Town of Superior

Water Conservation Plan

July 2011

Great Western Institute

CH2MHILL

Contents

Tables

Figures

Appendices

Acronyms and Abbreviations

acre-foot (AF)	Unit of volume to measure water, equivalent to an acre of area covered with one foot of water (325,850 gallons)
AMR	Automated meter reading
AWWA	American Water Works Association
Best management practice (BMP)	A measure or activity that is beneficial, empirically proven, cost-effective, and widely accepted in the professional community
CRC	Center for ReSource Conservation
CWCB	Colorado Water Conservation Board
Dual flush (DF) toilets	A toilet that uses no more than 1.6 gallons per flush for solids and 0.9 for liquids
Evapotranspiration (ET)	A combination of water evaporation from soil and exposed surfaces and plant transpiration which is the loss of water from plants
FTE	Full time equivalent
gpcd	Gallons per capita per day
gpd	Gallons per day
Gross per capita water use	Total treated water production divided by total service population
HET	High efficiency toilet (no more than 1.2 gallons per flush)
HOA	Home Owner's Association
ICI	Institutional, commercial, and industrial
Large-volume user	A water customer whose usage is substantial relative to other users; may present unique peaking or other demand characteristics
Measure (conservation)	A technology or practice that directly reduces water use
MG	Million gallons
mgd	Million gallons per day
OWCDP	Office of Water Conservation and Drought Planning
Per capita use	Total use divided by the total population served

Program (conservation)	An action or policy that encourages, requires, or otherwise leads to implementation of water saving measures.
Residential per capita water use	Total Residential + Multifamily metered treated water demand divided by total service population
Ultra-low-flush toilet (ULFT)	A toilet that uses no more than 1.6 gallons per flush
WET	Water Education for Teachers
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

Introduction

i. Purpose

The Town of Superior (Town), located primarily in Boulder County, has a history that dates back to 1896 as a mining town. Mining was the Town's major industry until 1945 when the largest mine closed. Population was steady around 250 until recently when development began for single family homes, retail establishments, and commercial business. Substantial development of land began in 1987 and has continued to increase the Town's population to an estimated 10,809 in 2009. Development of retail and commercial establishments has continued steadily along with single family home development.

The Town believes in good environmental stewardship and is committed to responsible and efficient use of its precious natural resources. To this end the Town has encouraged water conservation through the implementation of tiered water rates, residential irrigation audits, the institution of daytime watering restrictions, and the education of water customers using Town publications and online content. Currently the Town does not have an official water conservation planning document. The Town realizes the importance of evaluating more conservation measures and planning for implementation. The purpose of this document is to serve as the Town's planning document and meet the State requirements to have a Water Conservation Plan (the Plan).

The Plan assesses the characteristics of current water use, summarizes the current status of raw water supply and treatment capacity, estimates future water use, and uses this information to frame a water conservation program. In addition, the Plan provides a detailed assessment of identification and selection of future water conservation measures and programs for all types of water users. Finally, the Plan includes a proposed implementation plan of the selected measures and programs.

Development of this plan was accomplished under the leadership of the Town of Superior Public Works and Utilities Department, and funded through a grant from the Colorado Water Conservation Board (CWCB).

ii. Plan Approach

This Plan was prepared following the nine steps outlined in the Colorado Water Conservation Board (CWCB) Water Conservation Planning Guidance Document. The nine steps are as follows:

1. Existing Water System Profile
2. Characterize Water Use and Forecast Demand
3. Profile Proposed Infrastructure
4. Identify Conservation Goals
5. Identify Conservation Measures and Programs
6. Evaluate and Select Conservation Measures and Programs
7. Modify Demand Forecasts
8. Implementation Plan
9. Monitor, Evaluate, and Revise (occurs after plan has been accepted, approved, and implemented).

1 Existing Water System Profile

Understanding the existing water system and its components is an important step towards evaluating and implementing water conservation measures and programs. The following section discusses characteristics of the existing water system and service area for the Town of Superior (Town).

1.1 Overview

The Town is primarily located in Boulder County, except for the southern-most area which extends into Jefferson County. The Town boundary encloses approximately four square miles and is comprised of retail, small commercial, light industry, residential, and recreational uses. The Town's livelihood originally centered on coal-mining and was founded in 1896. Population began to rise steadily in the 1980's with influx of new residential and commercial development.

Population estimates in the Town's 2008 Utility Master Plan, based on information from Boulder County, reported a projected population of 15,800 by 2010. However, these estimates were established in 1998 and were more aggressive than what has actually occurred. For purposes of water conservation planning future population growth is expected to continue at roughly one percent per year until buildout, although it is not predicted to be a constant annual growth. Rather, it will likely come with several developments within Superior. Historical and projected populations based on a constant 1 percent growth rate are summarized in Table 1 Town of Superior Population Data.

TABLE 1
Town of Superior Population Data

Year	Population	% Change from Previous	Year	Projected Population[3]	% Change from Previous
2000[1]	9,008	-	**2010**	11,027 (11,078)	1.00
2001	9,860	9.46	**2011**	11,138 (11,188)	1.00
2002	9,963	1.05	**2012**	11,249 (11,300)	1.00
2003	10,212	2.50	**2013**	11,361 (11,413)	1.00
2004	10,267	0.54	**2014**	11,475 (11,527)	1.00
2005	10,171	-0.94	**2015**	11,590 (11,643)	1.00
2006	10,173	0.02	**2016**	11,706 (11,759)	1.00
2007[2]	10,703	5.21	**2017**	11,823 (11,877)	1.00
2008	10,718	0.14	**2018**	11,941 (11,996)	1.00
2009	10,809	0.85	**2019**	12,060 (12,115)	1.00
			2020	12,181 (12,237)	1.00
			Beyond 2020	14,500	-

[1]US Census Bureau (April 1, 2000)
[2]Denver Regional Council of Governments 2007 Population Estimates
[3]Estimated population projections provided by the Town were for January each year. For purposes of water demand forecasting the annual population was estimated for each year using an average of the interpolated monthly population. This value is shown in ().

At the end of 2009 the Town's population, which is also the service population, was 10,809. Further alternative development of the Town Center area between now and 2020 would increase the estimated population past 2020 to 14,500. If the growth rate continued at one percent annually this population would occur in 2038.

The Town is landlocked by bordering open space and other cities and only minor annexations are possible. A map of the zoning designations and areas is provided in Figure 1 Zoning Map 2010. The service area of the utility is indicated by the Town Boundary on the zoning map.

1.2 Water Rights and Sources

The Town* has a water rights portfolio that includes surface and ground water. However, for several years the Town's water supply has been only surface water; the small ground water wells are no longer in use. The annual average yield from the water rights portfolio for the Town is summarized in Table 2 Water Supply Summary.

*The Town's water rights are actually owned by the Superior Metropolitan District No. 1 for use by the Town.

TABLE 2
Town of Superior Water Supply Summary

Source	Average Annual Yield (acre-feet)	Dry Year Annual Yield (acre-feet)
Transbasin Water Source	-	-
Colorado-Big Thompson (CBT)	1,456	2,080
Windy Gap[2]	750	0
Irrigation Company Source	-	-
FRICO/Marshall Diversion	245.1	201.5
South Boulder & Coal Creek Ditch Co.	37.5	37.5
Goodhue Ditch Co.	4.5	0
Reuse - Windy Gap	500	500[3]
Total Surface Water Supply	**2,993**	**2,819**
Laramie-Fox Hills Aquifer Wells (not in use)	56.6	56.6[1]

[1]Original water right appropriated is 468 acre-feet, but actual pumped yield is no more than 56.6 acre-feet annually.
[2]The Town owns 15 units of Windy Gap water. After the original Windy Gap project was completed yield was expected to be 100 AF for each unit. Actual yield has been much less due to limitations in firming capacity. The Town is participating in the Windy Gap Firming Project which would increase the firm yield of the Town's Windy Gap Units to approximately 1,500 acre feet per year when completed.
[3] Until the Windy Gap Firming Project is completed, reuse water can only be generated in dry years through the Integrated Operations of the Colorado Big Thompson and Windy Gap Projects pursuant to the Amendatory Contract 4-07-70-W0107 between the U.S., Northern Colorado Water Conservancy District, and the Municipal Subdistrict.

The average annual total volume of water available annually is 2,993 acre-feet, of which 90 percent is from Colorado-Big Thompson (CBT), Windy Gap, and reuse from Windy Gap.

Only water from Windy Gap is available for reuse (use to extinction) since this is trans-basin water. Though CBT water is trans-basin in nature, it is not available for use reuse based upon its water rights.

FIGURE 1

Official 2010 Zoning Map

Zoning

- A-UR Agricultural Urban Reserve
- B-C Community Business
- B-O Office Business
- I-L Light Industry
- OS-N Open Space and Natural
- OS-R Open Space and Recreation
- PD Planned Development
- R-L Low Density Residential
- R-M Medium Density Residential

- Town Boundary
- County Boundary
- Boulder County Open Space
- Lake
- Stream

Feet
0 500 1,000

March 2010

Sources for the data included on this map are the Town of Superior and Boulder County.

Louisville
Boulder County
Broomfield County
Jefferson County
Jefferson County
Jefferson County
Broomfield County
DENVER-BOULDER TURNPIKE
US HWY 36
S 76TH ST
MARSHALL RD
SYCAMORE ST
COAL CREEK DR
JEFFERSON AVE
MCCASLIN BLVD
ROCK CREEK PKWY
INDIANA ST
S 88TH ST
COALTON RD
STATE HIGHWAY 128
Coal Creek
Rock Creek
Town Hall
Superior Cemetery
Town of Superior Open Space
Purple Park
Water Treatment Plant
TERMINAL RESERVOIR
Superior Elementary
Wastewater Treatment Plant
HODGSON HARRIS RESERVOIR
AUDREY RESERVOIR
Community Park
Police and Fire Station
Eldorado K-8
I-L
PD
R-M
R-L
OS-R
OS-N
A-UR
B-C
B-O

1.3 Water Delivery

Water services are provided to residents within the Town of Superior by Superior Metropolitan District (District) No. 1, which is governed by a Board of Directors. The Town's Board of Trustees is also designated as the District's Board of Directors.

Some of the oldest water distribution mains were constructed in 1980, and a majority of the system was built to coincide with growth between 1988 and 2000. To serve the population, the Town manages approximately 3,600 utility accounts. The Town operates its own 400 acre-feet (130 million gallon) reservoir to store raw water upstream of the water treatment plant. The Town's water treatment plant was constructed in 1990 and expanded to its current capacity of 5.5 million gallons per day (mgd) in 1999, which is equivalent to an annual treated water production of 6,160 acre-feet. Potable water is distributed from the treatment plant to customers through approximately 65 miles of pressurized mains in two pressure zones.

Existing infrastructure for the raw and potable water delivery systems includes:

- Two raw water pump stations to the reservoir
- 400 acre-feet raw water reservoir
- 5.5 MGD water treatment plant
- Two potable water distribution pump stations for the high pressure zone
- Three potable water storage tanks: 1.4 MG and 1.5 MG for the low pressure zone, and 0.5 MG for the high pressure zone, for a total storage volume of 3.4 MG

There is also a separate distribution system for non-potable water for irrigation use. The non-potable system conveys raw water and treated water from the WWTP to non-residential customers for irrigation. There is a small storage tank at the wastewater treatment plant for 500,000 gallons of reuse water for irrigation.

Existing infrastructure for the non-potable water delivery system includes:

- Reuse water pump station at the wastewater treatment plant
- Seven open storage ponds
- One 1.4 MG closed storage tank
- Two pump stations in the distribution system

2 Characterize Water Use and Forecasted Demand

2.1 Customer Segments

Potable and non-potable water delivery is categorized into five main customer segments. A brief summary of each is provided in Table 3 Customer Segments.

TABLE 3
Customer Segments

Customer Segment	Description	Source
Residential	Residential single family homes and duplexes, indoor and outdoor water use	Potable
Multi-Family	Three or more attached living units. Common areas have a separate irrigation tap supplied with reuse or raw water	Potable
Commercial	Taps that provide water to the building for indoor use. Services included in this classification are retail, schools, hotels, and offices. Commercial establishments have a separate irrigation tap.	Potable
Commercial Irrigation	Dedicated taps for irrigation at commercial establishments, as defined above.	Non-potable
Town Irrigation	Dedicated taps for irrigation at Town facilities including parks, right-of-ways, streetscapes, and medians	Non-potable

Non-potable water for irrigation is only provided to non-residential customers. Residential customers use potable water for irrigation.

2.2 Water Billing and Rate Structure

The District charges system development fees, fixed monthly base fees, and usage fees to cover capital and operating costs. Monthly potable water charges consist of a base fee and an inclining block usage charge. The base fee varies for commercial establishments depending on the tap size. Potable water bills are sent to customers monthly. Irrigation (non-potable) water charges consist of a base fee per meter and a flat usage charge per 1,000 gallons. Irrigation bills are sent to customers monthly.

For billing purposes the District has established equivalent residential (EQR) unit schedules. An EQR is the demand placed on a system attributable to an average single-family detached residence or the equivalent. For example, a small-sized multifamily residential unit (1 bedroom and 1 bathroom) is assigned an EQR of 0.5.

Usage charges for potable and non-potable water are summarized in Table 4 Water Rates Summary.

TABLE 4
Summary of Water Rates

Customer Segment	Base Fee ($/month/EQR)	Usage Fee ($/1,000 gallons/EQR)	Initial System Development Fee
Residential	$13.19	$2.57 - 0 to 7,000 gal $2.83 - 7,001 to 20,000 gal $3.99 - 20,001 to 30,000 gal $5.25 - 30,001 to 40,000 gal $7.70 - > 40,001 gal	$18,662
Commercial, Multifamily, Industrial	$13.19 - ¾” $24.94 - 1” $49.88 - 1 ½” $99.37 - 2” $215.12 - 3” $366.91 - 4”	$2.57 - 0 to 7,000 gal $2.83 - 7,001 to 20,000 gal $3.99 - 20,001 to 30,000 gal $5.25 - 30,001 to 40,000 gal $7.70 - > 40,001 gal	$14,515 - ¾” $18,662 - ¾” (w/o separate irrigation tap) $25,919 - 1” $58,058 - 1 ½” $100,565 - 2” $228,085 - 3” $402,259 - 4”
Irrigation (non-potable)	$9.83 $/month/meter (charged seasonally normally 8 months per years)	$2.06/1,000 gal $2.71/1,000 gal (Boulder Valley School District Lease)	$7,881 - ¾” $14,186 - 1” $31,524 - 1 ½” $52,541 - 2” $126,098 - 3” $210,163 - 4”

The above rates went into effect January 11th, 2010. Prior to this the last rate update was in January 2009. All potable water usage fees follow an inclining block rate structure, where the amount charged per gallon increases as more water is used. Non-potable water usage fees are a flat rate and the associated monthly base fee is only charged seasonally with water availability.

2.3 Potable Water Use

Accounting for water use through data collection is important in order for the Town to evaluate trends in water use and the effectiveness of measures and programs. The Town provided WTP data, as well as potable and non-potable water use based on billed monthly data for the last five years. While this data is adequate, water accounting could be improved with additional equipment to measure usage associated with the hydrant flushing and other operational activities. In addition, some water use is measured (i.e. construction water) but is billed off-line, so is not accounted for in the billed monthly data. Simple procedures could be added by the Town to ensure this data is captured consistently.

Per capita water use was calculated based on treated water use and total water use. Total water use includes raw water, treated water from the water treatment plant, and reuse water from the wastewater treatment plant. Per capita water use was calculated for the years 2005 through 2009. Per capita water use was calculated based on total water use and the population on record for that year.

The average per capita total water use was 177 gallons per capita per day and the average per capita treated water use was 113 gallons per capita per day (gpcd). It is important to

note that treated water is used for irrigation at single family homes and is included in the 113 gpcd. Potable and total per capita water use from 2005 to 2009 is summarized in Table 5.

TABLE 5
Water Use Summary - Gallons Per Capita

Year	Annual Potable (MG)	Annual Total (Potable+Non) (MG)	Annual Potable (gpcd)	Annual Total (Potable+Non) (gpcd)
2005	425.6	608.6	115	164
2006	472.9	831.2	127	224
2007	443.4	688.1	114	176
2008	436.8	686.5	112	175
2009	392.6	572.0	100	145
Average			**113**	**177**

A graph showing the trend of gallons per capita usage is provided in Figure 2.

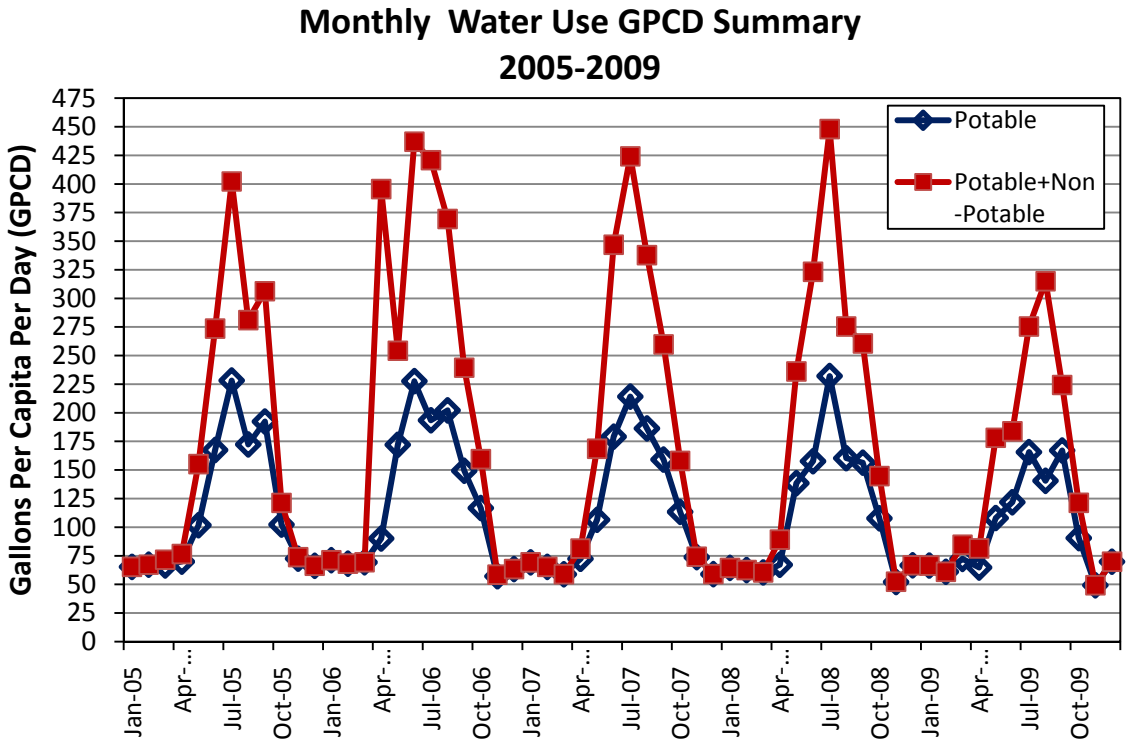


FIGURE 2
Monthly Water Use Gallons Per Capita Per Day (GPCD) Summary 2005-2009

2.4 Non-Potable Water Use

Non-potable water comes from two sources: treated wastewater from the WWTP, raw water from the Town's reservoir and ditch shares. For purposes of this report water treated from the WWTP for use as irrigation water is referred to as reuse water. The non-potable water system includes reuse water and raw water.

Non-potable water is used for irrigated areas at parks and schools, open spaces, common areas in home-owner association (HOA) controlled neighborhoods, and landscaped areas at commercial and office establishments. The total amount of irrigated acres supplied by the non-potable system is approximately 349 acres. Use of reuse water from the WWTP is maximized for irrigation, but storage capacity at the plant is limited. The non-potable system is supplemented with raw water from the reservoir if needed. Windy Gap water can be used to extinction and is available for reuse. CBT water is not available for reuse and must be returned to the creek. In addition to water rights accounting the Town must monitor for overwatering with non-potable water; ponding or runoff must be minimized to comply with the State's Regulation No. 84 Reclaimed Water Control.

Non-potable water is typically used from April through October. Pattern of use from 2008 to 2010 is shown in Figure 3 below.

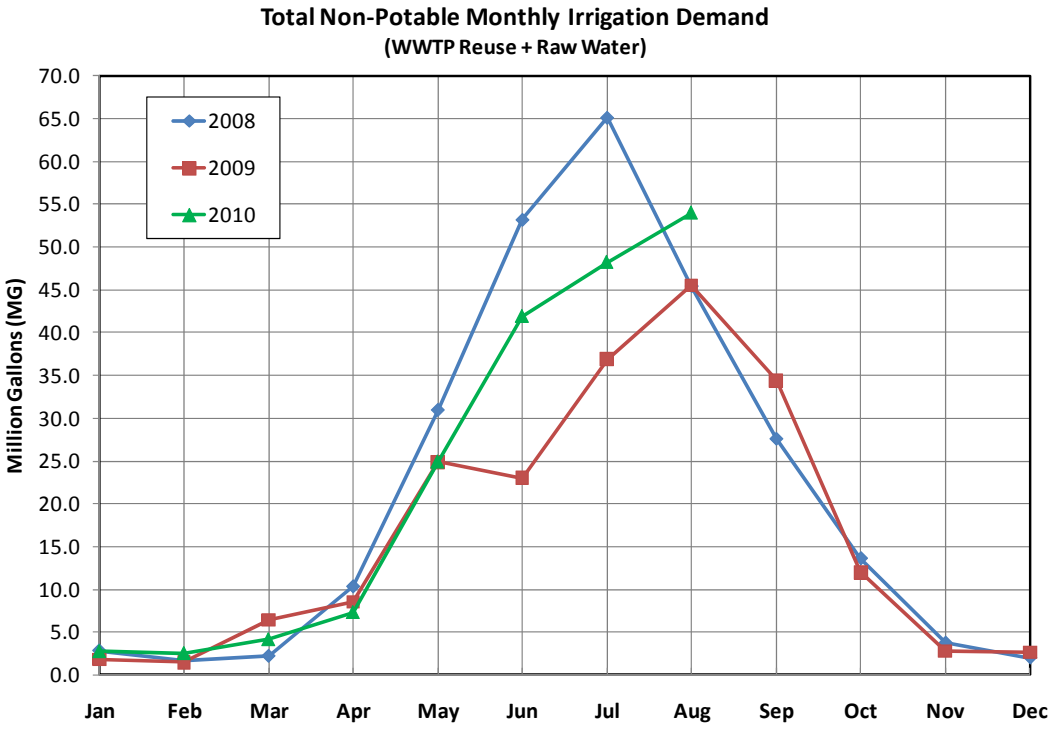


FIGURE 3
Total Non-Potable Demand Trend

The total amount of non-potable water used in 2008 was 259 MG (793.8 acre-feet) and in 2009 was 200 MG (615.1 acre-feet). Peak month usage was 65.1 MG in July of 2008, an average of 2.1 mgd for that month. A small amount of flow is recorded even during the winter months, but this is due to operational requirements at the WWTP to keep the tank filled and does not actually go into the non-potable system. Reuse water from the WWTP for irrigation is supplemented with raw water to meet demand. For 2008 and 2009, the breakdown between reuse water and raw water used for irrigation is summarized in Table 6.

TABLE 6
Non-Potable Water Summary

Year	WWTP Reuse	Raw Water	Total Non-Potable
2008	143.3 MG	115.4 MG	258.7
2009	143.3 MG	57.1 MG	200.4

Non-potable water use per connection was evaluated for purposes of water forecasting and is presented in Table 14.

2.5 Current Water Conservation Measures and Programs

The Town has several water conservation measures and programs already in place that will be evaluated as part of this plan, and potentially continued or expanded. A majority of land development in the Town occurred fairly recently compared to other communities, which provided the Town with a unique opportunity to better incorporate infrastructure that would support sustainable water use. The primary example is the separate non-potable water supply system for irrigation.

Other water conservation measures and programs currently in place include:

- Mandatory Watering Restrictions,
- Slow the Flow Water Audits,
- Meter inspection and replacement,
- Central irrigation system (non-potable),
- Leak detection,
- Fee structure,
- Residential Green Building Program,
- Educational Outreach,
- Environmental Water Conservation Tips – Town website

Each conservation item is briefly described in the following paragraphs.

Mandatory Watering Restrictions - In response to drought conditions in 2003 the District modified its rules and regulations to include mandatory time-of-day watering restrictions for both potable and non-potable water users. The restriction states there is no watering allowed from April 1st through October 31st from 10:00 am until 6:00 pm. These restrictions

were instituted effective December 15th, 2003; although they were in response to the drought, they have not been repealed.

Slow the Flow Water Audits - Slow the Flow is a program available through the Center for ReSource Conservation (CRC) for participating water providers. Last year the Town offered 53 water audits to residential customers as part of Slow the Flow. Each audit includes an evaluation of the customer's irrigation system and does not include indoor water use.

Meter Inspection and Replacement - The Town has an ongoing operation and maintenance budget for inspection and replacement of old water meters.

Central Irrigation System - In 2009 an automated irrigation control system was installed for the non-potable irrigation system. This system controls watering zones and times for all non-potable water.

Leak Detection - Though the distribution infrastructure is relatively new there are some older areas, and the Town understands the importance of monitoring and assessing the condition of the system. Since 2009 approximately 50 percent of the potable water distribution system has been tested for leaks using acoustic technology as part of Phase I and Phase II testing. The Town is planning to complete testing on the remainder of the potable water system by the end of 2011

Fee Structure - District potable water rates are charged according to an inclining block rate structure. This is a common approach to encourage water conservation by charging more per volume as water use increases. Non-potable water is charged at a flat rate per volume. There are planned water rate increases through 2015. Rates will increase 5 percent in 2011, 2013, and 2015; rates will increase 4 percent in 2012 and 2014. A System Development Fee Study was also completed in 2009. Development fees are one-time fees charged to a new customer connecting to the distribution system or an existing customer increasing demand on the system. As a result of this study adjustments were made to the development fees including increasing the residential fee, decreasing the fee for a ¾" commercial tap, and increasing the fee for commercial taps greater than ¾". Significant changes were made to the irrigation water system fees which were increased by a factor of five for each tap size.

Residential Green Building Program - The Superior Municipal Code outlines the requirements for building, electrical, plumbing, and many other disciplines. On May 11, 2009 the Town's board adopted Article XIV - Green Building Program. The article requires new residential construction and renovation projects to meet minimum efficiency requirements. The new dwelling has to meet "green point" requirements based on the project type and square footage. Many of the points are energy related, such as evaporative cooling, solar power, and efficient windows. However, there are several points that would conserve water: point of use water heater, high efficiency fixtures, Xeriscape landscaping and high-efficiency automatic irrigation. The regulations do not require a certain amount of water efficient points to meet the code requirements. Adding a requirement to include a certain percentage of water efficient points would be a simple way to ensure additional water efficiency for new construction.

Also, the Town is currently drafting a code section for commercial construction that would outline similar "green" building requirements. While in draft format, it would be a good

opportunity for the Town to consider adding water efficiency requirements to the commercial code.

Educational Outreach **-** The Town currently disseminates water conservation tips and strategies through its Town newsletter to residents. In addition, as part of its compliance with Regulation 84 requirements, the Town meets on an annual basis with all non-potable water customers to discuss their irrigation practices and to reiterate the need for application at no more than agronomic rates.

Internet **–** The Administration Department created an Environmental Web Page on the Town's website that advertises water conservation programs, events and tips for residents to view.

2.6 Future Water Demand

Growth has slowed, but not stopped in the Town. Over the next several years a recently completed 75-unit townhome development is expected to reach capacity. The Town also recently approved a 53 single-family home development that will be built over the next two years. Over the next 5 to 10 years a 15 acre parcel is proposed to construct a hotel (approximately 125 rooms) with additional room for approximately 175,000 square feet of office, and 10,200 square feet of retail. There is another 6-acre parcel that would include 54,000 square feet of office. An area of 27 acres west of the Superior Marketplace located in Boulder County will eventually be annexed into the Town as office or industrial use; currently 5 acres of that property has been annexed into the Town and zoned for storage units.

In 10 to 15 years the Town has planned a 162 acre development including a "Town Center" which would potentially include 334 single family units, 1,615 units of senior of multifamily housing, 19 acres of parks (irrigated), 41 acres of open space (non-irrigated), a hotel with 185 rooms, and 1.3 million square feet of commercial, retail, event center, and recreational facilities.

2.6.1 Introduction

This section presents the methodology and results of water demand forecasting conducted for the Town of Superior. Forecasting was performed to estimate annual and monthly water use over the planning period starting in 2010 and ending in 2020. The water demand forecasts for total potable and total water use (potable plus non-potable) were developed by estimating the future water use for each of the following customer water use categories currently served by the Town:

- Residential- Single Family (potable)
- Residential- Multi-Family (potable)
- Commercial (potable)
- Irrigation (non-potable)
- Non-Revenue (potable)

These categories were used to develop annual and monthly future potable and non-potable demands for the Town. Forecasting for each of these categories of water use is discussed in

the following subsections; as are results of the total potable and non-potable demand estimates.

Non-potable water use was included as a separate category of water use demand to account for the combination of real and apparent treated water losses that have been observed due to the following: transit losses between the treatment plant and customer meters, Town uses that are either not billed or not tracked by the Public Works Department, inaccurate customer meters, or are otherwise lost from the Town's potable water distribution system.

2.6.2 Methodology

Residential Single Family and Multi Family

Residential water use forecasts were developed based on a combination of single family and multi-family billing data, and future population data (provided in Table 1). Single family and multi-family customer segments account for all resident population water use within the Town, and exclude transient populations that use Town supplied water such as tourists and the daily influx of water uses in commercial businesses. The methodology used to estimate single- and multi-family future water demands is as follows:

1. Yearly populations for the years 2005 through 2020 were provided by the Town. Monthly population data was estimated using linear interpolation methods. Note that the Town population data were for January of each year. For purposes of this analysis, annual population was estimated for each year using an average of the interpolated monthly population, which in practice added about 50 people per year to the January population estimated by the Town (See Table 1).

2. Annual residential water use in gallons per capita per day (GPCD) was calculated for 2005 through 2009 for the combined single- and multi-family customer accounts. The average GPCD for these five years was used as the base for future residential GPCD estimates.

3. Passive water demand reductions[1] were developed to account for customer-based changes in water use that are expected to occur as a result of the natural replacement of toilets, clothes washers and dishwashers in accordance with recent policy analyses conducted for the State of Colorado (Great Western Institute, 2010). The State indicated that passive savings are expected to occur within a range of high and low potential changes to GPCD as presented in the Table 7. Given that housing in the Town was chiefly constructed since 1994 (after the 1992 National Energy Policy Act took effect—requiring that all toilets installed in residential settings were low flow toilets) it is anticipated that passive water demand reductions in the Town will trend toward the low end of the estimated range developed by the State.[2] Passive savings were estimated using the low range of GPCD adjustments.

[1] Passive water demand reductions are defined by the State as those water savings that occur as a result of customer purchasing decisions driven by the market and the replacement needs of each fixture and/or appliance. Conversely, active water conservation water demand reductions relate to activities conducted by a water utilities or districts that reduce customer water use.

[2] Using the low range is consistent with the passive savings that appear to have occurred in single-family and multi-family homes since 2005. Per capita indoor residential water use declined from about 63 GPCD in 2005 to 58 GPCD in 2009, or a reduction of about 5 GPCD. This agrees well with the predicted low range of passive savings predicted by the CWCB.

4. Future GPCD values were adjusted to include the expected passive savings related to water use reductions that may be realized from 2010 to 2020 as described above.
5. Future projections were created as the product of the predicted future population and the passive savings adjusted residential GPCD.
6. Separate forecasts for single family and multi-family customers were made by analyzing the existing residential water use data, and determining the historic ratio of single-family to multi-family water use as shown in Table 6. The percentage breakdowns for single-family and multi-family customer use were found to be 85 and 15 percent, respectively. These ratios were found to be relatively constant for each year with data (i.e., 2005 to 2009).

TABLE 7
Passive Water Savings from Statewide Water Supply Initiative (SWSI) Conservation Levels Analysis[1]

Year	GPCD Low Range Adjustment	GPCD High Range Adjustment
2010	0.82	1.61
2011	1.64	3.23
2012	2.46	4.84
2013	3.28	6.46
2014	4.11	8.07
2015	4.93	9.69
2016	5.73	11.00
2017	6.53	12.31
2018	7.34	12.66
2019	8.14	13.02
2020	8.95	13.37

[1] Prepared for the Colorado Water Conservation Board (CWCB) by Great Western Institute (2010)

Table 8 provides the historic ratio of single-family to multi-family water use.

TABLE 8
Observed Ratio of Single Family and Multi-Family Residential Water Use to Total Residential Water Use

Year	Single Family[1]	Multi-Family[2]
2005	85%	15%
2006	86%	14%
2007	85%	15%
2008	85%	15%
2009	83%	17%

[1] Ratio of single family water use to sum of single family and multi-family water use.
[2] Ratio of multi-family water use to sum of single family and multi-family water use.

Commercial

Future commercial water use was estimated based on observed monthly commercial water use and connection data. The methodology used to estimate future commercial water use is provided in the following steps.

1. The average daily commercial water use per connection was calculated for each year from 2005 through 2009. The number of connections in 2005 is an average from a partial year of data. The results of this analysis by year are presented in Table 9.
2. Using the commercial connections data, a projected annual connection growth rate of 2 percent per year was estimated using linear interpolation methods from the period of 2005 to 2010, such that the number of commercial connections is predicted to increase from 52 in 2010 to 65 in 2020.
3. Forecasting commercial water use was performed using the product of the average yearly commercial water use per connection presented in Table 9 and the extrapolation of the observed linear growth of commercial connections through the year 2020.

TABLE 9
Commercial Water Use Per Connection

Year	Connections (qty)	Total Annual Water Use (gallons)	Average Daily Water Use per Connection (gallons)
2005	46	21,029,000	1,252
2006	48	21,848,000	1,251
2007	48	22,888,871	1,304
2008	49	24,638,000	1,366
2009	52	24,479,000	1,300
		Average	**1,295**

Irrigation (Non-Potable)

Irrigation, or non-potable, water was estimated based on observed monthly irrigation water use and connection data. The methodology used to estimate future irrigation water use is provided in the following steps.

1. The average daily irrigation water use per connection was calculated for each year from 2005 through 2009, excluding the year 2006 because of the abnormal water use observed in April of that year. The number of connections in 2005 is an average from a partial year of data as presented in Table 10.
2. Using the irrigation connections data, a projected annual connection growth rate of about 0.5 percent per year was estimated using linear interpolation methods from the period of 2008 to 2010, such that the number of irrigation connections is predicted to increase from 68 in 2010 to 88 in 2020.The 2020 estimate of 88 irrigation connections is assumed to be consistent with build-out (noting that build-out for irrigation connections is predicted to occur in 2019).

3. Forecasting irrigation water use was performed using the product of the average yearly irrigation water use per connection presented in Table 10 and the extrapolation of the observed linear growth of irrigation connections through the year 2020.

TABLE 10
Irrigation Water Use Per Connection

Year	# of Connections	Water Use	Daily Water Use per Connection
2005	56	183,059,000	8,956
2006	59	358,355,000	16,783
2007	64	244,695,000	10,557
2008	65	249,717,000	10,525
2009	68	179,412,000	7,264
		Average[1]	**9,326**

[1] Average was calculated including only the years 2005, 2007 and 2008. 2006 was not included due to the usually high water use of 94 million gallons used in April of that year; whereas 2009 was not included due to the unusually wet weather conditions which occurred during the summer months.

Non-Revenue

Non-revenue water relates only to potable water uses. Non-revenue water on an annual basis was estimated using the following steps:

1. Annual non-revenue water was estimated based on the reported difference between total treated water and total billed water. Therefore, non-revenue water includes: unbilled authorized uses, unmetered uses, leaks, meter inaccuracies, etc.

2. An annual percent of non-revenue water was estimated based on the data presented in Table 11**.** Based on these data, a future expected percent of non-revenue water was estimated to be 11.86 percent, calculated using the three most recent years of data.

3. Projected future non-revenue water was then calculated for each future year between 2010 and 2020 as the sum of future annual potable water (single family, multifamily, and commercial) multiplied by the average percent of non-revenue water (i.e., 11.86 percent).

TABLE 11
Estimated Annual Percentage of Non-Revenue Treated Water

Year	WTP Usage (MG)	Billed Usage (MG)	Unbilled Authorized Usage (MG)	Real or Apparent Losses (MG)	Non-Revenue Water (%)
2005	436.05	425.58	N/A[2]	10.47	2.4
2006	518.37	472.87	N/A	45.51	8.8
2007	505.23	443.42	N/A	61.82	12.2
2008	498.19	436.79	N/A	61.40	12.3
2009	449.60	392.62	7.2	49.79	11.1
				Average[1]	**11.9**

[1] Used only 2007, 2008 and 2009 because these years appear to represent current trends. MG = million gallons
[2] Unbilled authorized usage not available for 2005-2008.

2.6.3 Total Potable

Using the forecasts developed for each of the categories of water use described above, total annual and monthly potable water use was forecasted for the period 2010 through 2020 using the following steps:

1. Total annual potable water use for each forecasted year was calculated by summing single family, multi-family, commercial, and non-revenue water use for that year.
2. Monthly potable water use was estimated using a factor that was calculated for each month, based on the percentage of annual treated water used each month, on average, over the past five years, excluding 2009 (because it was a wet year with unusually low summertime water demand). Table 12 presents the percentage of total annual treated water that is used on average in each month.
3. Assuming these monthly water use percentages remain constant, estimates of future monthly treated water use were made by multiplying total predicted annual potable water use by the calculated percentage of annual water use for each month, as presented in Table 12.

2.6.4 Total Non-Potable

Using the information gathered from the forecasts explained above, total non-potable annual and monthly forecasts were created for the period 2010 through 2020.

1. Total non-potable water use for each forecasted year was estimated using projected annual irrigation water use.
2. Monthly non-potable water use was estimated using a factor that was calculated for each month, based on the percentage of annual non-potable water used each month, on average, over the past five years, excluding 2006 (because the April 2006 non-potable water use was observed to be more than 20 times greater than the expected non-potable water use for that month as compared to other years). Table 12 presents the percentage of total annual non-potable water that is used on average in each month.

3. Assuming these monthly water use percentages remain constant, estimates of future monthly non-potable water use were made by multiplying total predicted annual non-potable water use by the calculated percentage of annual water use for each month, as presented in Table 12.

TABLE 12
Monthly Water Use As Percent of Annual[1]

Month	Total Potable %	Total Non-Potable %
January	4.9	0.0
February	4.4	0.0
March	4.7	0.2
April	5.3	1.7
May	9.5	10.2
June	13.0	21.7
July	15.9	28.6
August	13.3	18.8
September	11.7	13.7
October	8.1	5.0
November	4.5	0.1
December	4.7	0.0

[1] Calculated based on the average observed water use in each month divided by the total annual water use for each type of water use (i.e., potable and non-potable).

2.6.5 Peak Day Water Demand

Peak day potable water demand for each month was estimated to characterize potential limitations in the current water treatment plant capacity. The steps used to estimate future peak day potable water demand are presented below.

1. Monthly peaking factors were calculated by comparing the average daily water treatment plant production rates to the peak day production rates within each month of the year. Table 13 presents the peaking factors for each month calculated using the Town's production records.

2. Forecasted monthly peak day demand values were calculated by multiplying forecasted monthly average daily demand values by the monthly peaking factors for each month for the period 2010 through 2020.

TABLE 13
Peaking Factor for Estimating Peak Day Demand from Monthly Water Use

Month	Average Peaking Factor
January	1.27
February	1.26
March	1.33
April	1.21
May	1.59
June	1.29
July	1.25
August	1.34
September	1.32
October	1.67
November	1.31
December	1.22

2.6.6 Results

Results of the water demand forecasting are discussed in this section. Note that the water demand forecasting presented in this section does not account for future water conservation impacts on water use demand, but capture expected water use demands if the Town's customers continue their current water use habits and practices and as influenced by outside market forces (i.e., passive savings). The impact on demand of future water conservation efforts implemented as a result of this water conservation plan is discussed later in Section 7.

To begin, Table 14 presents the annual forecasted water demands for each category of water use: potable, non-potable, and total, based on the methodologies presented previously. The Town should be able to determine the accuracy of the forecasted demands by comparing them to actual demands in the upcoming years. This table indicates that on average, future total water demand in the year 2020 is 2,583 acre-feet, including potable and non-potable demands. In other words, there is a 50 percent likelihood that the total water demand in the Town will be 2,583 acre-feet or less in the year 2020.

TABLE 14
Summary of Forecasted Annual Water Use

Year	Water Use (gallons)					Total Potable		Total Potable + Non-Potable	
	Single Family	Multi-Family	Commercial	Non-Revenue	Irrigation (Non-Potable)	Gallons	AF	Gallons	AF
2010	361,417,953	64,417,403	24,575,814	53,508,847	259,485,482	503,920,017	1,546	763,405,498	2,343
2011	362,189,996	64,555,008	25,521,038	53,729,206	266,794,932	505,995,248	1,553	772,790,179	2,372
2012	362,941,338	64,688,924	25,993,650	53,890,521	274,104,382	507,514,432	1,558	781,618,814	2,399
2013	363,671,488	64,819,062	26,466,262	54,048,869	281,413,832	509,005,681	1,562	790,419,513	2,426
2014	364,344,237	64,938,970	27,411,485	54,255,329	288,723,282	510,950,021	1,568	799,673,303	2,454
2015	365,030,141	65,061,222	27,884,097	54,407,485	296,032,733	512,382,944	1,572	808,415,677	2,481
2016	365,766,185	65,192,411	28,356,709	54,566,658	303,342,183	513,881,962	1,577	817,224,145	2,508
2017	366,480,446	65,319,717	28,829,321	54,722,783	310,651,633	515,352,267	1,582	826,003,900	2,535
2018	367,135,256	65,436,427	29,774,544	54,926,732	317,961,083	517,272,960	1,587	835,234,043	2,563
2019	367,804,047	65,555,629	30,247,156	55,076,492	321,615,808	518,683,324	1,592	840,299,132	2,579
2020	368,449,499	65,670,672	30,719,768	55,222,985	321,615,808	520,062,924	1,596	841,678,732	2,583

AF = acre-feet

A graph of the future average total monthly water demands are presented in Figure 4 and 5 for potable and total water (potable plus non-potable), respectively.

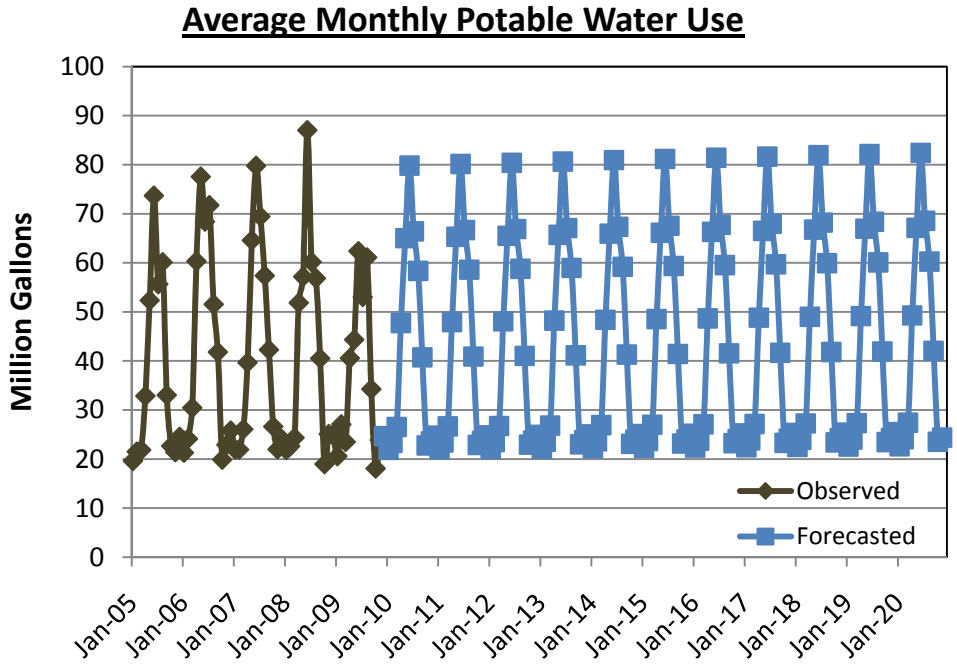


FIGURE 4
Forecasted Average Monthly Potable Water Use

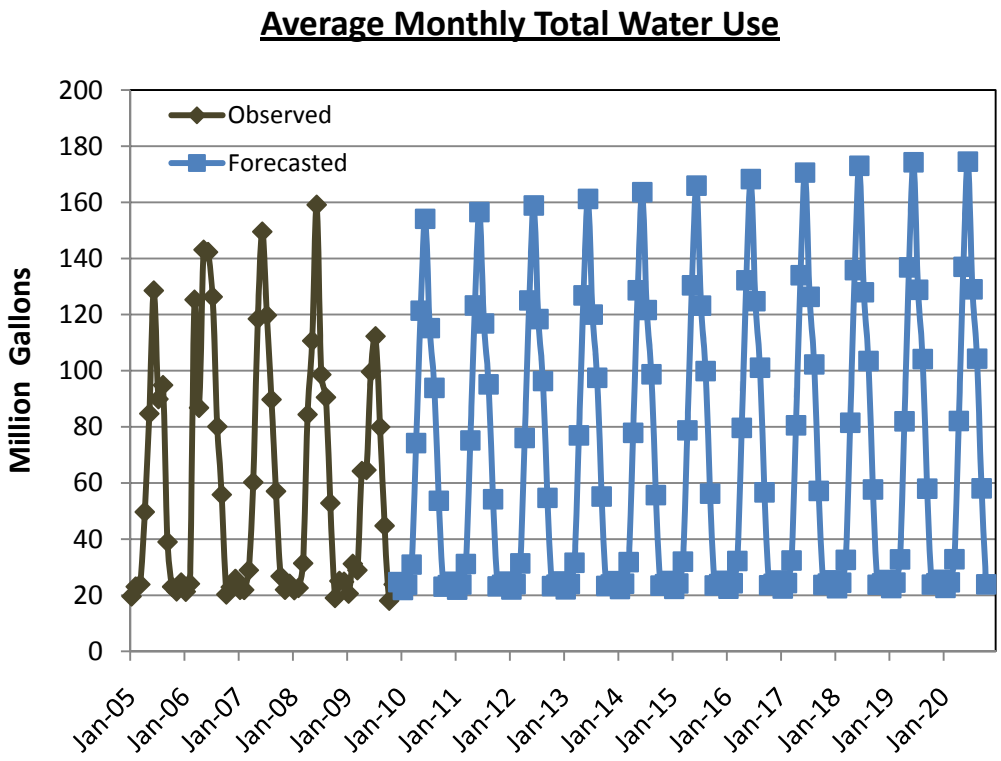


FIGURE 5
Forecasted Average Monthly Total Water Use (Potable + Non-Potable)

Figure 6 and 7 present the total water demand for the Town on an annual basis based on the forecasting performed herein, for both potable and total water, respectively.

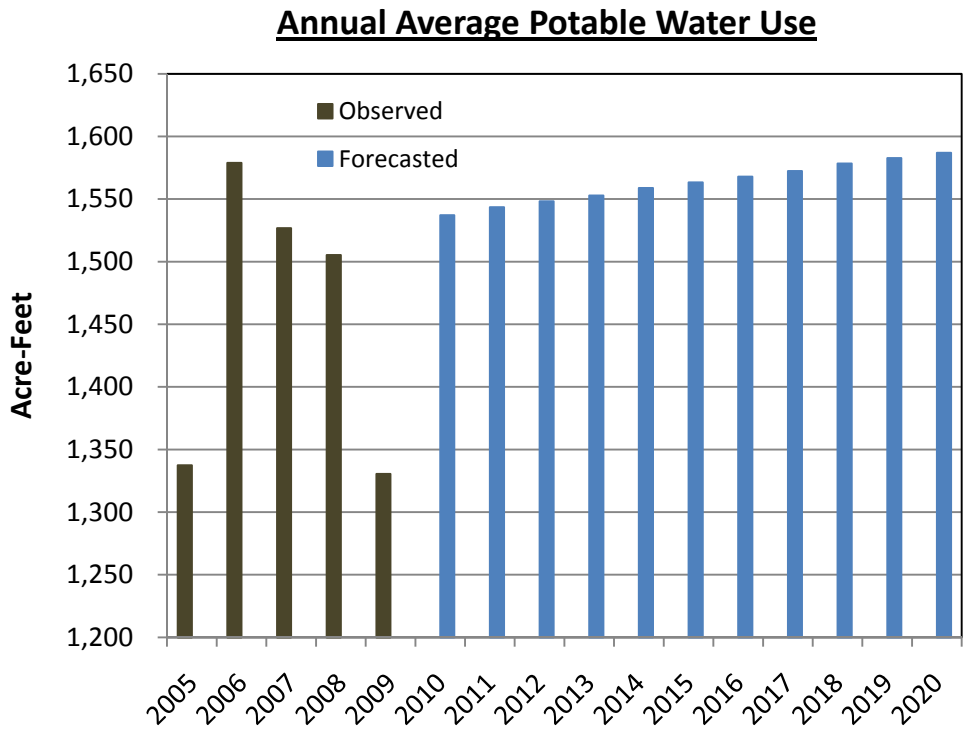


FIGURE 6
Annual Average Potable Water Use

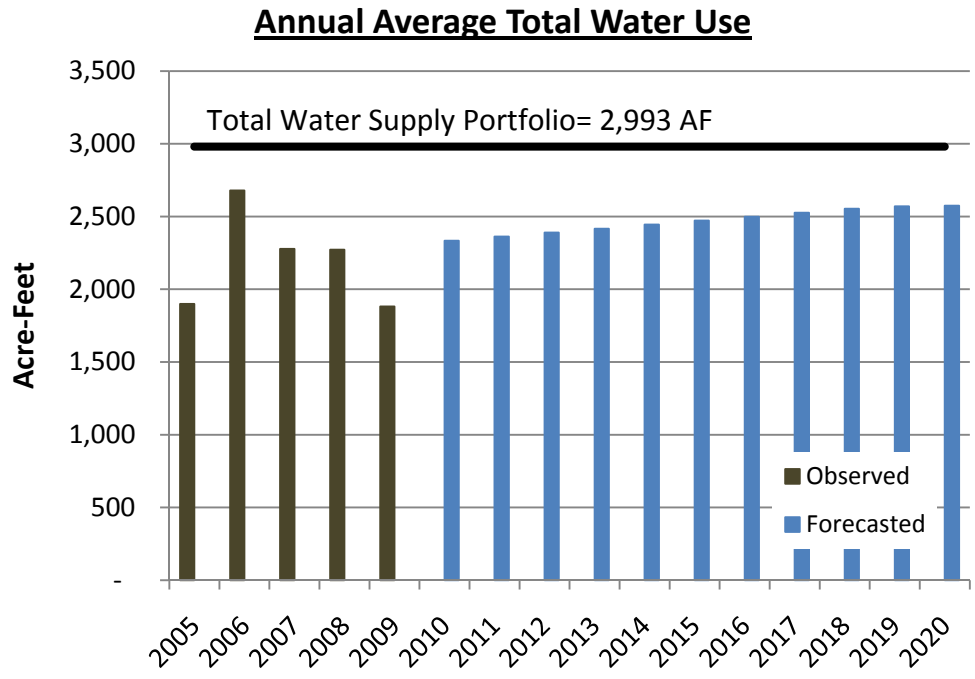


FIGURE 7
Annual Average Total Water Use

Historical water demand data from the Town for the last five years was influenced by natural variability due to weather. To understand and quantify this variability as it relates to estimating future water demands, an analysis of past water demand variability was performed. Statistical results are summarized in Table 15.

TABLE 15
Variability of Observed Annual Water Use by Customer Type

Statistical Measure	Residential Water Use (GPCD)	Commercial Water Use (gallons per connection)	Irrigation Water Use (gallons per connection)	Peak Day Factor[1]
Mean[2]	106	1,295	9,326	1.25
Standard Deviation[2]	9.6	47	1,565	0.061
Coefficient of Variation[3]	9%	4%	17%	5%

[1] For July which is the month with the highest observed peak daily demand in each year.
[2] Adjusted for estimated passive savings for the years 2005 through 2009, except for irrigation water use, which used all years except 2006.
[3] Ratio of standard deviation to the mean.
GPCD = gallons per capita per day

The coefficient of variation is a measure of the variability of the data. The results indicate the greatest variability in water use has been related to outdoor irrigation associated with residential and irrigation water use accounts.

Assuming that water demand in any given year is normally distributed, Figure 8 presents the estimated variability of water demand predicted for the year 2020.

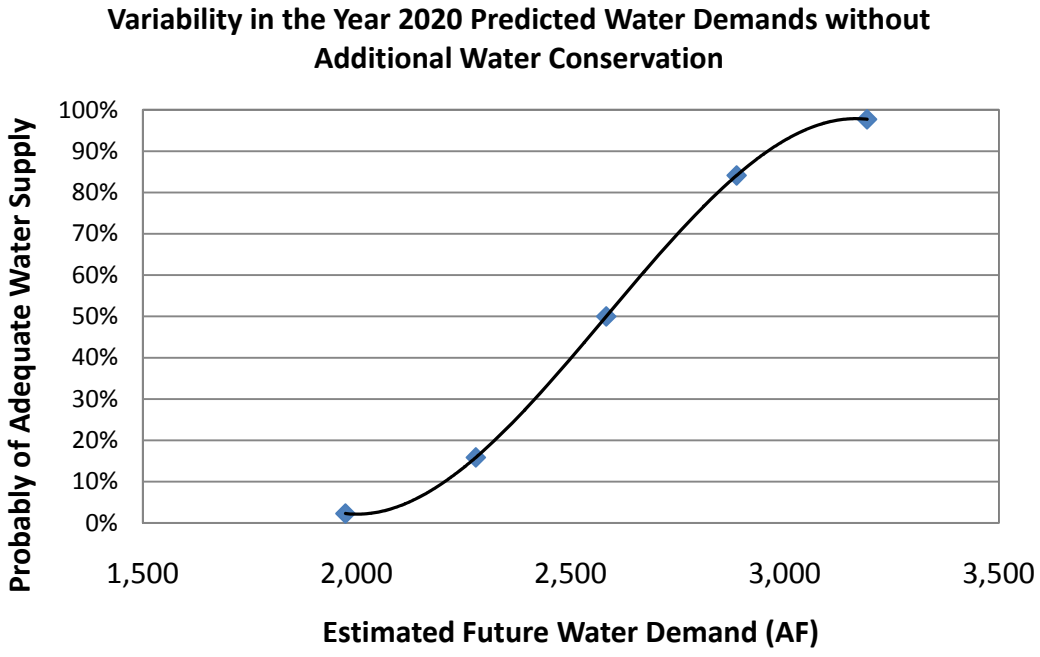


FIGURE 8
Variability in Water Demand in 2020

The above figure indicates that there is a 84 percent likelihood that water demand will be 2,890 AF or less; and a 16 percent likelihood that water demand will be 2,280 AF or less based on the past observed variability of annual water demand in the Town.

Finally, Figure 9 presents the peak day water demand forecasted by month over the planning period. Based on this figure the current water treatment plant capacity is adequate for future water demands through the year 2020.

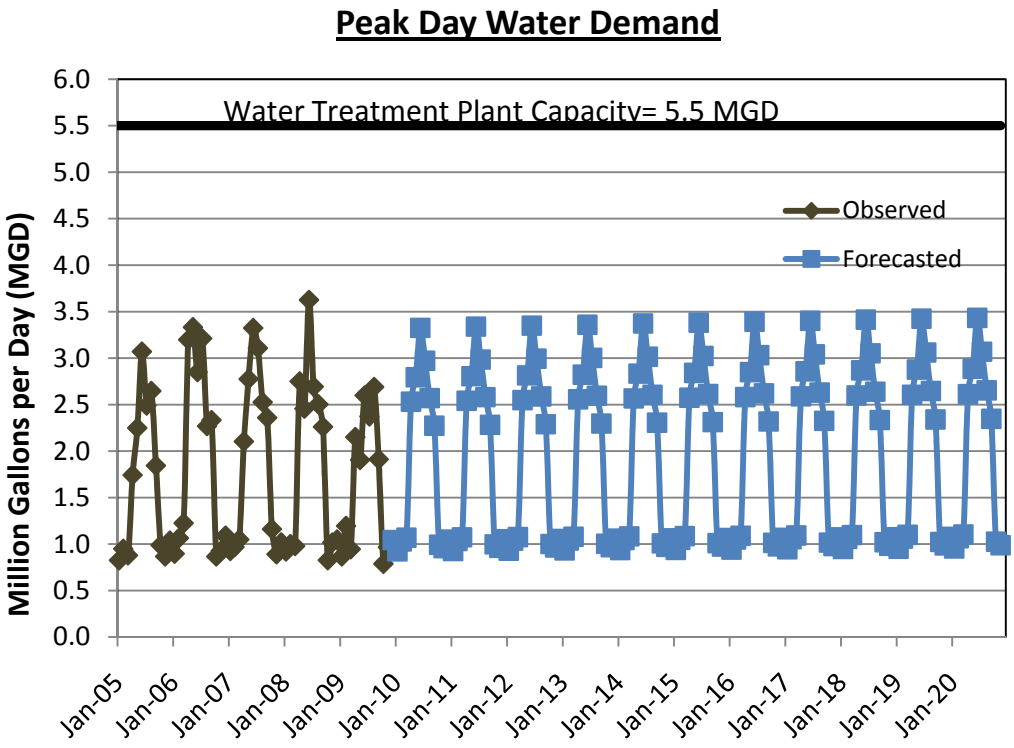


FIGURE 9
Peak Day Water Demand

The impact of weather variability on forecasted 2020 peak day demands was also evaluated using the statics presented in Table 13. Based on the those factors influencing treated water demand, it is anticipated that peak daily demand in July would increase from 3.4 mgd for an average year to 3.9 mgd for a dry year, which is still less than the current water treatment plant capacity of 5.5 mgd.

3 Proposed Future Infrastructure

The following section provides an overview of proposed future infrastructure projects related to raw water, potable water, and non-potable water systems. The purpose is to identify any potential savings or schedule impacts that conservation measures have the potential impact.

There are no plans to acquire additional water rights. However, currently the Town is a participant in the Windy Gap Firming Project. The original Windy Gap project was completed in 1985; a unit was expected to produce a firm yield of 100 AF per year. However, participants have not been able to rely on Windy Gap water in both dry and wet years. The firming project would provide storage of the Town's existing Windy Gap water rights and firm up the annual yield. The Windy Gap Firming Project is especially important in wet years. In those years, Windy Gap spills and the yield of CBT Units can be as low as 0.5 acre feet per Unit. In such years, the Windy Gap Firming Project is essential to provide water both to existing uses and for future demands. Windy Gap water is an important component of the Town's supply since it can be used to extinction (i.e. reuse water) unlike other rights, which is an important component in water conservation. The Town has budgeted $14,000,000 over the next three years for the Windy Gap Firming Project.

At the water treatment plant (WTP) there is a raw water reservoir with 400 acre-feet of storage. Even at the treatment plant's peak capacity of 5.5 MGD this volume provides 23 days of storage. There is no plan to construct additional raw water storage. According to the evaluation in this plan there is not a need to increase WTP capacity in the next 10 years. There is no redundancy in terms of water treatment for the Town's water supply. To address redundancy construction of a pipeline interconnect is planned with the City of Broomfield and the City of Louisville that would be able to supply water in the event of a catastrophic failure at the Town's facility.

The potable water distribution system is planned to have capital improvements. It was identified in the 2008 Utility Master Plan that the existing storage capacity in the distribution system is not adequate to meet peak day storage requirements. Additional storage capacity is needed regardless of impacts from water conservation measures. No additional pump stations are anticipated for the system. However, based on the 2008 Utility Master Plan evaluation it is likely that line sizes will need to be upsized in the potable water distribution system to meet future peak demand flows. Depending on the amount of conservation the timing of such improvements may be delayed due to conservation efforts.

The non-potable water distribution system also requires capital improvements. The existing 1.4 MG storage tank at the wastewater treatment plant (WWTP) is not adequate to meet high demands. When the tank level is low the reuse pumps operate continuously to keep up with demand, but their capacity is also not enough to match instantaneous demands. When this happens raw water is supplied from Pond 5 to supplement the reuse water. To maximize reuse water additional reuse water storage is needed; the total should be adequate to store one day of demand. Outdoor water conservation efforts would help maximize the use of reuse water immediately even without constructing additional water

storage. When the Windy Gap Firming Project is complete, and with increased reuse storage, the reuse system may be able to provide all irrigation water without supplemental raw water.

4 Identify Water Conservation Goals

Water conservation goals for individual entities are always unique, even differing from that of neighboring communities depending on development patterns, available water rights, and public interest. The Town of Superior has unique water conservation needs and the goals are catered as such.

Given that a majority of single family homes have been recently constructed these homes already include more water efficient fixtures compared to older houses. Based on this fact it is anticipated that residential per capita water use is not expected to change substantially due to indoor water use reductions, beyond those that will naturally occur as a result of passive savings. There may be modest savings expected in this segment from more efficient irrigation practices in single family homes. In terms of indoor water use there may be more opportunity to conserve water with commercial and office establishments, as well as within Town-owned and managed facilities. Therefore, goals for future water demand reductions are focused upon the Town's ability to limit the following water uses and related inefficiencies:

- Non-revenue water losses
- Outdoor irrigation practices
- High customer water uses of both potable and non-potable supplies

Non-revenue water losses are currently averaging about 11.9 percent per year. The Town is looking to reduce these real and/or apparent losses to 8 percent by 2020; which is a water savings of about 17 million gallons a year. Noteworthy is that it is currently estimated that apparent water losses constitute about 3 to 4 percent of the combined losses and real losses constitute the other 8 to 9 percent. The goal is therefore to reduce apparent losses to about 0.5 percent and real losses to about 7.5 percent.

The Town is also looking to reduce the total annual potable water demand by about 3.5 percent over the next 10 years, which translates to about 5 AF, or 18 million gallons a year, including improvements in non-revenue water loss reduction. This goal reflects the fact that the Town currently provides water service to new infrastructure built since 1994 (with respect to both residential and commercial customers). If the Town had a large component of older infrastructure built before the National Energy Policy Act of 1992 was implemented, it may have higher targets for water savings, but the vast majority of the Town was constructed after the Act took effect in 1994.

Non-potable water, which includes all commercial, multifamily and irrigation systems, is a segment of water use more suited for targeted water conservation measures. Control of the system was recently switched to a programmable controller, but the system has not been optimized and there is potential for savings. A more aggressive water savings goal of approximately 13 percent in the next 8 years is desired by the Town for the non-potable system (which translates to a water demand reduction in 2020 of about 130 AF, or about 42 million gallons per year).

5 Identify Water Conservation Measures and Programs

5.1 Framework

The State of Colorado statute (CRS 37-60-126, see Appendix A) requires entities that are planning for future water conservation to consider nine measures and programs that may improve local water use efficiency. In addition, the CWCB has recently created a Best Practices (BP) Manual (Aquacraft, 2010) that lists fourteen best practices that may be used by water utilities and special districts for local water conservation. The process of identifying potential water conservation measures and programs for the Town was influenced by these documents.

In addition, the CWCB has developed a new framework for evaluating water conservation plans and programs (Great Western Institute, 2010) in the State. The new framework identifies four categories of water conservation measures and programs as follows:

- Foundational – those measures or programs that address the core mission and businesses of the water providing utility or district
- Ongoing Water Uses – those measures or programs that help to control and reduce ongoing customer water uses
- Ordinances – those measures or programs that help control and reduce current and future water demands through regulation, ordinances, and requirements
- Education and Public Information

Identification of water conservation measures and programs was performed using these four key headings and includes references to State requirements and best practices contained in the BP Manual.

5.2 Background

The Town has a robust water supply portfolio going into the next decade. The estimated future demand of potable and non-potable water does not exceed the peak day water treatment capacity or the average water rights yield of the Town's CBT and ditch portfolios. The Town requires the Windy Gap Firming Project to meet its demands under various scenarios. However, the Town's water supply could also be compromised by drought or other unforeseen natural impacts (e.g., forest fire). In addition, the cost to the Town for treating and delivering reliable potable and non-potable water supplies is not insignificant. Finally, the Town has reasons to reduce its water demands to help maintain the reliability of its overall water supply system.

Two key areas of water savings are available to the Town through more efficient operation of its own infrastructure and facilities, including reducing non-revenue water and

improving water use efficiency within its buildings and parks. Other water saving measures and programs are available to the Town, and will be discussed later in this section.

The Town will evaluate water conservation measures and programs that help it to manage its water use and its infrastructure as a first priority. Next the Town will evaluate those measures and programs that will help to reduce future water demands related to outdoor and seasonal water uses by its residential and largest commercial and irrigation customers.

5.3 Identification of Potential Conservation Measures and Programs

The measures and programs that were identified as potential candidates for consideration and evaluation in this Plan are listed in Appendix B. Where applicable the list includes references to the associated statute or best practice from which the item originated. Note that State statute requires the Town consider water reuse as one of its water conservation measures and programs. Since the Town currently operates a reuse water supply system for outdoor irrigation purposes this criteria was considered to be addressed.

Once the various candidate measures and programs were listed and described, a screening process was implemented to select the water conservation measures and programs the Town would further evaluate as part of this Plan. The screening process included the following considerations:

- Applicability to the Town's circumstance - candidate measures and programs that were either already implemented or were not considered useful given the Town's customer base, water use profile, or current water uses, were not carried forward to the evaluation effort.
- Expected cost – candidate measures and programs that were considered to be cost prohibitive were not carried forward to the evaluation effort.
- Requires additional data collection or other actions to occur first – candidate measures and programs that cannot be fully characterized until the Town implements other measures and programs were not carried forward to the evaluation effort.

Finally, some of the education related measures and programs were not carried forward into the evaluation portion for two reasons. First, cost benefit analyses comparing the price of implementation with the amount of water demand reduction for education and public information efforts are difficult to estimate. Second, the Town will choose to implement some forms of education and public information in conjunction with the implementation of this Plan given the importance and overall value of such efforts. Since these programs will be incorporated there is no benefit to screening and evaluating these programs. Recommendations and implementation outlined later in this Plan detail the specific activities that will be implemented by the Town with regard to education and public information in conjunction with the other selected measures and programs.

The candidate measures and programs that were selected for further evaluation include the following:

- Foundational
  - Leak Detection and Repair
    - Continue to conduct leak detection and repairs on the Town's potable and irrigation lines,
    - Conduct system-wide water audit using AWWA methodology
    - Implement recommendations from system wide water audit
    - Continue acoustic emissions testing of selected portions of Town distribution system
  - Meter Improvements
    - Continue ongoing meter testing and repair program
    - Continue meter replacement program
    - Implement program to meter unmetered uses
  - Other
    - Conduct water rate studies and implement water rate increases
- Ongoing Water Uses
  - Audits
    - Conduct audits of Town's facilities to improve water use
    - Conduct audits of residential outdoor water use
    - Conduct audits of Town's largest commercial and irrigation customer water use
  - Conduct water use workshops for Town's existing customers
    - Residential water use and landscaping
    - Commercial customer water use
    - Irrigation customer water use and landscaping
    - Xeriscape demonstration garden/Garden in a Box
  - Rebates and retrofits
    - Indoor fixtures and appliances for Town and commercial customer facilities
    - Outdoor irrigation equipment for Town, residential, and irrigation customer applications
- Ordinances
  - Enforce existing ordinances that have been established and implemented by the Town (e.g., time of day restrictions)
  - Upgrade current Green Building Codes and Requirements for new and upgraded residential construction (focus on water and hot water improvements)
  - Support development of new Green Building Program construction requirements for commercial construction
- Education and Public Information (see discussion provided above)

6 Evaluation and Selection of Water Conservation Measures and Programs

The Town of Superior has identified a select group of candidate water conservation measures and programs that address the key needs of the community with regard to future water use demand management. However, additional analyses are required for the Town to appropriate value and evaluate the effectiveness of each candidate water conservation measure and program with regard to key evaluation criteria the Town has developed.

The candidate measures and programs have been evaluated and discussed in the broad categories that the CWCB established within the new water conservation framework developed recently (Great Western Institute, 2010).The CWCB framework includes:

- Foundational measures and programs;
- Management of ongoing water uses;
- Ordinances; and
- Education and outreach.

Using this framework, the Town is able to evaluate measures and programs that share common characteristics. For example, the Town can compare expanding ongoing foundational programs without necessarily completing detailed cost benefit analyses, since these measures and programs are known to be a priority for managing water deliveries and generating revenue. In addition, the Town can use the framework to select measures and programs from each broad category without direct comparison. For example, educational and outreach programs do not provide water demand reductions that are explicitly measurable. However, educational efforts are known to be integral to the implementation and maintenance of long-term water conservation savings. To this point, the evaluation of candidate measures and programs will be completed using these three evaluation techniques:

- **Cost benefit analyses** which will be conducted by calculating the cost for each acre-foot of future water demand reduction.
- **Weight of evidence** which uses information from the literature and other sources to identify the benefit and appropriateness of selected measures and programs.
- **Continuation of ongoing programs** which have been identified as being effective in reducing water demand.

Overall, the candidate measures and programs were selected because they addressed key water conservation needs of the Town including:

- Reduce non-revenue water losses (real and apparent);
- Reduce outdoor water use; and
- Support the Town's efforts to be recognized as a "green community".

This section presents a detailed description of each candidate measure and program, and an evaluation of the measure and program using at least one of the criteria lists above.

6.1 Description and Evaluation of Candidate Measures and Programs

6.1.1 Foundational Measures and Programs

The Town is most focused on implementing foundational measures and programs since these will not only improve the water use efficiency and profitability of the organization, but they are actions the Town has jurisdiction over, such that if chosen, the Town will be able to implement the selected measures and programs completely and to fruition.

System Wide Water Audit

The Town would benefit from an audit of overall water use, since non-revenue water use has increased to an average of about 11.9 percent in the last three years[3]. The system wide audit would be performed using the guidelines and methods that AWWA has identified (AWWA, 2009), as further characterized by various regional water management agencies[4]. The goal of the system wide audit would be to characterize current non-revenue water losses in both the potable and non-potable water systems through a review of current water production and delivery data. It would also identify water uses that may be unmeasured and/or unbilled, and evaluate the accuracy of Town and customer meters for accuracy. The system wide audit would be used to better characterize real and apparent water losses, and identify data gaps regarding measuring current non-revenue water within the Town's distribution system.

The cost of performing a system wide audit is variable depending on the level of detail desired, and the availability of staff resources. At a minimum, the Town will need to commit staff resources from the Public Works, Finance, and Parks Departments to perform the audit. The Town would also need to commit some resources to implement recommendations identified during performance of the system-wide audit.

Actual water savings from the system wide audit can vary widely depending on the study findings. For example, the audit may find that a substantial amount of apparent losses exist as a result of inaccurate metering (although this is unlikely given that the Town is conducting a two year, $450,000 project to test and repair customer meters). A more aggressive meter replacement program could help increase revenue for the Town. A reduction of apparent water losses by one percent could translate into increased water sales of about 5.5 million gallons annually or an increase in water sales revenue of about $14,000 per year.

[3] Non-revenue water at a rate of about 12% is higher than the target of 7 to 8 %, which is based on the Town's goals and targets that AWWA has identified (AWWA M-36, 2009).

[4] Using a methodology such as the following, which is based on the AWWA reference: http://www.mde.state.md.us/assets/document/water_cons/Water_Audit_guidance.pdf

Other water savings may also be realized in associated with the system wide audit including:

- Reducing unbilled water uses (which could account for another 1.5 to 2 percent of the Town's non-revenue water),
- Improving water and wastewater treatment plant operations,
- Reducing real losses (when coupled with improved metering and sub-metering of the distribution system).

Implement Recommendations from the System Wide Audit

The system wide audit may produce recommendations for implementation of various water saving or revenue generating activities, such as:

- Improve measurement of unbilled water uses (e.g., flushing flows, other Town uses),
- Increase meter testing and replacement efforts on large taps,
- Conduct additional acoustic testing of older distribution lines,
- Install sub-meters and valves in the distribution system to separate portions of the distribution system, and allow for flow testing.

Each of these potential recommendations could help the Town improve its water use efficiency and the efficiency of its distribution system. No specific recommendations are presented at this time until the system wide audit is conducted beyond those activities discussed below, some of which are the continuation of ongoing Town programs.

Continue Distribution Piping System Acoustic Evaluation

The Town conducted focused acoustic testing of about 90,000 feet of distribution system piping in locations of interest identified by Public Works[5]. These testing efforts helped to pinpoint the location of specific leaks and areas for leak repair for the Public Works Department. The current Public Works budget includes $10,000 for a continuation of the acoustic testing program into additional areas of interest.

Expanding the acoustic testing program may be warranted after the system wide audit is completed. No additional testing is recommended at this time until the system wide audit is completed.

Distribution System Repair and Maintenance

The Town currently conducts line repair and maintenance as an ongoing component of operations. The work consists chiefly of repairing observed leaks in both the potable and non-potable systems and replacing old distribution lines. The Town maintains two separate line items in its annual budget for repair and maintenance including "repair and maintenance of potable lines" and "repair and maintenance of irrigation lines". The current Public Works budget allocated for these two line items in 2011 are $75,000 and $6,000, respectively. These two programs continue throughout the planning period for this Plan (i.e., through 2020). Budget is expended based on need, and may not be fully spent each year. No additional evaluation is necessary at this time.

[5] Phase I was conducted on 40,000 feet of new and older black iron pipe in the Sagamore subdivision, Old Town, Superior Plaza and Superior Market Place; Phase 2 was conducted on 50,000 feet of Hillcrest, Crestwood, Hilton, Rosewood, Ridgewood Subdivisions and a special detailed survey of the area around Yarrow Circle Creek. These two projects tested about 50% of the Town's major distribution system pipelines,

Note that line replacement and/or maintenance may change in the future depending on the outcome of the system-wide audit that is recommended as part of Plan implementation. However, until the system-wide audit is conducted, various data gaps are addressed, and appropriate data is collected, additional line replacement and repair activities beyond those currently budgeted by the Town in its CIP are not warranted.

Meter Testing, Repair, and Replacement

The Town has ongoing programs to test, repair, and replace water meters for its customers. In 2010, the Town spent about $25,000 on meter testing and repair efforts, which allowed for the testing of the majority of the commercial and irrigation account meters, plus some residential meters. Additional testing and repair efforts are scheduled for 2011 to expand the coverage into more residential and Town accounts. The meter testing program may be renewed or expanded depending on the results of the system wide audit.

The Town also maintains a $31,500 plus annual budget to replace water meters that are either old or suspected as being inaccurate. This program allows for replacement of approximately 5 percent of the Town's residential customer meters in any one year, which translates to a complete replacement time horizon of about 20 years. An increase investment in meter replacement on an annual basis is likely warranted once the meter testing and repair program is completed, especially to address the larger tap size meters. A summary of tap quantities and sizes is summarized in Table 16.

TABLE 16
Summary of Tap Sizes and Quantities

Potable Taps		**Non-Potable Taps**	
Size	**Quantity**	**Size**	**Quantity**
¾"	2,881	¾"	3
1"	227	1"	7
1 ½"	51	1 ½"	30
2"	13	2"	12
		3"	10
		4"	7
Total Potable Taps	**3,172**	**Total Non-Potable Taps**	**69**

The Town is installing new meter vaults and meters on three large unmetered non-potable taps at a cost of $91,000 in 2011. These meters will help to reduce apparent losses in the Town's non-potable water system.

Water Rate Studies and Water Rate Increases

The Town currently employs an inclining rate block structure for all its potable water customers. Because the Town does not include any water in its base rate customers are

paying the most for the first 1,000 gallons of water[6], averaging $4.45 per 1,000 gallons for the first 7,000 gallons of water they use. For this reason, the tiered structure the Town uses could be improved by either providing some water with the base rate, or by raising the second tier rate. However, the Town would need to evaluate the effect of either adjustment on its gross and net cash flow before implementing the change.

The Town is planning to increase water rates by 4 to 5 percent per year over the next five years for all water uses and customer types. The Town does not currently plan on conducting a detailed water rate study within the next four years unless customer water use behaviors are needed or revenue limitations demand. The water rate increases the Town plans to implement are assumed to have no capital cost associated with the measure, since there is no water rate study required to make the planned changes.

Data Collection

Although this activity is not a specific water conservation measure and program identified during the previous task the Town will need to improve overall data collection and evaluation procedures to effectively implement this water conservation plan. The Town currently collects water use data and bills monthly for its customer segments (residential, multi-family, commercial, and irrigation). The Town could improve tracking of key customer water use behaviors with the following revisions:

- Track Town water use (including both potable and non-potable uses) as a separate customer segment,
- Further differentiate non-potable water use in the Town by the three CIP categories that are tracked: parks, landscape fees, and special uses (i.e., the Superior McCaslin interchange).

In this way, the Town would be able to identify more readily effects of investments in water use efficiency related to the Town's operations (e.g., the irrigation controllers purchased in 2009 for parks and landscape fee area uses). There is minimal cost to the Town to make these minor upgrades to the customer tracking process.

Other improvements in data collection and water use tracking may be identified during the system-wide audit process. A cost of $2,500 per year is included for implementation of new data collection and management efforts resulting from the system-wide audit.

6.2 Management of Ongoing Water Use

The CWCB has three levels of measures and programs associated with management of ongoing water use:

- Improve water use efficiency at Town facilities,
- Conduct evaluations and provide technical assistance to better understand the needs of the Town's customers,
- Provide incentives and/or perform retrofitting of customer facilities.

[6] The first thousand gallons costs each customer $13.19 for the base rate plus $2.57 (see Table 4 for 2010 water rates).

The Town is focused on improving those water uses that it controls first (i.e., improvement of water use efficiency at Town-owned facilities), then it will evaluate the need and efficacy of conducting technical assistance for its customers. To this point, the Town will first focus on conducting audits and assessments to better understand its own water use and plan infrastructure improvements to address recommendations of the audits and assessments.

Town Facility Audits

The Town is interested in auditing indoor water use at its own facilities, which include the Town administrative buildings, recreation facilities, and water and wastewater treatment plants. In all there are ten different buildings that house public and staff bathrooms, and staff kitchen facilities. The audits would be used to identify opportunities for improvements in water use efficiencies.

Given that the Town facilities are not tracked as a unique customer segment, Town water use was not calculated. However, it is estimated the Town facilities use about 7 million gallons of potable water per year. Based on these numbers a water audit, combined with a follow-up of appropriate retrofits of each facility, could potentially reduce current water demands by 15 to 30 percent or reduce indoor demands by up to 2 million gallons per year. Audits for Town facilities are estimated to cost approximately $7,500, or $1,200 per acre-feet of saved water. In addition, auditing and retrofitting the Town's facilities is an important step in the Town's overall messaging related to the importance and need for water conservation to its customers and service area.

Outdoor irrigation audits of watering at Town landscape and park irrigation areas could also save significant amounts of non-potable water. The Town currently uses about 110 million gallons of non-potable water per year (based on the water cost estimates in the 2010 parks, landscape fee, and special use budgets). A modest savings related to improved operations of the Town's irrigation system could reduce non-potable water use by 5 percent, or about 5 million gallons a year at a cost of approximately $1,000 per audit.

The Town could potentially characterize its carbon footprint and the potential reduction of its footprint based on the proposed water audit program. This would be achieved by incorporating the impact and cost of water treatment and delivery, and wastewater collection and treatment, as well as the cost of energy used to heat water. The audits would therefore support both water conservation program implementation and sustainability evaluations.

Residential Outdoor Irrigation Audits

The Town is currently a participating water provider with the Center for Resource Conservation and currently pays $12,000 per year for the program. The Center provides "Slow the Flow" outdoor water audits free of charge to residential customers that sign up. The Town will continue to promote this effort since residential water customers receive hands-on technical education and training regarding improved outdoor water use efficiency through this program. In 2008 there were 68 residential participants, and in 2009 there were 62 participants. The Town would like to see this number increase in the coming years, however the water savings from Slow the Flow audits do not necessarily justify the cost expenditure. Therefore the Town will be reducing the number of residential outdoor irrigation audits per year.

The importance of Slow the Flow Audits to the Town will continue as it implements a residential outdoor irrigation rebate program in the future. Information collected through the Slow the Flow audits will to support future residential irrigation equipment rebate programs. Using the Slow the Flow audits in conjunction with the outdoor rebate program should help to increase the amount of water saved by each of these programs working independently.

Commercial and Irrigation Customer Audits

The Town is also interested in conducting audits to support water use efficiency efforts of its largest commercial and irrigation customers. These audits would focus on the largest and in some cases oldest, customers. The Town's largest water users are listed below with water usage in gallons per year (gpy) from 2009:

- Potable Water Use
  - Summit at Rock Creek Homeowners Association Building #19 (558,000 gpy)
  - Costco (1,693,000 gpy)
  - Panda Express (959,000 gpy)
  - Rock Creek Village Strip Mall (1,743,000gpy)
  - Boulder Valley Ice (1,364,000 gpy)
- Non-Potable Water Use
  - Boulder Valley Schools Eldorado K-8 (679,000 gpy)
  - Boulder Valley Schools Monarch K-8 (22,639,000 gpy)
  - Town of Superior PS Pond 5 (13,700,000 gpy)

The Town's audit program would be designed to address both the potable and non-potable water users, although more research is needed to evaluate and select the best customers. The above listing simply provides some information that will allow for the quantification of potential water savings. At a cost of $1,500 to $2,000 per audit, the potential water savings are in the range of 15 to 25 percent of total water use (Vickers, 2001), which for the listed water customers would be about 8.7 million gallons, or about 27 acre-feet of water of combined potable and non-potable water use. Note that the Town would have to support specific retrofit activities in these selected facilities to realize a significant portion of these estimated water savings.

