K	
F4	Water Rights Claim Investigation	\$20,000			\$10K	\$10K					
F5	Increase Monitoring of Existing Sources	\$10,000	\$5K		\$5K						
F6	River Diversion Improvements	\$125,000				\$125K					
F7	Alternative Water Source Feasibility Study	\$200,000			\$14K	\$14K	\$172K				
F8	Additional Water Rights and Source of Supply	\$9,800,000							\$9,800K		
F9	Well Nos. 1 and 2 Improvements	\$500,000							\$500K		
F10	Well No. 5 Abandonment	\$10,000					\$10K				
F11	Clear Well No. 3 Construction	\$235,000							\$235K		
F12	Clear Well No. 1 and No. 2 Rehabilitation/WTP Leak	\$133,000	\$133K								
F13	1050 Zone Reservoir	\$1,339,000								\$1,339K	
F14	996 Zone Reservoir Roof Repair	\$0	\$0K								
F15	996 Zone Reservoir Replacement	\$984,000							\$984K		
F16	Center Street Booster Pump Station Improvements	\$354,000								\$354K	
F17	Hilltop Booster Pump Station Improvements	\$572,000							\$572K		
F18	Telemetry and Supervisory Control Improvements	\$34,000	\$34K								
F19	Telemetry and Supervisory Control Expansion	\$237,000							\$237K		

- WM1: Minimal water main replacement
- PZ1: Minimum pressure requirements per WAC 246-290-230
- F1: Membranes must be replaced every 7 to 10 years
- F4 - F7: Source of supply planning/may get outside funding
- F12: Lost water reduces water system capacity, increases DSL, and over utilizes existing sources of supply



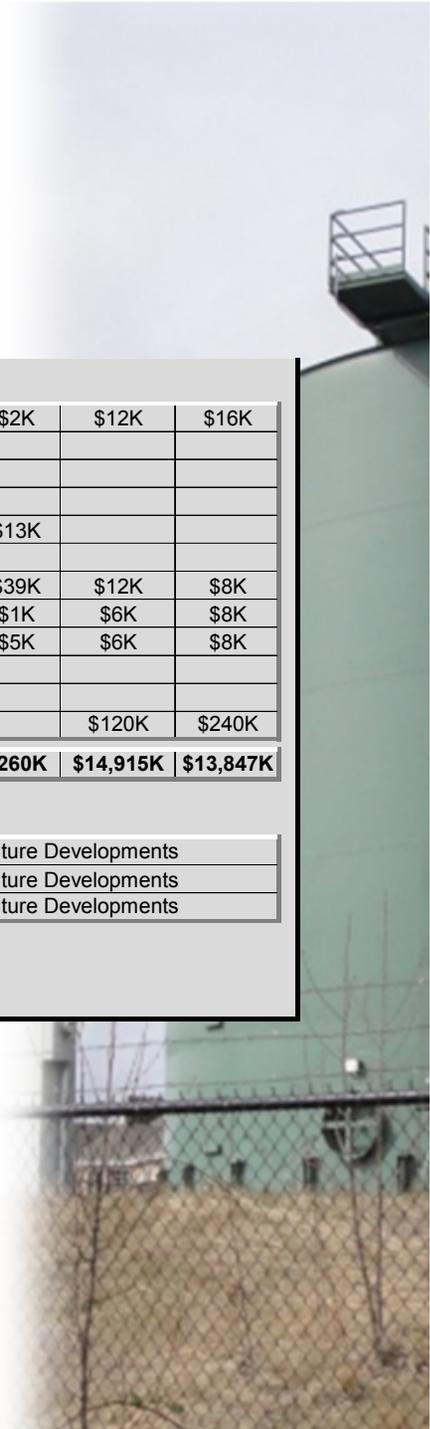


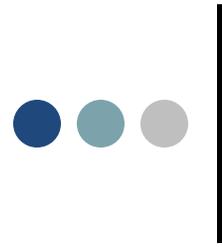
# Water System CIP

Miscellaneous Improvements										
M1	Annual PRV Testing and Inspection	\$40,000	\$2K	\$2K	\$2K	\$2K	\$2K	\$2K	\$12K	\$16K
M2	1050 Zone Reservoir Level Reading Improvement	\$8,000			\$8K					
M3	Update the Water Development and Construction Standards	\$10,000					\$10K			
M4	Update the Water Sections of the Eatonville Municipal Code	\$8,000		\$1K	\$4K	\$4K				
M5	Hydraulic Model Calibration	\$13,000						\$13K		
M6	Leak Identification at the Water Treatment Plant Site	\$5,000	\$5K							
M7	Water Use Efficiency Program and Leak Detection	\$75,000	\$2K	\$2K	\$2K	\$5K	\$5K	\$39K	\$12K	\$8K
M8	Cross Connection Control Program	\$20,000	\$1K		\$2K	\$1K	\$1K	\$1K	\$6K	\$8K
M9	Watershed Control Program	\$38,000	\$1K	\$1K	\$2K	\$8K	\$8K	\$5K	\$6K	\$8K
M10	Billing System Modificaitons <sup>1</sup>	\$0								
M11	Comprehensive Water System Plan Addendum	\$10,000		\$10K						
M12	Comprehensive Water System Plan Update (Every 6 years)	\$370,000	\$10K						\$120K	\$240K
<b>Total Estimated Project Costs of Town Funded Improvements</b>		<b>\$29,925,000</b>	<b>\$193K</b>	<b>\$151K</b>	<b>\$49K</b>	<b>\$168K</b>	<b>\$343K</b>	<b>\$260K</b>	<b>\$14,915K</b>	<b>\$13,847K</b>
Developer Funded Improvements										
DF1	1140 Pressure Zone	\$1,268,000	Timing of Project Based on Timing of Future Developments							
DF2	1060 Pressure Zone	\$3,640,000	Timing of Project Based on Timing of Future Developments							
DF3	Eatonville Highway W 8-inch Water Main	\$2,255,000	Timing of Project Based on Timing of Future Developments							
<b>Total Estimated Project Costs of Developer Funded Improvements</b>		<b>\$7,163,000</b>								

1: Project completed in-house by the Town in 2012.

- M1 – M12: On-going programs and planning efforts
- Total Annual Project Costs are less than \$200K per year, except for 2015, which includes a project that will likely get outside funding, and 2016, which includes the start of a water main replacement program

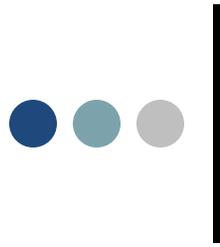




# Guidance Document

- The CIP is a tool for the Town's use
- Shift projects as growth patterns and priorities change
- Modifying the 20-year population projections will not alter the proposed 6-year CIP





# Financial Program

- 6-Year CIP funding sources:
  - Capital Reserves
  - Minimal Debt Issuance, mostly in 2018 (Revenue Bonds)
- Annual Rate Adjustment
  - 2.5% in 2014 and 2018
  - 6% in 2015, 2016, and 2017
  - Results in bills that are \$2 to \$5 more per month





# Town of Eatonville

## Comprehensive Water System Plan

Town of Eatonville



Agency Review  
February 2013



Prepared By:

