TOWN OF FREDERICK

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Engineering Department

August 1, 2011

Veva Deheza
Colorado Water Conservation Board
Department of Natural Resources
1313 Sherman Street, Room 721
Denver, Colorado 80203

Re Town of Frederick 2011 Water Conservation Plan

Ms. Deheza,

With the completion of the 2011 Water Conservation Plan the Town of Frederick is prepared to improve its efforts in conserving water for protection of the environment and regional water supplies. Civil Resources, LLC. and the Town of Frederick are presenting this *2011 Water Conservation Plan* for your review. The plan was developed by Civil Resources and Town staff as presented on the plan cover. Along with the selected strategies for water conservation, included in the plan are: 1) *the retail water deliveries for the past 6 years; 2) the population served for the past 6 years* and; 3*) public review and comment information attached in Appendix B.*

An electronic copy of the plan has been emailed to your office and a hard copy is in the mail. Thank you for your technical assistance and help in funding this important document.

Sincerely,

Tony Carey
Mayor Pro Tem
Town of Frederick

TOWN OF FREDERICK
WATER CONSERVATION PLAN

PREPARED FOR:

Town of Frederick
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Frederick, CO 80530

PREPARED BY:

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CIVIL RESOURCES, LLC
ENGINEERS & PLANNERS

DATE PREPARED: JULY 2011
REVISED: FEBRUARY 2012

TOWN OF FREDERICK

2011 WATER CONSERVATION PLAN

ACKNOWLEDGMENTS

I hereby certify that this Town of Frederick Water Conservation Plan was prepared by me (or under my direct supervision) in accordance with the provisions of the State of Colorado Water Conservation Board guidelines and generally accepted engineering standards.

Andrew Rodriguez, P.E.

Brad L. Hagen, P.E.

The following members of Civil Resources, LLC staff contributed to the study and preparation of this report:

Project Manager / Engineer:	Andrew Rodriguez, P.E.
Principal Engineer:	Brad L. Hagen, P.E.

The following Town of Frederick Staff contributed to the study and preparation of this report:

Town Engineer:	Richard Leffler, P.E.
Town Staff Engineer:	Brian Frank, P.E.

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EXECUTIVE SUMMARY

The Town of Frederick is located on the semi-arid plains twenty (20) miles east of the foothills of the Rocky Mountains. The Town Board and Staff have adopted improved water conservation as a prudent and reasonable goal for the citizens and customers of the Town water system. With increasing population growth rates expected and ongoing competition among diverse interests for a limited resource, wisely managing the Town's water supply by conserving this resource is a reasonable and responsible action to take.

The Town of Frederick has developed this Water Conservation Plan in accordance with the Water Conservation Act of 2004 and to meet the appropriate portions of the Colorado Revised Statute section 37-60-126.

Water Conservation Goals

The Town of Frederick will focus initial efforts on leak detection, public education, self -guided water audits, identifying unaccounted-for losses and incentive programs to reduce overall usage. Administrative controls in the form of municipal code revisions, new development requirements, along with infrastructure improvements will follow.

The goal for this plan is to reduce the Town's water use by 18.4% or 367 acre-feet per year over the next ten (10) years as discussed with the Colorado Water Conservation Board following award of the grant for this plan. The overall projected savings from preferred measures identified in the selection process resulted in 344 acre-feet per year (17.2%) of savings. This savings will come from the identified water use categories of 1) residential, 2) commercial, 3) industrial, 4) public, and 5) unaccounted-for losses.