Nonetheless, water savings associated with the audits, independent of the follow-up retrofitting of inefficient fixtures and appliances are expected. Water savings that can be realized simply through the audit process relate to identifying and repairing ongoing leaks. For this reason, water savings are predicted for all Town supported customer audits. However, the water savings from the audits are predicted to be only a fraction of the 15 to 25 percent savings that are possible when follow-up retrofits have been implemented.

The predicted water savings related to the audits for residential, commercial and irrigation customers (estimated to be 1 percent of average annual water use for each audited facility) is proportional to the amount of water, on average, each customer uses.

The potential water savings related to the various audits is:

- Greatest for irrigation customers, which use on average 3.9 million gallons of water annually;
- Then commercial customers, which use on average ½ million gallons of water annually; and
- Finally residential customers, which use on average 60,000 gallons of water annually for outdoor use.

Therefore, irrigation audits and commercial audits are the most cost-effective of the audits the Town plans to conduct. For the purposes of this plan it was estimated that 50 Slow the Flow audits, 5 commercial audits and 7 irrigation audits would be conducted each year, beginning in a staggered manner as described in the implementation plan. One key point to consider is that the Town currently only has 52 commercial customers and 69 irrigation customers. The number of audits selected allows for conducting audits on 10 percent of current customers for these categories per year.

Other Technical Assistance Efforts

The Town has considered doing specific technical assistance programs in conjunction with the audits and various customer education and outreach efforts, as a means to maintain a consistent message of outdoor water use efficiency with it residential and irrigation customers. Technical assistance would consist of performing workshops on the following topics, for the specified target audience:

- Residential landscaping and water use,
- Commercial and other large irrigator landscaping and water use.

These technical workshops would be held for residents and local commercial operators, as well as landscape and irrigation professionals in the area. The attendees would be required to sign in such that the Town could track before and after water use, and thereby determine the effectiveness of the workshop.

The cost of the workshops would vary depending on the numbers in attendance. However, a 10-person workshop is estimated to cost approximately $300 including advertising and hand out materials (excluding staff time). Savings on the order of 2 to 5 percent per attending customer have been reported by other local utilities including the City of Greeley and the Town of Castle Rock. Typical outdoor water use is estimated to be about 60,000 gpy per customer, which is about 30 inches of water on one half acre. Potential water savings from the residential workshops could range from 1,200 to 3,000 gallons per connection or up to 30,000 gallons per workshop.

Another opportunity to educate interested residential customers about appropriate, native landscape options involves utilizing the CRC “Garden in a Box” program, which delivers professionally packaged Xeriscape plant materials and planting designs to do-it-yourself homeowners. The Town could either subsidize the program, or let homeowners bear the entire cost; with the Town tracking which customers purchase and install the gardens. It is anticipated the cost of the gardens ($65 to 110 per “Garden in a Box”) prohibits customer non-participation once the garden is purchased. However, actual water savings may be limited depending on the ability of the homeowner to install the Xeriscape plant materials in

a segregated sprinkler zone. At a minimum, customer education would be one outcome, as would the education of those that enjoy the garden view from the street.

Workshops for commercial irrigators could provide larger water savings than the residential workshops based on the magnitude of irrigation water use, which is estimated to be about 3.9 million gallons per connection[7]. A 2.5 percent reduction in water use resulting from the irrigation efficiency workshop would result in about a 100,000 gallon demand reduction per connection. However, landscaper and irrigation contractors may not be as permanent in their management of specific commercial locations as homeowners, and thus these savings may be transient.

Given the current limitations in Town staff availability, and other programs that are more effective in reducing future water use demands within the Town's service area, the technical assistance programs were not selected for implementation within the current planning horizon.

Rebates and Retrofits

For purposes of this discussion, retrofits will be those fixture and appliance upgrades that are conducted for a finite period of time using grant funding whenever possible, whereas rebates will be ongoing programs that are funded by and administered by the Town.

Indoor Retrofits for Town Facilities and Commercial Customers

The Town has a number of opportunities to conduct either rebates or retrofits as a service to its customer base. First and foremost, the Town desires to retrofit its own facilities with high-efficiency fixtures and appliances, where such an action is determined to be cost-effective and practical. It is anticipated for example that the Town would be able to install more efficient faucet aerators on bathrooms sinks in all of its facilities. Given that sink aerators are inexpensive and relatively simple to replace this retrofit effort could be completed during the audit process. Similarly, more efficient showerheads could be installed at the Town's recreation center and police station, again as part of the audit process. It is anticipated that retrofitting sink aerators and showerheads will not only reduce future water demand for the Town, but it will also reduce future energy demand as well. Therefore, these two retrofits would be of value to the Town even if installed prior to the audit analyses. For purposes of this planning effort, it was assumed that 90 sinks and 12 showerheads would be retrofit during the audit process.

Other more expansive retrofitting on the Town's facilities (e.g., high efficiency toilets, low flow or waterless urinals, etc.) would not be warranted until after the audit analyses have been completed and a cost-benefit analysis can be completed. For the purpose of this planning effort, it has been assumed that 20 toilets in the Towns' facilities and 10 urinals in the Town's facilities would be replaced after the audits have been completed.

Similar to the Town program, the commercial retrofits would be conducted in phases, with sink aerators, and whenever possible showerheads, installed during the audits, and toilets and urinals, and other high efficiency devices (e.g., washing machines, ice makers, etc.) installed only after a cost-benefit analyses has been conducted based on data collected

[7] Noting that this customer class includes all outdoor Town water uses, including parks, landscaped areas and special areas (i.e., Superior and McCaslin Interchange)

during the audit. For cost purposes it was assumed that 50 faucet aerators per year would be installed in conjunction with the commercial audits. Although it may be that the audits find specific benefits for conducting additional commercial retrofits, no other fixtures or appliances are included for installation at existing commercial customers in the current planning period.

Indoor Rebates for Residential Customers

The Town is considering implementing an indoor rebate program for its residential customers, even though the program is not one of the most cost-effective programs they could implement. The Town views that an indoor rebate program supports and promotes its ongoing water conservation efforts in a manner that educates and engages its largest customer base, residential customers. In addition, the Town believes that its residential customers expect a utility-based rebate program as part of the local culture.

For these reasons, the Town will implement a one-year indoor residential rebate program to support the appropriate replacement of toilets and washing machines using $100 per fixture/appliance rebate for up to 100 rebates. Once this effort is completed, the Town will shift its resources to more cost-effective outdoor irrigation equipment rebate program for residential customers.

Outdoor Irrigation Equipment Rebates for Residential Customers

The Town's water conservation goals are chiefly focused on reducing summertime peak water use. For this reason, the Town is considering implementing an outdoor irrigation equipment rebate for its largest customer category, residential customers. The residential irrigation equipment rebate program would focus on reducing outdoor irrigation by improving individual customer efficiencies with ET controllers, rainfall sensors, and replacement MP Rotators (which will replace existing pop-up spray heads).

ET controllers are effective in improving outdoor water use efficiency by reducing the number of watering days and by improving the manner in which the irrigation water is applied to the turf and plant materials. For purposes of this planning effort it was estimated that ET Controllers would improve the efficiency of outdoor irrigation application by about 12 percent. ET Water, a manufacturer of ET controllers and other water management devices estimates savings between 30 to 50 percent (www.etwater.com). For cost purposes, it was assumed that one hundred $80 rebates per year would be provided under the Town's future ET Controller residential rebate program.

The use of rainfall sensors would also reduce outdoor water use. However, rainfall sensors only impact whether or not a scheduled irrigation event will occur or not, compared to an ET controller which can alter irrigation timing and water application rates. Rainfall sensors were assumed to improve irrigation efficiency by about 5.5 percent. For cost purposes it was assumed that fifty $50 rebates per year would be provided for under the Town's future rainfall sensor residential rebate program.

Finally, the Town would provide replacement pop-up spray heads using MP rotators, which improve irrigation application efficiency by about 20 percent (Hunter, 2010). For cost purposes, it was assumed that 30 new MP rotators would be provided to each of 15 homes per year at a cost of $225 per home. The homeowners would be responsible for completing

the installation and the Town (or a Slow the Flow auditor) would have to go to the home and verify installation before the check would be provided to the homeowner.

Retrofits for Commercial and Irrigation Customers

The Town has an opportunity to support the significant reduction of non-potable water summertime demand through the retrofit of outdoor irrigation equipment for its largest water users, irrigation and commercial customers. Although there are relatively few of these customers, each of these customers use as much as 80 times more outdoor irrigation water than does the average residential customer.

For the commercial and irrigation customer retrofit program, the Town would only implement ET Controller and rainfall sensor programs since the MP rotator program would be cost prohibitive at the scale of these particular customers. For cost purposes it was assumed that ten ET controllers and ten rainfall sensors would be installed each year for these customer types (e.g., install one each at 5 commercial customers and one each at 5 irrigation customers, or some combination thereof for a total of 10). Using this rate of installation, all irrigation customers could have ET Controllers within eight years.

6.3 Ordinances

The Town currently has a watering ordinance that restricts watering time, and is provided in Appendix C. This ordinance allows the Town to enforce fines and penalties for non-compliance to time of day restrictions.

The Town also has established a Green Building ordinance that impacts all new residential development. The ordinance requires new residential construction and renovation projects to meet minimum efficiency requirements. The new dwelling has to meet "green point" requirements based on the project type and square footage. Many of the points are energy related, such as evaporative cooling, solar power, and efficient windows. However, there are several points that would conserve water. The Town is looking to develop a similar Green Building code for new commercial construction.

There is no additional cost to the Town to develop Green Building codes for commercial development beyond what is already in place for administering the Green Building requirements for new residential construction. Town plan review, construction site review and inspection, and permitting must all work together to enforce the code requirements[8]. Any new Green Building code would carry with it the cost for training staff to appropriately implement the code and facilitate its intent.

Currently there is not adequate data to estimate costs and benefits of implementing the ordinances listed above, in part because the ordinances have either been sparingly enforced (e.g., water waste ordinance) or have not been in place long enough to provide for estimating ongoing water savings (e.g., green residential building code). Implementation of these ordinances will therefore require that appropriate data be collected to indicate the value of the effort and to verify that water demand reductions are actually occurring.

[8] Town planning, finance and permit already works together to implement the commercial green building code requirements.

6.4 Education and Outreach

The Town currently conducts limited education of and outreach to its customers. The Town does not anticipate increasing its educational efforts substantially although it will need to advertise its new programs, especially its residential programs, to increase participation. Education and outreach will be conducted therefore by including information on the Town's website, creating printed materials that can be placed in high visibility areas, and creating published articles regarding the Town's efforts, beginning with the publicity around the creation and implementation of this Plan.

The Town will continue its practice of providing a door hanger with facts regarding water use efficiency and water conservation to new homeowners upon move in. This information helps to instill a culture of water use awareness. It also helps to inform new customers about the Town's water conservation programs.

The Town currently budgets $5,000 per year for education and outreach. This cost will continue into the future.

6.5 Summary

The specific water conservation measures and programs the Town supports are summarized below; Table 17 summarizes measures and programs associated with foundational water savings, and Table 18 summarizes measures and programs associated with ongoing water uses.

The overall cost to implement all measures and programs in this plan is estimated to be about $2.05 million over the next ten years; note that about $1.43 million of these costs have already been included in the Public Works capital improvement and operating budget. Therefore, this plan outlines an additional $600,000, or approximately $60,000 per year from now through 2020. The process of implementation, including a discussion of the timing, staging, and priority of these measures and programs is presented in Section 8, Implementation Plan.

Future appropriations of Town funding for the various measures and programs contained herein cannot be guaranteed given that the nature of future Town priorities may change due to funding constraints, public health issues, or other unforeseeable issues. Based on the current economic climate the Town estimates available funds for additional conservation measures and programs as approximately $200,000 for the next ten years, or $20,000 per year. It is possible that a portion of the annual budget for water conservation could be funded from State grant programs currently administrated by the CWCB. These grant programs could be used to match Town funding (in-kind and cash) to conduct those activities that will best support the Town's overall goals and objectives for its water conservation measures and programs.

TABLE 17
Summary of Selected Measures and Programs - Foundational Water Savings

Selected Measure and Program	Estimated Year(s) for Implementation	Total Estimated Cost for Implementation	Estimated Total Annual Water Saved (AF)
Foundational Water Savings			
Leak Detection and Repair			
Conduct System-Wide Water Audit & Implement Recommendations	2012-2020	$40,000	-
Leak Repair (Potable & Non-potable)	2011-2020	$903,030*	-
Acoustic Emissions Testing of Selected Areas	2013	$33,000	-
Meter Improvements			
Install Meters on Unmetered Uses	2011, 2013	$20,000	-
Install New Valving/Submetering Based on Audit Recommendations	2013	$20,000	-
Meter Testing & Repair	2011-2012	$450,000*	-
Ongoing Meter Replacement Program	2011-2020	$65,800*	-
Other			
Water Rate Increase (annually for next 5 years)	2011-2020	-	-
Water Rate Studies	2015	$70,000	-
Total Estimated Cost through 2020 (Foundational)		$1,601,830	-
Estimated Reduction In Apparent Losses (Low to High range)			38.9 to 51.3 AF
Estimated Reduction in Real Losses (Low to High range)			10.9 to 23.4 AF

* Items already included in the Town's 2011 Planning Budget.

Below is a summary of selected measures and programs associated with achieving water savings from ongoing water use.

TABLE 18
Summary of Selected Measures and Programs - Ongoing Water Use

Selected Measure and Program	Year(s) for Implementation	Total Estimated Cost for Implementation	Estimated Total Annual Water Saved (AF)
Ongoing Water Uses			
Audits			
Conduct Audit of Town Facilities	2012	$20,000	
Conduct Audit of Residential Outdoor Use (Slow the Flow - 60 audits/year)	2011-2020	$60,000	1.0
Conduct Audit of Largest Commercial Customers (5/year)	2013-2020	$50,000	0.3
Conduct Audit of Largest Irrigation Customers (7/year)	2013-2020	$52,500	4.2
Rebates and Retrofits			
Retrofits - Town Facilities	2013	$11,440	2.0
Rebates - Residential Indoor Fixtures/Appliances	2011	$10,000*	0.01
Retrofits - Commercial Indoor Fixtures/Appliances	2013-2017	$1,280	0.2
Retrofits - Commercial/Irrigation ET Controllers (10/year)	2015-2017	$45,000	50.2
Retrofits - Commercial/Irrigation MP Rotators (10 facilities/year)	2015-2017	$72,000	80.3
Rebate - Residential Outdoor ET Controllers (80/year)	2012-2020	$72,000	17.0
Rebate - Residential Outdoor Rain Check Sensor (50/year)	2012-2020	$22,500	1.5
Rebate - Residential Outdoor MP Rotators (15/year)	2012-2020	$30,375	5.1
Total Estimated Cost through 2020 (Ongoing Water Uses)		$447,095	
Estimated Water Savings (AF)			162.1 AF

* Items already included in the Town's 2011Planning Budget.

7 Modify Demand Forecast and Other Impacts

The Town, to the extent funding allows, plans to implement water conservation measures and programs as discussed in the prior section for purposes of reducing future potable and non-potable water demands; and reducing real and apparent system losses while maintaining current levels of water sales revenues.

The estimated water savings that the Town would realize through the implementation of all proposed water conservation efforts over the next ten years are summarized in Table 19. Appendix D provides the assumptions and analysis used to develop the estimated water savings. Actual water savings will depend upon the actual programs implemented and numerous internal and external forces influencing customer water use. Therefore, the Town will monitor the progress of its proposed water conservation programs, such that the actual water savings are tracked and reported on a regular basis to the Town Council and its operating committees.

TABLE 19
Estimated Future Water Demand Reductions

Year	Estimated Total Annual Water Savings Potable (acre-feet)[1]	Estimated Total Annual Water Savings Non-Potable (acre-feet)
2011	2	0
2012	7	0
2013	15	0
2014	21	0
2015	27	22
2016	33	44
2017	40	65
2018	45	87
2019	50	109
2020	55	131

[1] Assumes the estimated high level of reduction in real losses.

Figures 10 and 11 illustrate the trend of future water demand over the next ten years for potable and total water use (i.e., potable plus non-potable water use) respectively, with and without the effects of the proposed water conservation measures and programs. Based on the rate of predicted growth the proposed water conservation measures and programs roughly offset the increased demand of treated water over the next ten years. Non-potable demand, which is expected to increase at a greater rate over this same period of time, is not offset until after 2015, since the commercial and irrigation customer retrofits and rebates are not substantially implemented until that time. By 2020, total water demand is expected to

decrease from the highest 2014 and 2015 levels, returning to approximately the 2011 predicted demands.

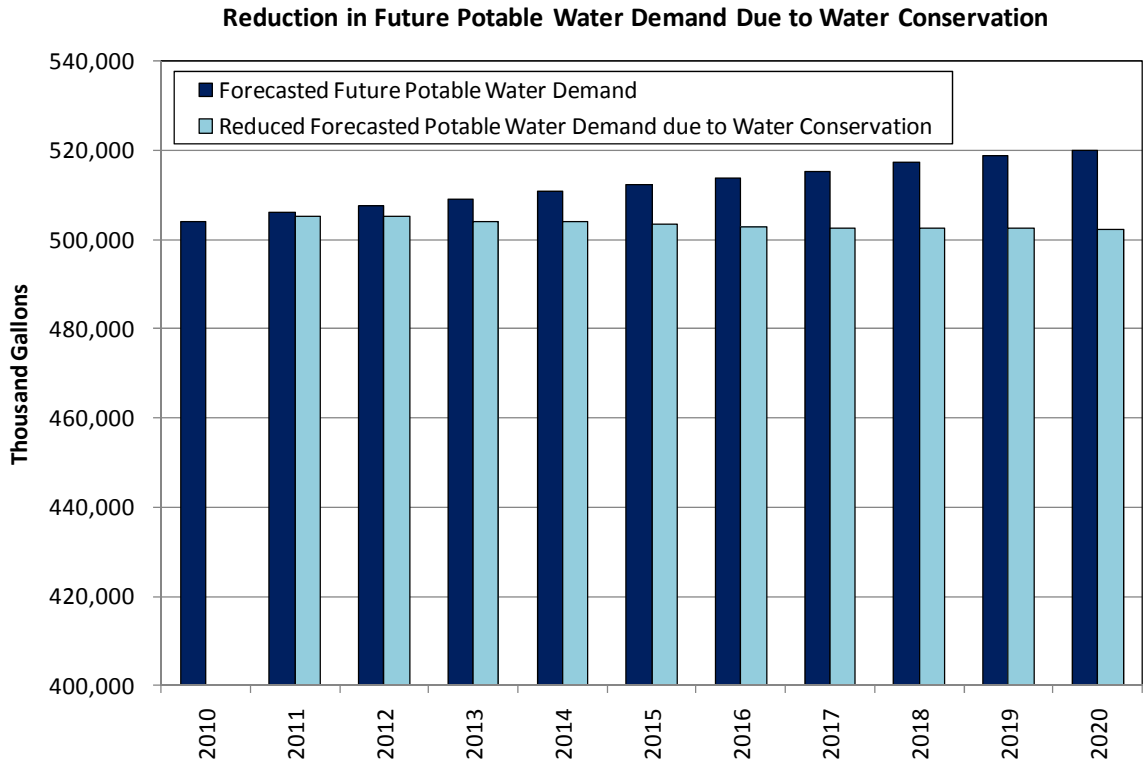


FIGURE 10
Summary of Estimated Reduction in Future Potable Water Demand

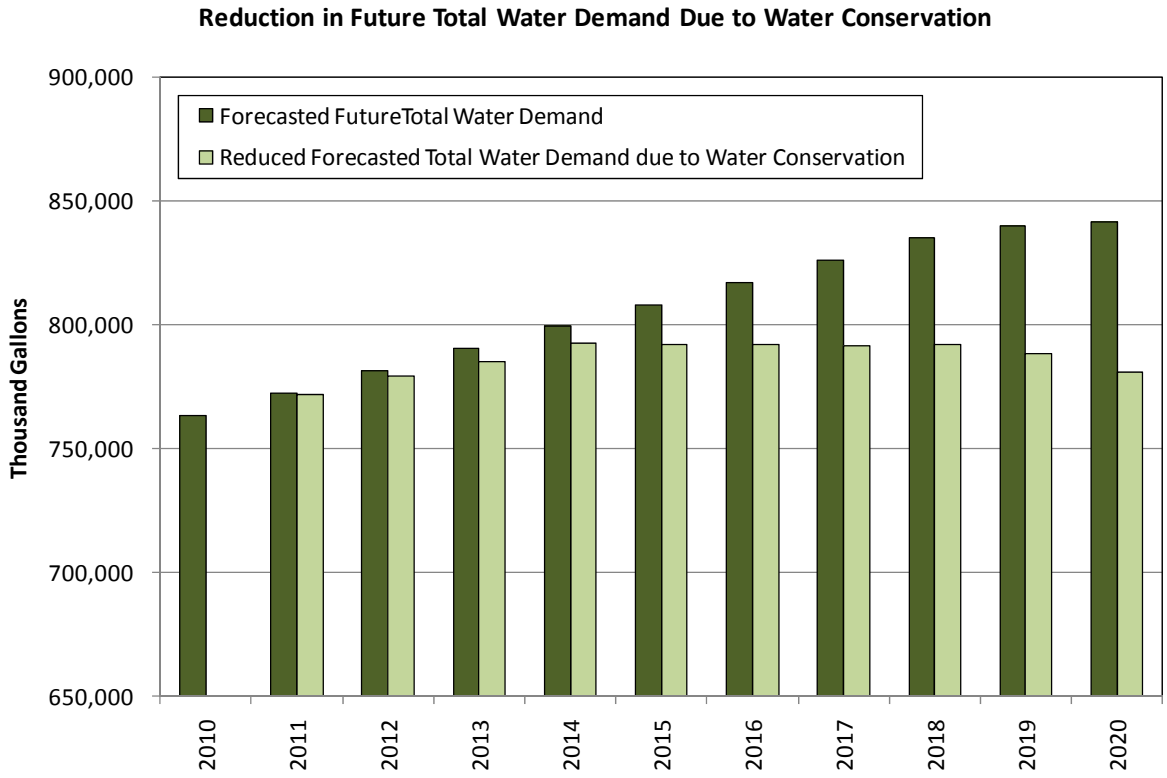


FIGURE 11
Summary of Estimated Reduction in Future Total Water Demand

The impact of the proposed water conservation efforts on Town cash flow and revenue is not as dramatic as the impact on future water demands. Figure 12 presents the estimated revenue for the Town from water sales with and without water conservation. As water conservation efforts are implemented revenues increase from 2011 through 2016. This increase is due to the fact that apparent water losses are decreased with the implementation of aggressive meter testing and repair programs, as well as meter replacement programs. As apparent water losses decreases, water sales revenues increase. This trend continues until 2016 when water sales revenue begins to be impacted by reduced water demand.

From 2016 to 2020 predicted water sales revenue, which are at least 40 percent greater than they are today, are below the "no water conservation" program estimates by about 1 to 3 percent. Reduced costs to the Town related to avoided treatment costs from real loss reductions have not been included in this analysis.

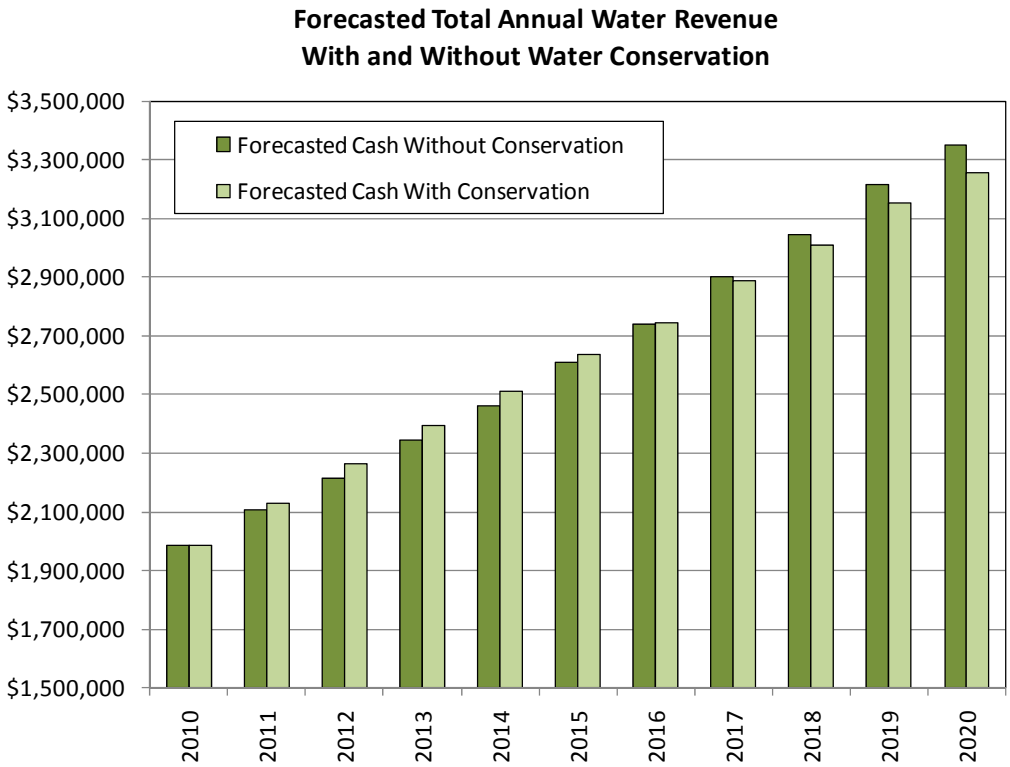


FIGURE 12
Estimated Total Annual Water Revenue With and Without Water Conservation

8 Implementation Plan

The Town has identified measures and programs to implement to reduce future customer water demand. This plan provides the Town with a complete roadmap to pursue meaningful water conservation. Future capital funding and annual budgets will be developed considering the funding requirements presented in the preceding chapters. However, future appropriations of Town funding for the various measures and programs contained herein cannot be guaranteed given that the nature of future Town priorities may change due to budget constraints, public health issues, or other unforeseeable issues.

The implementation plan for water conservation supported by the Town needs to maintain flexibility to adapt to changing needs and requirements of not only the Town's resources, but the water conservation program as well. As portions of the water conservation program are implemented, new data and information will be acquired which may influence future water conservation programs. Therefore, this Plan will be implemented in an adaptive management approach, incorporating changing conditions and influences into water conservation activities planned and executed by the Town.

Given this framework and understanding the Plan is best served through the identification of the sequencing of the various selected water conservation measures and programs; and a listing of those measures and programs that are of the highest priority to the Town as of this planning effort.

8.1 Sequencing

Although the Town understands and supports the implementation of meaningful water conservation, its resources are not unlimited; therefore, it has chosen to sequence the implementation of its selected water conservation measures and programs in accordance with its current needs, expectations for future fund allocations, and the logical connection and interaction between specific measures and programs. For example, retrofitting existing Town facilities with high efficiency toilets and urinals is best conducted after the facilities are audited to determine the cost and benefit related to any specific installation. Similarly, a system-wide audit of the Town's water treatment, distribution, and billing systems will be used to inform decisions to implement new meter testing, repair, and/or installation activities.

The expected sequencing of water conservation measures and programs selected by the Town for implementation is provided in Figure 13. There are a number of measures and programs that are spread out over a three-year period starting in 2011. These activities, many of which are one-time efforts, will be used to collect data and information to better characterize current water use within the Town such that more meaningful water conservation measures and programs can be devised and implemented. These data will be used to identify data gaps, develop cost-benefit analyses, and prepare grant requests in support of the Town's water conservation efforts.

Appendix D presents a summary of the estimated annual costs for selected water conservation measures and programs as understood at this time. The costs have been developed based on the following assumptions:

- Individual water customers of the Town will be interested and participate in the various measures and programs, especially the residential and commercial rebates;
- The system-wide audit will help to identify areas for Town improvement regarding measuring and billing non-revenue water uses; and
- The Town will coordinate the budgeting of its Capital Improvement Projects with the annual water conservation budget.

8.2 Priorities

For the Town, the implementation of water conservation to support future demand reduction begins with the management of current non-revenue water, which aligns with one of the State-defined foundational water conservation elements. Non-revenue water includes both apparent losses that effect Town billings and revenue; as well as real losses, which effect Town operational costs. The Town is focused on reducing the current level of non-revenue water, currently estimated to be about 13 percent of total treated water, to about 8 percent in the next 10 years. To achieve this goal, the Town will need to:

- Improve meter reading accuracy on existing accounts,
- Identify and measure unmetered water uses, and
- Continue testing and repair of water distribution lines to manage leaks and other real losses between the treatment works and customer meters.

These are the greatest current priorities for the Town. Those items listed in the following paragraphs are next highest in priority.

Pricing of the Town's water with respect to both the generation of revenue to cover actual fixed and variable costs, and to promote water use efficiency by its customers, is another high priority set of activities. To this end, the Town will continue with annual water rate increases and will conduct an evaluation of its water rates in 2015.

The next highest priority for the Town will be to conduct those measures and programs that improve the water use efficiency of the Town's facilities. These measures and programs include facility audits and appropriate retrofits and replacements.

Other water conservation measures and programs that support a better understanding of specific customer uses and improve their water use efficiencies, while considered important to the management of future water demand, are considered less important than those measures and programs discussed above.

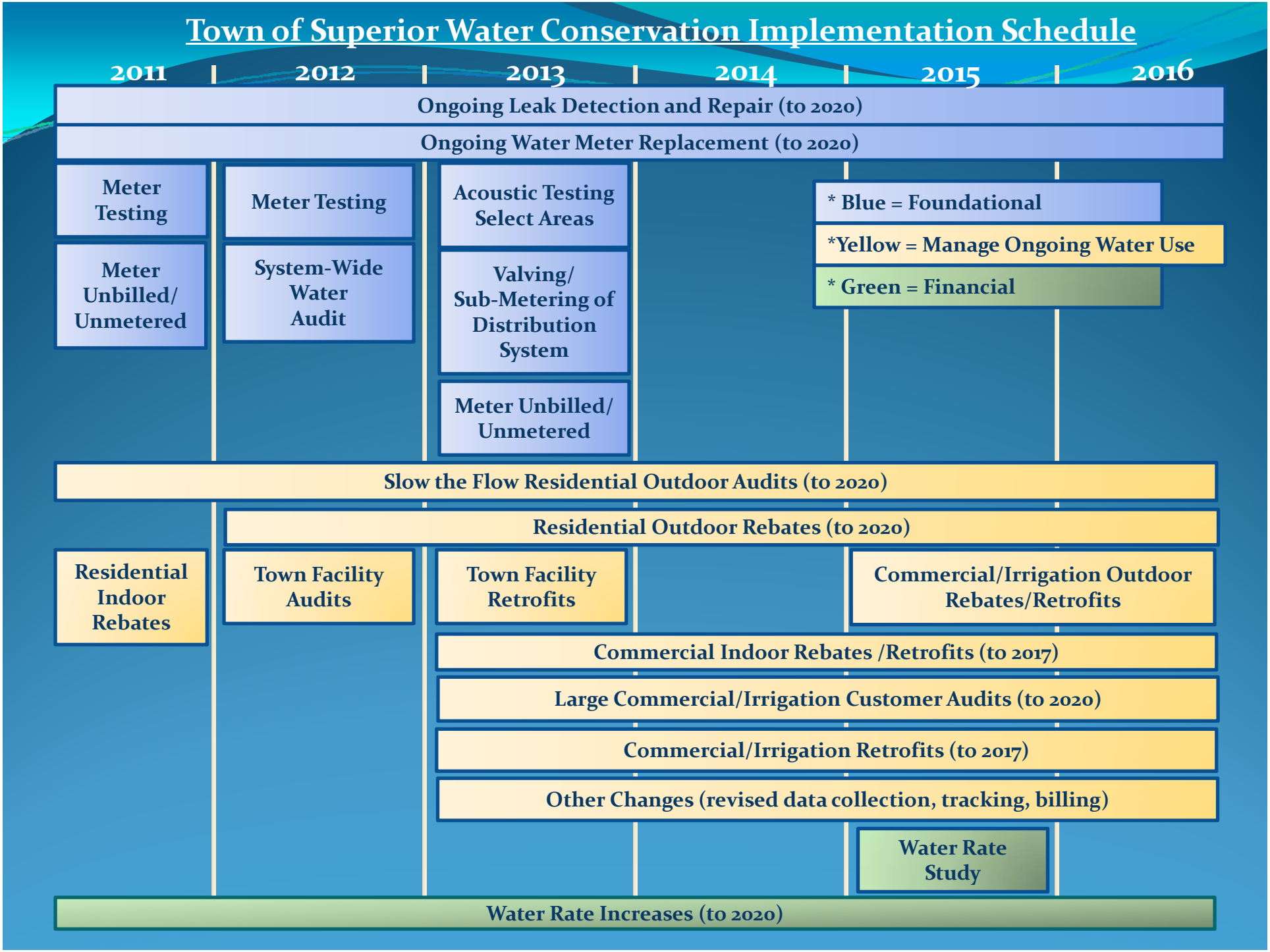
8.3 Public Input and Plan Approval

The Draft Water Conservation Plan was available for public comment for 60 days beginning May 9, 2011. Notice of the opening for public comment was provided using the following media:

- Notice posted on the Town's website with a copy of the full plan available in Adobe Acrobat (pdf) format,
- Distribution of a Town E-newsletter to current subscribers.

The included a description of how the public could submit comments to the Town for consideration. The plan was available electronically from the Town's website in Adobe Acrobat (pdf) format, and in hard copy to review at the Town Hall. In addition, the Draft Water Conservation Plan was open to comment at each Town Board Meeting, held the 2nd and 4th Mondays of each month. There were no public comments received on the Draft Water Conservation Plan.

Town of Superior Water Conservation Implementation Schedule



9 Monitor, Evaluate, and Revise

9.1 Monitoring and Evaluation of Measures and Programs

It is important to identify an approach to monitoring as many of the measures and programs as possible so the value of each program can be evaluated. Some measures and programs such as customer education and increasing water rates will not be measured directly, but can be generally tracked through annual average water use and per capita water use. Other measures and programs, such as the audits conducted on large water users, can be monitored on an individual basis. The Town will also need to create a procedure for tracking waster use at Town facilities to monitor these water savings separately. Monitoring efforts and metrics that the Town proposes are summarized in Table 20.

TABLE 20
Summary of Monitoring Methods for Estimating Water Savings

Conservation Measure/Program	Non-Revenue Water	Quantity of Audits/Rebates/Meter Replacements	Individual Water Use	Per Connection Water Use	Monthly Water Use
System-Wide Audit	X				
Leak Repair	X				
New Meter Installation and Replacement	X	X			
Water Rate Increase				X	X
Town Facility Audits			X (Town facilities only)		
Residential Audits		X	X	X	
Residential Rebates (Indoor and Outdoor)		X	X	X	X
Commercial Audits		X	X		X
Commercial Rebates/Retrofits		X	X		X

9.2 Plan Updates and Revisions

On an annual basis the Town will monitor the metrics proposed in Table 20. The results will be reported to the Town's Board of Trustees and the District's Board of Directors. These annual reports will help prepare the Town for updating the conservation plan every seven years as required by the CWCB. The plan will be updated at the end of 2018.

Appendix A
State of Colorado Statute CRS 37-60-126

37-60-126. Water conservation and drought mitigation planning - programs - relationship to state assistance for water facilities - guidelines - water efficiency grant program - repeal.

(1) As used in this section and section 37-60-126.5, unless the context otherwise requires:

(a) "Agency" means a public or private entity whose primary purpose includes the promotion of water resource conservation.

(b) "Covered entity" means each municipality, agency, utility, including any privately owned utility, or other publicly owned entity with a legal obligation to supply, distribute, or otherwise provide water at retail to domestic, commercial, industrial, or public facility customers, and that has a total demand for such customers of two thousand acre-feet or more.

(c) "Grant program" means the water efficiency grant program established pursuant to subsection (12) of this section.

(d) "Office" means the office of water conservation and drought planning created in section 37-60-124.

(e) "Plan elements" means those components of water conservation plans that address water-saving measures and programs, implementation review, water-saving goals, and the actions a covered entity shall take to develop, implement, monitor, review, and revise its water conservation plan.

(f) "Public facility" means any facility operated by an instrument of government for the benefit of the public, including, but not limited to, a government building; park or other recreational facility; school, college, university, or other educational institution; highway; hospital; or stadium.

(g) "Water conservation" means water use efficiency, wise water use, water transmission and distribution system efficiency, and supply substitution. The objective of water conservation is a long-term increase in the productive use of water supply in order to satisfy water supply needs without compromising desired water services.

(h) "Water conservation plan", "water use efficiency plan", or "plan" means a plan adopted in accordance with this section.

(i) "Water-saving measures and programs" includes a device, a practice, hardware, or equipment that reduces water demands and a program that uses a combination of measures and incentives that allow for an increase in the productive use of a local water supply.

(2) (a) Each covered entity shall, subject to section 37-60-127, develop, adopt, make publicly available, and implement a plan pursuant to which such covered entity shall encourage its domestic, commercial, industrial, and public facility customers to use water more efficiently. Any state or local governmental entity that is not a covered entity may develop, adopt, make publicly available, and implement such a plan.

(b) The office shall review previously submitted conservation plans to evaluate their consistency with the provisions of this section and the guidelines established pursuant to paragraph (a) of

subsection (7) of this section.

(c) On and after July 1, 2006, a covered entity that seeks financial assistance from either the board or the Colorado water resources and power development authority shall submit to the board a new or revised plan to meet water conservation goals adopted by the covered entity, in accordance with this section, for the board's approval prior to the release of new loan proceeds.

(3) The manner in which the covered entity develops, adopts, makes publicly available, and implements a plan established pursuant to subsection (2) of this section shall be determined by the covered entity in accordance with this section. The plan shall be accompanied by a schedule for its implementation. The plans and schedules shall be provided to the office within ninety days after their adoption. For those entities seeking financial assistance, the office shall then notify the covered entity and the appropriate financing authority that the plan has been reviewed and whether the plan has been approved in accordance with this section.

(4) A plan developed by a covered entity pursuant to subsection (2) of this section shall, at a minimum, include a full evaluation of the following plan elements:

(a) The water-saving measures and programs to be used by the covered entity for water conservation. In developing these measures and programs, each covered entity shall, at a minimum, consider the following:

(I) Water-efficient fixtures and appliances, including toilets, urinals, showerheads, and faucets;

(II) Low water use landscapes, drought-resistant vegetation, removal of phreatophytes, and efficient irrigation;

(III) Water-efficient industrial and commercial water-using processes;

(IV) Water reuse systems;

(V) Distribution system leak identification and repair;

(VI) Dissemination of information regarding water use efficiency measures, including by public education, customer water use audits, and water-saving demonstrations;

(VII) Water rate structures and billing systems designed to encourage water use efficiency in a fiscally responsible manner;

(VIII) The department of local affairs may provide technical assistance to covered entities that are local governments to implement water billing systems that show customer water usage and that implement tiered billing systems;

(IX) Regulatory measures designed to encourage water conservation;

(X) Incentives to implement water conservation techniques, including rebates to customers to encourage the installation of water conservation measures;

(b) A section stating the covered entity's best judgment of the role of water conservation plans in the covered entity's water supply planning;

(c) The steps the covered entity used to develop, and will use to implement, monitor, review, and revise, its water conservation plan;

(d) The time period, not to exceed seven years, after which the covered entity will review and update its adopted plan; and

(e) Either as a percentage or in acre-foot increments, an estimate of the amount of water that has been saved through a previously implemented conservation plan and an estimate of the amount of water that will be saved through conservation when the plan is implemented.

(5) Each covered entity and other state or local governmental entity that adopts a plan shall follow the entity's rules, codes, or ordinances to make the draft plan available for public review and comment. If there are no rules, codes, or ordinances governing the entity's public planning process, then each entity shall publish a draft plan, give public notice of the plan, make such plan publicly available, and solicit comments from the public for a period of not less than sixty days after the date on which the draft plan is made publicly available. Reference shall be made in the public notice to the elements of a plan that have already been implemented.

(6) The board is hereby authorized to recommend the appropriation and expenditure of such revenues as are necessary from the unobligated balance of the five percent share of the operational account of the severance tax trust fund designated for use by the board for the purpose of the office providing assistance to covered entities to develop water conservation plans that meet the provisions of this section.

(7) (a) The board shall adopt guidelines for the office to review water conservation plans submitted by covered entities and other state or local governmental entities. The guidelines shall define the method for submitting plans to the office, the methods for office review and approval of the plans, and the interest rate surcharge provided for in paragraph (a) of subsection (9) of this section.

(b) If no other applicable guidelines exist as of June 1, 2007, the board shall adopt guidelines by July 31, 2007, for the office to use in reviewing applications submitted by covered entities, other state or local governmental entities, and agencies for grants from the grant program and from the grant program established in section 37-60-126.5 (3). The guidelines shall establish deadlines and procedures for covered entities, other state or local governmental entities, and agencies to follow in applying for grants and the criteria to be used by the office and the board in prioritizing and awarding grants.

(8) A covered entity may at any time adopt changes to an approved plan in accordance with this section after notifying and receiving concurrence from the office. If the proposed changes are major, the covered entity shall give public notice of the changes, make the changes available in draft form, and provide the public an opportunity to comment on such changes before adopting them in accordance with subsection (5) of this section.

(9) (a) Neither the board nor the Colorado water resources and power development authority shall release loan proceeds to a covered entity unless such covered entity provides a copy of the water conservation plan adopted pursuant to this section; except that the board or the authority may release such loan proceeds if the board or the authority, as applicable, determines that an unforseen emergency exists in relation to the covered entity's loan application, in which case the

board or the authority, as applicable, may impose a loan surcharge upon the covered entity that may be rebated or reduced if the covered entity submits and adopts a plan in compliance with this section in a timely manner as determined by the board or the authority, as applicable.

(b) The board and the Colorado water resources and power development authority, to which any covered entity has applied for financial assistance for the construction of a water diversion, storage, conveyance, water treatment, or wastewater treatment facility, shall consider any water conservation plan filed pursuant to this section in determining whether to render financial assistance to such entity. Such consideration shall be carried out within the discretion accorded the board and the Colorado water resources and power development authority pursuant to which such board and authority render such financial assistance to such covered entity.

(c) The board and the Colorado water resources and power development authority may enter into a memorandum of understanding with each other for the purposes of avoiding delay in the processing of applications for financial assistance covered by this section and avoiding duplication in the consideration required by this subsection (9).

(10) Repealed.

(11) (a) Any section of a restrictive covenant that prohibits or limits xeriscape, prohibits or limits the installation or use of drought-tolerant vegetative landscapes, or requires cultivated vegetation to consist exclusively or primarily of turf grass is hereby declared contrary to public policy and, on that basis, that section of the covenant shall be unenforceable.

(b) As used in this subsection (11):

(I) "Executive board policy or practice" includes any additional procedural step or burden, financial or otherwise, placed on a unit owner who seeks approval for a landscaping change by the executive board of a unit owners' association, as defined in section 38-33.3-103, C.R.S., and not included in the existing declaration or bylaws of the association. An "executive board policy or practice" includes, without limitation, the requirement of:

(A) An architect's stamp;

(B) Preapproval by an architect or landscape architect retained by the executive board;

(C) An analysis of water usage under the proposed new landscape plan or a history of water usage under the unit owner's existing landscape plan; and

(D) The adoption of a landscaping change fee.

(II) "Restrictive covenant" means any covenant, restriction, bylaw, executive board policy or practice, or condition applicable to real property for the purpose of controlling land use, but does not include any covenant, restriction, or condition imposed on such real property by any governmental entity.

(III) "Turf grass" means continuous plant coverage consisting of hybridized grasses that, when regularly mowed, form a dense growth of leaf blades and roots.

(IV) "Xeriscape" means the application of the principles of landscape planning and design, soil

analysis and improvement, appropriate plant selection, limitation of turf area, use of mulches, irrigation efficiency, and appropriate maintenance that results in water use efficiency and water-saving practices.

(c) Nothing in this subsection (11) shall preclude the executive board of a common interest community from taking enforcement action against a unit owner who allows his or her existing landscaping to die; except that:

(I) Such enforcement action shall be suspended during a period of water use restrictions declared by the jurisdiction in which the common interest community is located, in which case the unit owner shall comply with any watering restrictions imposed by the water provider for the common interest community;

(II) Enforcement shall be consistent within the community and not arbitrary or capricious; and

(III) Once the drought emergency is lifted, the unit owner shall be allowed a reasonable and practical opportunity, as defined by the association's executive board, with consideration of applicable local growing seasons or practical limitations, to reseed and revive turf grass before being required to replace it with new sod.

(12) (a) There is hereby created the water efficiency grant program for purposes of providing state funding to aid in the planning and implementation of water conservation plans developed in accordance with the requirements of this section and to promote the benefits of water efficiency. The board is authorized to distribute grants to covered entities, other state or local governmental entities, and agencies in accordance with its guidelines from the moneys transferred to and appropriated from the water efficiency grant program cash fund, which is hereby created in the state treasury. For the 2005-06 through 2010-11 fiscal years, the general assembly shall appropriate from the fund to the board up to five hundred thousand dollars annually for the purpose of providing grants to covered entities, other state and local governmental entities, and agencies in accordance with this subsection (12). Commencing July 1, 2008, the general assembly shall also appropriate from the fund to the board fifty thousand dollars each fiscal year through 2011-12 to cover the costs associated with the administration of the grant program and the requirements of section 37-60-124. However, if less than five hundred thousand dollars is appropriated or expended in any such fiscal year, an amount equal to the difference between five hundred thousand dollars and the amount actually appropriated or expended in that fiscal year shall be available for appropriation and expenditure to the grant program in the next fiscal year in addition to the five hundred thousand dollars available for appropriation in that fiscal year. Any moneys remaining in the fund on June 30, 2012, shall be transferred to the reserve in the operational account of the severance tax trust fund described in section 39-29-109.3 (3), C.R.S.

(b) Any covered entity or state or local governmental entity that has adopted a water conservation plan and that supplies, distributes, or otherwise provides water at retail to customers may apply for a grant to aid in the implementation of the water efficiency goals of the plan. Any agency may apply for a grant to fund outreach or education programs aimed at demonstrating the benefits of water efficiency. The office shall review the applications and make recommendations to the board regarding the awarding and distribution of grants to applicants who satisfy the criteria outlined in this subsection (12) and the guidelines developed pursuant to subsection (7) of this section.

(c) This subsection (12) is repealed, effective July 1, 2012.

Source: L. 91: Entire section added, p. 2023, § 4, effective June 4. **L. 99:** (10) repealed, p. 25, § 3, effective March 5. **L. 2003:** (4)(g) amended and (11) added, p. 1368, § 4, effective April 25. **L. 2004:** Entire section amended, p. 1779, § 3, effective August 4. **L. 2005:** (1), (2)(b), and (7) amended and (12) added, p. 1481, § 1, effective June 7; (11) amended, p. 1372, § 1, effective June 6. **L. 2007:** (1)(a), (2)(a), (5), (7), and (12) amended, p. 1890, § 1, effective June 1. **L. 2008:** IP(4) amended, p. 1575, § 30, effective May 29; (12)(a) amended, p. 1873, § 14, effective June 2.

Editor's note: Subsection (12) was originally enacted as (13) in House Bill 05-1254 but has been renumbered on revision for ease of location.

Cross references: (1) In 1991, this entire section was added by the "Water Conservation Act of 1991". For the short title and the legislative declaration, see sections 1 and 2 of chapter 328, Session Laws of Colorado 1991.

(2) For the legislative declaration contained in the 2004 act amending this section, see section 1 of chapter 373, Session Laws of Colorado 2004.

Appendix B
List of Potential Measures and Programs

Appendix B - List of Potential Measures and Programs

FOUNDATIONAL WATER CONSERVATION	State Statute Requirement[1]	CWW BP[2]	Comment	Specific Issues	Screening Results
Metering	**V, VII**	BP 1			
Submetering of Commercial Entities			The Town has separated its commercial indoor and outdoor uses using potable and non-potable water supplies. In addition, the largest outdoor water users (e.g., HOAs and parks) are also on non-potable water supplies.	Submetering is already in place in the Town	Do not move forward to evaluation
AMR Installation and Operations			The Town would like to install AMR devices on key water meters, but the cost of the initial installation is currently prohibitively expensive.	The Town would benefit from AMR; however the Town is currently reading customer meters and billing monthly. Costs expected to be prohibitive at this time.	Do not move forward to evaluation
Metering of Town Water Uses (including WTP, WWTP, etc.)			The Town needs to improve its current metering of its own water uses, including flushing flows, WTP and WWTP uses.	The Town needs to improve its understanding of non-revenue water. Better metering of flushing flows, and other Town uses is needed	Perform as outcome of systemwide water audit
Meter Testing and Replacement			Some of the water meters in the Town are older than 10 year,.. And therefore more aggressive meter testing and replacement is warranted to ensure that the Town has an accurate reading of water use for each of its customers.	The Town would benefit from more aggressive meter testing and replacement especially for its larger water use customers	Town is currently funding meter testing and repair program; and meter replacement program. No additional analyses will be needed.
Meter Upgrades (to higher accuracy/lower incremental reading)			The Town is interested in improving the accuracy of its meters to less than 1,000 gallon increments; however the large scale replacement of 3,000 meters is cost prohibitive.		Do not move forward to evaluation
Conservation Oriented Rates	**VII, VIII**	BP 1			
Water Rate Increase			The Town has scheduled water rate increases in each of the coming five years; however the rate increase is tied to current CIP plans and operating needs. The Town will need to re-evaluate its cash flow needs in light of water conservation, metering and billing needs, and overall revenue projections by 2015.		Town is currently funding future water rate studies. No additional analyses will be needed.
Inclining Block Rate Adjustments			The Town, which has tiered rate structure for all its customer classes, does not currently have planned a re-evaluation of its tiered rate structure, due in part to concerns about inequitable billing practices.		Do not move forward to evaluation
Water Budgets			The Town does not currently have the means to develop lot and customer specific water budgets.		Do not move forward to evaluation
Tap Fees with Water Conservation Incentives			The Town may develop tap fee structure that creates incentives for green building and water smart homes and businesses.	The Town currently has a green building code requirement for new residential construction, and is developing one for commercial construction. In addtion, the tiered rate structure provides some punitive impact to water use over reasonable levels.	Do not move forward to evaluation
System Water Loss Control	**V**	BP 3			
System Wide Water Audit (AWWA M-36 Methodology)			The Town has recently conducted an AWWA audit of its system wide water uses and tracking.	The Town may need to increase the level of accuracy used for preliminary analysis and commit more resources to better characterize non-revenue water	Move to evaluations
Leak Detection Programs Using Listening and Sensing Devices			The Town desires to better characterize real and apparent water losses to reduce its non-revenue water.	The Town may need to increase the level of accuracy used for preliminary analysis and commit more resources to better characterize non-revenue water	Move to evaluations
Improved Water Use Monitoring			The Town desires permanently improving the accuracy and regularity of data collection used to characterize it and its customer water use.	This is linked to better meter testing and replacement for large water users (see above).	Perform as outcome of systemwide water audit
Pipe Lining and Replacement			The Town would consider distribution and transmission pipe lining if data existed to indicate that pipelining would be effective in reducing non-revenue water	The Town will not initiate this task until after the AWWA Audit is conducted	Do not move forward to evaluation
Infrastructure Replacement Program			The Town would benefit from a more aggressive infrastructure replacement program; which will identify the time period for the entire replacement of its water transmission and distribution system, and set aside funds for that repalcement schedule on a yearly basis.	The Town will need to perform this task independent of the Water Conservation Plan, but should include language in the Plan related to it being conducted.	Do not move forward to evaluation
Data Collection - Monitoring and Verification		BP 2			
Customer Categorization in Billing System			The Town currently tracks residential single family and multifamily, commercial and irrigation water use. It could benefit by more specific tracking of Town water use(s) and tracking of commercial and irrigation water uses by industry code.	The Town is small enough (fewer than 60 commercial customers and 70 irrigation customers) that improved classification is unnecessary.	Do not move forward to evaluation
Monthly Meter Reading and Billing			The Town currently reads all meters in the Town on a monthly basis.		Do not move forward to evaluation
AMR Installation and Operations			The Town would like to install AMR devices on key water meters, but the cost of the initial installation is currently prohibitively expensive.		Do not move forward to evaluation
Integrated Resource Planning		BP 2	The Town currently links its water conservation plan with its water supply planning, wastewater planning, and its overall water resources planning.	IRP is currently occuring at the Town.	Do not move forward to evaluation
Conservation Coordinator		BP 4			Will be conseidered as part of other candidate measures and programs

ONGOING WATER USE	State Statute Requirement[1]	CWW BP[2]	Comment	Specific Issues	Screening Results
Town Facility Evaluations and Retrofits	**I, II, VI**	BP 10, 14			
Facility Indoor Audits			The Town has a number of facilities that would benefit from audits to determine the cost and replacement value of its indoor fixtures and appliances.		Move to evaluations
Facility Outdoor Audits			The Town has a number of facilities that would benefit from audits to determine the cost and related benefits associated with upgrading its outdoor irrigation practices		Move to evaluations
Facility Retrofits - Indoor			Based on the findings of the audits, the Town may choose to implement selected indoor fixture and/or appliance replacements	Replace faucet aerators, showerheads, toilets and/or urinals; fix and repair leaks	Move to evaluations
Irrigation Equipment Upgrades			Based on the findings of the audits, the Town may choose to implement selected outdoor irrigation upgrades and/or replacements	Replace sprinkler heads, install pressure reducing values, upgrade controllers, fix leaks and improve values/value boxes	Move to evaluations
Existing Customer Water Audits	**VI**	BP 10, 13, 14			
Residential Indoor			Conduct residential indoor water audits	Residential indoor per capita water use is currently about 60 gpcd.	Do not move forward to evaluation
Residential Outdoor			Conduct residential outdoor irrigation audits - Slo the Flo for example	Town currently uses Slo the Flo	Move to evaluations
Commercial Facilities			Conduct commercial facility indoor and outdoor water audits	Focus on high water use facilities	Move to evaluations
Irrigation Customers			Conduct irrigation customer audits	Focus on high water use facilities	Move to evaluations
Existing Customer Technical Assistance	**III, VI**	BP 9			
Landscape Design and Maintenance Workshops			Focus workshops on landscape design for homeowners, HOA Boards, landscape designers	Requires tracking of participants and their water use before and after the workshop - difficult to track non-resident businesses and contractors.	Do not move forward to evaluation
Xeriscape Demonstration Garden/Garden in a Box			Create and maintain Town sponsored Xeriscape Garden (could be a value program sponsored by the Town and conducted by the High School)		Move to evaluations
Residential Customer Water Use Workshops			Focus workshops on residential outdoor water use and xeriscape concepts	Requires tracking of participants and their water use before and after the workshop	Move to evaluations
Commercial Customer Water Use Workshops			Focus workshops on specific types of commercial water use - e.g., restaurants and bars, etc.	Requires tracking of participants and their water use before and after the workshop; however, corporations are biggest water users, not local store owners, so workshops may not be effective	Move to evaluations
Irrigation Customer Water Use Workshops			Focus workshops on irrigation practices and technologies for HOA Boards, irrigation contractors, landscape contractors	Requires tracking of participants and their water use before and after the workshop	Move to evaluations
Rebates and Retrofits	**X**	BP 12			
Residential Indoor Fixture and Appliance Rebates/Retrofits			Based on the findings of the audits, the Town may choose to implement selected indoor fixture and/or appliance rebates	Residential indoor per capita water use is currently about 60 gpcd.	Do not move forward to evaluation
Commercial Indoor Fixture and Appliance Rebates/Retrofits			Based on the findings of the audits, the Town may choose to implement selected indoor fixture and/or appliance rebates		Move to evaluations
Irrigation Equipment Rebates/Retrofits			Based on the findings of the audits, the Town may choose to implement selected outdoor irrigation upgrades and/or rebates		Move to evaluations
Turf Replacement Programs/Xeriscape Incentives			The Town may decide to provide incentives for its customers to remove turf and replace it with native plant materials and/or Xeric landscaping	Town will focus on new construction controls of plant materials as more cost effective than turf replacement programs to manage future demand	Do not move forward to evaluation

ORDINANCES	State Statute Requirement[1]	CWW BP[2]	Comment	Specific Issues	Screening Results
Water Waste Ordinance		BP 5			
Time of Day Watering Restrictions			Utilize time of day water restrictions from 10 am to 6 pm for all days in the months from May to September, which is already on the books for the Town.	Cost is for seasonal employees. Town will look at using Town staff only	Move enforcement of current ordinance to evaluations
Day of the Week Watering Restrictions			Utilize "Day of the Week" watering restrictions limiting watering to every second or third day is not something that Town Council will pass.		Do not move forward to evaluation
Water Overspray Limitations			Create limits for irrigation overspray, but is difficult to enforce.		Do not move forward to evaluation
Commercial Certifications (Car Washes, Restaurants, etc.)			Develop certification program for water efficient commercial businesses in Town	Cost is for seasonal employees. Town will look at using Town staff only	Move to evaluations
Landscape Design and Installation Rules and Regulations	**III**	BP 8			
Landscaper Certification and Training			Develop and implement landscaper certification program - must be connected with Town permitting and planning processes (including inspections and awarding of certificates of occupancy)	Town lacks resources at this time to implement, and Town is 98% built out, so there are limited opportunities for new construction to change total water demand.	Do not move forward to evaluation
Irrigation System Installer Certification and Training			Develop and implement irrigation installer certification program - must be connected with Town permitting and planning processes (including inspections and awarding of certificates of occupancy)	Town lacks resources at this time to implement, and Town is 98% built out, so there are limited opportunities for new construction to change total water demand.	Do not move forward to evaluation
Rules for New Construction	**IX**	BP 11			
Indoor Plumbing Requirements			Develop and implement indoor plumbing requirements for new homes and/or businesses - must be connected with Town permitting and planning processes (including inspections and awarding of certificates of occupancy)	The Town has residential Green Building requirements that influences indoor water use in all new homes.	Town has already committed resources to this effort.
Outdoor Irrigation Requirements			Develop and implement outdoor irrigation requirements for new homes and/or businesses - must be connected with Town permitting and planning processes (including inspections and awarding of certificates of occupancy)	The Town has residential Green Building requirements that influence outdoor irrigation requirements for all new homes.	Town has already committed resources to this effort.
Outdoor Turf and Landscaping Requirements			Develop and implement outdoor turf and landscaping requirements for new homes and/or businesses - must be connected with Town permitting and planning processes (including inspections and awarding of certificates of occupancy)	The Town has residential Green Building requirements that influence outdoor irrigation requirements for all new homes.	Town has already committed resources to this effort.
Commercial Cooling and Process Water Requirements			Develop and implement commercial cooling and process water requirements for new homes and/or businesses - must be connected with Town permitting and planning processes (including inspections and awarding of certificates of occupancy)	Town lacks resources at this time to implement, and Town is 98% built out, so there are limited opportunities for new construction to change total water demand.	Do not move forward to evaluation
Town Facility Requirements			Develop and implement Town facility water use requirements for new facilities - must be connected with Town permitting and planning processes (including inspections and awarding of certificates of occupancy)	The Town has no current plans to construct new municipal facilities.	Do not move forward to evaluation
Rules for Existing Construction	**IX**	BP 8, 9			
Point of Sales (POS) Requirements			Develop and implement POS requirements for real estate sales and transactions	Town lacks resources at this time to implement, and Town is 98% built out, so there are limited opportunities for new construction to change total water demand.	Do not move forward to evaluation
Alternative Water Supply Options (greywater, rainwater harvesting)			Develop and implement alternative water supply regulations for Town	Town lacks resources at this time to implement, and Town is 98% built out, so there are limited opportunities for new construction to change total water demand.	Do not move forward to evaluation
Commercial Cooling and Process Water Requirements			Develop and implement commercial cooling and process water requirements for existing facilities	Town lacks resources at this time to implement, and Town is 98% built out, so there are limited opportunities for new construction to change total water demand.	Do not move forward to evaluation
Outdoor Irrigation Requirements			Develop and implement outdoor irrigation system requirements (e.g., ET Controller requirements).	Town lacks resources at this time to implement, and Town is 98% built out, so there are limited opportunities for new construction to change total water demand.	Do not move forward to evaluation

EDUCATION	State Statute Requirement[1]	CWW BP[2]	Comment	Specific Issues	Screening Results
One Way	**VI**	BP 6			
Bill stuffers, Newsletter, Mailings			Town currently maintains a website with water conservation tips, newsletters and bill stuffers	Need to link any expenditures for printing and mailing to overall Town water messaging campaign	No specific cost/benefit analysis will be performed; will be recommended as part of the Water Conservation Plan
Two Way					
K-12 Education			The Town is interested in support local K-12 water education	The Town already works in partnership with the Keep it Clean Partnership and Project WET; would require adding water supply and conservation to the curriculum	No specific cost/benefit analysis will be performed; will be recommended as part of the Water Conservation Plan
Message Development/ Campaign			The Town does not have a water messaging campaign; it relies on messaging within the media shed.	The Town would benefit from a messaging campaign to link its various water conservation efforts with water rates; water waste ordinances; etc.	No specific cost/benefit analysis will be performed; will be recommended as part of the Water Conservation Plan
Engaged					
Citizens Advisory Group			The Town current maintains a Citizens Advisory Board on water and other issues	The Town should evaluate creation of a citizens advisory group to augment current Town Board efforts	No specific cost/benefit analysis will be performed; will be recommended as part of the Water Conservation Plan
Customer Surveys			The Town does not currently utilize surveys		Do not move forward to evaluation

[1] **CRS 37-60-126 4 (a)**

[2] **Colorado Water Wise Best Practices**

Appendix C
Watering Restrictions Ordinance

RESOLUTION OF THE BOARD OF DIRECTORS OF THE SUPERIOR METROPOLITAN DISTRICT NO. 1 REGARDING MODIFIED MANDATORY OUTDOOR WATER RESTRICTIONS FOR POTABLE WATER USE

No. 2003-21

WHEREAS, the Superior Metropolitan District No. 1 (the "District") is a duly authorized and existing metropolitan district, quasi-municipal corporation and political subdivision of the State of Colorado; and

WHEREAS, the District, pursuant to its Rules and Regulations, may restrict or prohibit water use for emergency purposes; and

WHEREAS, the District has the power to fix penalties for services, programs or facilities furnished by the District and until paid such penalties constitute a perpetual lien on and against the property served, pursuant to Section 32-1-1001(1)(j), C.R.S.; and

WHEREAS, pursuant to Section 32-1-1006(1)(d), C.R.S., the District has the power to assess reasonable penalties for delinquency in the payment of rates, fees, tolls or charges or for any violations of the rules and regulations of the District and to shut off or discontinue water or sanitation service for such delinquencies or delinquencies in the payment of taxes or for any violation of the District's rules and regulations; and

WHEREAS, pursuant to Section 32-1-1101(1)(e), C.R.S., the District has the power to certify delinquent fees, rates, tolls, penalties, charges or assessments made or levied for water, sewer or water and sewer purposes to the treasurer of the county to be collected and paid over by the treasurer of the county in the same manner as taxes are authorized to be collected and paid over; and

WHEREAS, the District has taken notice of the drought conditions existing throughout the State and in the community; and

WHEREAS, the Board has determined that the severity of the drought requires the immediate implementation of conservation measures to protect the District's potable water supply; and

WHEREAS, the Board has further determined that the severity of the drought requires the restriction of the use of Raw Water, Irrigation Water and Potable Water, as defined in the District's Rules and Regulations; and

WHEREAS, the Board has previously adopted Resolution No. 2002-7 on July 29, 2002, Resolution No. 2002-9 on September 30, 2002, Resolution No. 2003-11 on March 17, 2003, and Resolution No. 2003-14 on May 19, 2003, all of which imposed mandatory outdoor water restrictions on potable water use, and the Board now desires to modify those restrictions.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE SUPERIOR METROPOLITAN DISTRICT NO. 1 AS FOLLOWS:

1. Outdoor Watering Restrictions. All Customers, as defined in the District's Rules and Regulations, who utilize Potable Water for outdoor use shall comply with the following outdoor watering restrictions:

a. Between November 1 and the last day of March of each year, outdoor watering may be done at any time.

b. Between April 1 and October 31 of each year, outdoor watering is prohibited between the hours of 10:00 A.M. and 6:00 P.M., seven days a week.

2. Enforcement and Penalties. Individual Customers shall be responsible for complying with the outdoor watering restrictions contained herein. Violation of these outdoor watering restrictions shall subject Customers to the following penalties:

a. For a first violation of any outdoor watering restriction, the Customer will be advised in writing and a twenty-five dollar ($25) penalty shall be added to the Customer's water bill.

b. For a second violation of any outdoor watering restriction, the Customer will be advised in writing and a fifty dollar ($50) penalty shall be added to the Customer's water bill.

c. For every subsequent violation of any outdoor watering restriction, the Customer will be advised in writing and a monetary penalty, increasing in fifty dollar ($50) increments per violation, shall be added to the Customer's water bill in the following schedule:

Number of Violations	Penalty Amount
Three (3)	$100
Four (4)	$150
Five (5)	$200
Six (6)	$250
Seven (7)	$300

Number of Violations	Penalty Amount
Eight (8)	$350
Nine (9)	$400
Ten (10)	$450
Eleven (11)	$500
Each Subsequent Violation	$500

The maximum penalty for each violation shall be five hundred dollars ($500).

d. Outdoor watering restrictions shall be enforced by District field staff and officers of the Town of Superior Police Department.

e. The District reserves all remedies for collection of payment as provided in Sections 32-1-1001(1)(j); 32-1-1006(1)(d); and 32-1-1101(1)(e), C.R.S.

f. Notice of violations and enforcement will commence on March 15, 2004.

3. Effective Date. The outdoor watering restrictions contained herein shall be effective on December 15, 2003.

4. Appeal Process. Any person subject to a penalty described in Section 2 may appeal such decision in the manner set forth in Section 8 of the District's Rules and Regulations.

DONE and adopted this 15th day of December 2003, by the Board of Directors of the Superior Metropolitan District No. 1.

SUPERIOR METROPOLITAN DISTRICT NO. 1

By: _____
Susan K. Spence, President

ATTEST:

By: _____
Lisa Johnson, Secretary

2003-21 re water restrictions MAR103003

Appendix D
Estimated Water Savings Assumptions and Analysis

TOWN OF SUPERIOR
WATER CONSERVATION PLAN
APPENDIX D - ESTIMATED WATER SAVINGS ASSUMPTIONS AND ANALYSIS

APPENDIX D - ESTIMATED WATER SAVINGS ASSUMPTIONS AND ANALYSIS	2011		2012		2013		2014		2015	
Measures and Programs (** indicates items already included in Town's 2011 Budget)	Cost	Water (gallons)	Cost	Water (gallons)	Cost	Water (gallons)	Cost	Water (gallons)	Cost	Water (gallons)
Foundational Water Savings										
Leak Detection and Repair										
Conduct system wide water audit using AWWA methodology and implement recommendations	$ -		$ 20,000		$ 2,500		$ 2,500		$ 2,500	
**Leak Repair- potable lines and non-potable lines[1]	$ 81,000		$ 74,550		$ 78,278		$ 82,191		$ 86,301	
Acoustic emissions testing of selected portions of Town distribution system	$ -		$ -		$ -		$ 11,000		$ -	
Meter Improvements										
Installation of New Meters on Unmetered Uses	$ -		$ -		$ 20,000		$ -		$ -	
Installation of New Valving and/or Submetering within Distribution System- recommended from audit	$ -		$ -		$ 2,500		$ 2,500		$ 2,500	
**Water meter replacement program	$ 225,000		$ 225,000		$ -		$ -		$ -	
**Ongoing water meter replacement, water audit, leak detection, meter testing	$ 15,000		$ 5,000		$ 5,150		$ 5,305		$ 5,464	
Other										
**Implement 5% increase in water rates annually	$ -		$ -		$ -		$ -		$ -	
Conduct water rate studies	$ -		$ -		$ -		$ -		$ 70,000	
Total Cost (Foundation Water Savings)	$ 321,000		$ 324,550		$ 108,428		$ 103,496		$ 166,765	
Annual Reduction in Non-Revenue Water										
Reduction in Apparent losses	AF	gallons	AF	gallons	AF	gallons	AF	gallons	AF	gallons
Estimated High Reduction	25.6	8,348,922	25.7	8,373,988	0.0	-	0.0	-	0.0	-
Estimated High Reduction (cumulative)	25.6	8,348,922	51.3	16,722,910	51.3	16,722,910	51.3	16,722,910	51.3	16,722,910
Estimated Low Reduction	19.4	6,324,941	19.5	6,343,930	0.0	-	0.0	-	0.0	-
Estimated Low Reduction (cumulative)	19.4	6,324,941	38.9	12,668,871	38.9	12,668,871	38.9	12,668,871	38.9	12,668,871
Reduction in Real losses										
Estimated High Reduction	2.2	708,393	2.2	710,520	2.3	765,417	2.4	768,341	2.4	770,496
Estimated High Reduction (cumulative)	2.2	708,393	4.4	1,418,914	6.7	2,184,331	9.1	2,952,672	11.4	3,723,168
Estimated Low Reduction	0.9	303,597	0.9	304,509	1.1	363,939	1.1	365,329	1.1	366,354
Estimated Low Reduction (cumulative)	0.9	303,597	1.9	608,106	3.0	972,045	4.1	1,337,374	5.2	1,703,728
Ongoing Water Uses										
Audits										
Conduct audits of Town's facilities to improve water use (9 facilities)	$ -	-	$ 20,000	-	$ -	-	$ -	-	$ -	-
Conduct audits of residential outdoor water use (Slow the Flow- 60 audits/yr)	$ 6,000	35,000	$ 6,000	35,000	$ 6,000	35,000	$ 6,000	35,000	$ 6,000	35,000
Conduct audits of Town's largest commercial customer water use (5 per year)	$ -	-	$ -	-	$ 10,000	23,631	$ 10,000	23,631	$ 10,000	23,631
Conduct audits of Town's largest irrigation customer water use (7 per year)	$ -	-	$ -	-	$ 10,500	272,260	$ 10,500	272,260	$ 10,500	272,260
Rebates and retrofits										
Town facility retrofits	$ -	-	$ -	-	$ 11,440	662,600	$ -	-	$ -	-
**Rebate- Indoor fixtures and appliances for residential and commercial customers	$ 10,000	2,192	$ -	-	$ -	-	$ -	-	$ -	-
Retrofits- Indoor fixtures and appliances for commercial customers	$ -	-	$ -	-	$ 256	13,500	$ 256	13,500	$ 256	13,500
Retrofits- Outdoor irrigation equipment for commercial and irrigation customers										
ET Controllers (10/yr)	$ -	-	$ -	-	$ -	-			$ 7,500	2,726,277
MP Rotators (10 facilities/yr)	$ -	-	$ -	-	$ -	-			$ 12,000	4,362,043
Rebate- Outdoor irrigation equipment for residential customers										
ET Controllers (80/yr)	$ -	-	$ 8,000	617,411	$ 8,000	617,411	$ 8,000	617,411	$ 8,000	617,411
Rain Check Sensor Rain Bird (50/yr)	$ -	-	$ 2,500	56,596	$ 2,500	56,596	$ 2,500	56,596	$ 2,500	56,596
MP Rotators (15 homes/yr)	$ -	-	$ 3,375	185,223	$ 3,375	185,223	$ 3,375	185,223	$ 3,375	185,223
Total Cost - Potable	$ 16,000		$ 39,875		$ 52,070		$ 40,631		$ 40,631	
Total Cost - Non-Potable	$ -		$ -		$ -		$ -		$ 19,500	
Water Saved - per year	AF	gallons	AF	gallons	AF	gallons	AF	gallons	AF	gallons
Potable	0.1	37,192	2.7	894,230	5.7	1,866,220	3.7	1,203,620	3.7	1,203,620
Non-Potable		-		-		-		-	21.8	7,088,319
Water Saved- cumulative (annually)										
Potable	0.1	37,192	2.9	931,421	8.6	2,797,642	12.3	4,001,262	16.0	5,204,883
Non-Potable		-		-		-		-	21.8	7,088,319
Total Water Saved Annually (estimated high reduction)	27.9		30.6		8.1		6.1		27.8	
Total Water Saved Annually (estimated low reduction)	20.5		23.1		6.8		4.8		26.6	
Ordinances										
Enforce existing ordinances that have been established and implemented by the Town (e.g., time of day restrictions)										
Upgrade current Green Building Codes and Requirements for new and upgraded residential construction										
Support development of new Green commercial construction requirements										
Water Conservation Measures & Programs Estimated Budget Summary										
Water Conservation Measures & Programs Estimated Total Cost (Foundational + Ongoing Water Use)	$ 337,000		$ 364,425		$ 160,498		$ 144,126		$ 226,895	
Water Conservation Measures & Programs (already included in current 2011 budget)	$ 331,000		$ 304,550		$ 83,428		$ 87,496		$ 91,765	
Water Conservation Measures & Programs (estimated additional budget)	$ 6,000		$ 59,875		$ 77,070		$ 56,631		$ 135,131	

Notes:

[1] Budget for leak repair is allocated and is expended based on need; all funds may not be used each year.

TOWN OF SUPERIOR
WATER CONSERVATION PLAN
APPENDIX D - ESTIMATED WATER SAVINGS ASSUMPTIONS AND ANALYSIS

APPENDIX D - ESTIMATED WATER SAVINGS ASSUMPTIONS AND ANALYSIS	2016		2017		2018		2019		2020	
Measures and Programs (** indicates items already included in Town's 2011 Budget)	Cost	Water (gallons)	Cost	Water (gallons)	Cost	Water (gallons)	Cost	Water (gallons)	Cost	Water (gallons)
Foundational Water Savings										
Leak Detection and Repair										
Conduct system wide water audit using AWWA methodology and implement recommendations	$ 2,500		$ 2,500		$ 2,500		$ 2,500		$ 2,500	
**Leak Repair- potable lines and non-potable lines[1]	$ 90,616		$ 95,147		$ 99,904		$ 104,899		$ 110,144	
Acoustic emissions testing of selected portions of Town distribution system	$ -		$ 11,000		$ -		$ -		$ 11,000	
Meter Improvements										
Installation of New Meters on Unmetered Uses	$ -		$ -		$ -		$ -		$ -	
Installation of New Valving and/or Submetering within Distribution System- recommended from audit	$ 2,500		$ 2,500		$ 2,500		$ 2,500		$ 2,500	
**Water meter replacement program	$ -		$ -		$ -		$ -		$ -	
**Ongoing water meter replacement, water audit, leak detection, meter testing	$ 5,628		$ 5,796		$ 5,970		$ 6,149		$ 6,334	
Other										
**Implement 5% increase in water rates annually	$ -		$ -		$ -		$ -		$ -	
Conduct water rate studies	$ -		$ -		$ -		$ -		$ -	
Total Cost (Foundation Water Savings)	$ 101,244		$ 116,943		$ 110,874		$ 116,049		$ 132,478	
Annual Reduction in Non-Revenue Water										
Reduction in Apparent losses	AF	gallons	AF	gallons	AF	gallons	AF	gallons	AF	gallons
Estimated High Reduction	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-
Estimated High Reduction (cumulative)	51.3	16,722,910	51.3	16,722,910	51.3	16,722,910	51.3	16,722,910	51.3	16,722,910
Estimated Low Reduction	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-
Estimated Low Reduction (cumulative)	38.9	12,668,871	38.9	12,668,871	38.9	12,668,871	38.9	12,668,871	38.9	12,668,871
Reduction in Real losses										
Estimated High Reduction	2.4	772,750	2.4	774,961	2.4	777,849	2.4	779,970	2.4	782,045
Estimated High Reduction (cumulative)	13.8	4,495,918	16.2	5,270,879	18.6	6,048,728	21.0	6,828,698	23.4	7,610,743
Estimated Low Reduction	1.1	367,426	1.1	368,477	1.1	369,850	1.1	370,859	1.1	371,845
Estimated Low Reduction (cumulative)	6.4	2,071,154	7.5	2,439,630	8.6	2,809,481	9.8	3,180,339	10.9	3,552,184
Ongoing Water Uses										
Audits										
Conduct audits of Town's facilities to improve water use (9 facilities)	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-
Conduct audits of residential outdoor water use (Slow the Flow- 60 audits/yr)	$ 6,000	35,000	$ 6,000	35,000	$ 6,000	35,000	$ 6,000	35,000	$ 6,000	35,000
Conduct audits of Town's largest commercial customer water use (5 per year)	$ 10,000	23,631	$ 10,000	23,631	$ -	-	$ -	-	$ -	-
Conduct audits of Town's largest irrigation customer water use (7 per year)	$ 10,500	272,260	$ 10,500	272,260	$ -	-	$ -	-	$ -	-
Rebates and retrofits										
Town facility retrofits	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-
**Rebate- Indoor fixtures and appliances for residential and commercial customers	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-
Retrofits- Indoor fixtures and appliances for commercial customers	$ 256	13,500	$ 256	13,500	$ -	-	$ -	-	$ -	-
Retrofits- Outdoor irrigation equipment for commercial and irrigation customers									$ -	
ET Controllers (10/yr)	$ 7,500	2,726,277	$ 7,500	2,726,277	$ 7,500	2,726,277	$ 7,500	2,726,277	$ 7,500	2,726,277
MP Rotators (10 facilities/yr)	$ 12,000	4,362,043	$ 12,000	4,362,043	$ 12,000	4,362,043	$ 12,000	4,362,043	$ 12,000	4,362,043
Rebate- Outdoor irrigation equipment for residential customers										
ET Controllers (80/yr)	$ 8,000	617,411	$ 8,000	617,411	$ 8,000	617,411	$ 8,000	617,411	$ 8,000	617,411
Rain Check Sensor Rain Bird (50/yr)	$ 2,500	56,596	$ 2,500	56,596	$ 2,500	56,596	$ 2,500	56,596	$ 2,500	56,596
MP Rotators (15 homes/yr)	$ 3,375	185,223	$ 3,375	185,223	$ 3,375	185,223	$ 3,375	185,223	$ 3,375	185,223
Total Cost - Potable	$ 40,631		$ 40,631		$ 19,875		$ 19,875		$ 19,875	
Total Cost - Non-Potable	$ 19,500		$ 19,500		$ 19,500		$ 19,500		$ 19,500	
Water Saved - per year	AF	gallons	AF	gallons	AF	gallons	AF	gallons	AF	gallons
Potable	3.7	1,203,620	3.7	1,203,620	2.7	894,230	2.7	894,230	2.7	894,230
Non-Potable	21.8	7,088,319	21.8	7,088,319	21.8	7,088,319	21.8	7,088,319	21.8	7,088,319
Water Saved- cumulative (annually)										
Potable	19.7	6,408,503	23.4	7,612,123	26.1	8,506,353	28.8	9,400,583	31.6	10,294,812
Non-Potable	43.5	14,176,638	65.3	21,264,958	87.0	28,353,277	108.8	35,441,596	130.5	42,529,915
Total Water Saved Annually (estimated high reduction)	27.8		27.8		26.9		26.9		26.9	
Total Water Saved Annually (estimated low reduction)	26.6		26.6		25.6		25.6		25.6	
Ordinances										
Enforce existing ordinances that have been established and implemented by the Town (e.g., time of day restrictions)										
Upgrade current Green Building Codes and Requirements for new and upgraded residential construction										
Support development of new Green commercial construction requirements										
Water Conservation Measures & Programs Estimated Budget Summary										
Water Conservation Measures & Programs Estimated Total Cost (Foundational + Ongoing Water Use)	$ 161,374		$ 177,074		$ 150,249		$ 155,424		$ 171,853	
Water Conservation Measures & Programs (already included in current 2011 budget)	$ 96,244		$ 100,943		$ 105,874		$ 111,049		$ 116,478	
Water Conservation Measures & Programs (estimated additional budget)	$ 65,131		$ 76,131		$ 44,375		$ 44,375		$ 55,375	

Notes:

[1] Budget for leak repair is allocated and is expended based on need; all funds may not be used each year.

Appendix E
Public Comment Website

- Login

Water Conservation Plan

Back to Main Page

The Town of Superior has completed a public draft of its proposed Water Conservation Plan. This plan has been performed under a grant from and completed in accordance with guidelines set forth by the Colorado Water Conservation Board.

The purpose of this plan is to assess the characteristics of the Town's current water use, summarize the current status of raw water supply and treatment capacity, estimate future water use, and use this information to frame a water conservation program.

Currently, the plan is being published for a public comment period of 60 days.

Comments may be made in the following manner:

- By contacting Kurt Kowar, Director of Public Works and Utilities, at the Town's main phone number (303-499-3675).
- By sending an email to: waterconservationplan@superiorcolorado.gov (Please Note that comments will be collected without a reply via this method)

A hard copy is also available for review at the Town Hall front desk which is located at:

124 East Coal Creek Drive
Superior, CO 80027

The public comment period will be in effect until July 8, 2011.

- Superior water conservation plan public apr082011.pdf (4881K)
- By Kurt Kowar
- May 09 at 5:57 PM (2 months ago)

Project Information

No Project Description Provided.

- Portfolio Operations
- Status Active
- Phase Public Engagement
- Project Type(s):

  Water Supply