Table ES-1: Combined Water Savings by Use Group

Water Use Categories	*Estimated Annual Water Savings After Implementation*	*Estimated Annual Cost (including lost revenue)*	*Estimated Annual Cost (w/out lost revenue)*
	Acre-Feet	*Dollars*	*Dollars*
Residential	276	$71,316	$29,154
Commercial	20	$5,442	$2,333
Industrial	11	$2,745	$1,057
Public	21	$5,501	$2,471
Unaccounted-for Losses	16	$50,000	$50,000
Total	*344*	*$135,004*	*$85,015*

Implementation Plan

Town resources are a limiting factor in implementing the developed water conservation plan. The schedule for implementation of measures and programs was based on the following:

- Water conservation opportunities available in conjunction with currently planned projects and programs.
- Resources (staff time and effort) required to establish the measure or program.
- Initial financial investment.
- Expected water savings.

Measures and programs were separated into five implementation categories including: (1) supply side programs, (2) regulatory control and standards, (3) educational programs, (4) rebates and incentive programs, and (5) audit programs. The implementation plan is shown in Table 9.1.

1.0 INTRODUCTION

The Town of Frederick (the Town of Frederick) is a growing community located along Colorado's Front Range. It is situated along both sides of Interstate 25 (I-25) and generally north of State Highway 52 (SH52) in southwestern Weld County. The Town of Frederick's Water Conservation Planning Boundary includes approximately 11.5 square miles (Figure 1).

Frederick began as a coal mining camp and was incorporated in 1907. Prior to 1988, the Town treated Boulder Creek water (via Lower Boulder Ditch and Milavec Lake) in a filter plant located at Milavec Lake. In 1988 the Town stopped treating Boulder Creek water and supplied the potable system with Colorado-Big Thompson (C-BT) water treated and delivered to the Town's system by Central Weld County Water District (Central Weld). Central Weld treats the Town's C-BT water at the Carter Lake Water Treatment Plant and delivers the potable water (through an underground pipe network) to the Town's master meters located east of I-25. C-BT shares and quotas are administered by the Northern Colorado Water Conservancy District (Northern). The Town's wastewater is treated by St. Vrain Sanitation District. No re-use is available due to the limitation of a single use of C-BT volume that was specified in the original legislation creating the C-BT system.

Left Hand Water District (Left Hand) is the sole provider for potable water service to areas within the Town's limits located west of Interstate 25. Therefore, water users provide water shares for developments west of Interstate 25 to Left Hand Water District and these shares are not owned or administered by the Town.

The recent drought years of 1998 through 2002 and a rapidly growing Colorado Front Range population have prompted municipalities to review their existing water policies and to plan for future water supplies including conservation of this limited resource. Frederick's Board of Trustees and Mayor recognized the need for a broader base of conservation measures to "stretch" or maximize the Town's current water supply. This plan will provide a planning tool for conservation measures and management of the Town of Frederick's current and future potable water resources.

This plan presents measures for existing and future development, however, additional measures or modifications to this plan may be necessary based on: 1) the level and timing of development; and 2) level of active participation by the public in conservation. Therefore, this document should be used as a guideline and will require updating. Frederick has developed this Water Conservation Plan in accordance with the Water Conservation Act of 2004 and to meet the appropriate portions of the Colorado Revised Statute section 37-60-126.

2.0 PROFILE EXISTING WATER SYSTEM

The Town's potable water system is currently reliant on its ownership in Colorado-Big Thompson project shares. The Town is currently a participant in the Northern Integrated Supply Project (NISP) to secure a future supply of first use high quality drinking water and to diversify their water rights portfolio. NISP is a proposed regional water supply project managed by the Northern Colorado Water Conservancy District. NISP will supply 40,000 acre-feet of eastern slope water to be used by districts and municipalities along the Front Range. The Town is currently enrolled for 2,600 acre-feet of NISP water to be used in their potable water supply system with approximately twenty (20) percent (520 af) of the Town's enrollment intended to supplement the existing water supply and the remaining volume (2,080 af) secured for future demands.

2.1 Colorado - Big Thompson (C-BT)

The Town currently uses only C-BT shares for its potable water supply. The Town owns a total of 3,487 units of C-BT as of January, 2011. Developers are required to dedicate 1.2 C-BT units per 5/8-inch tap to the Town, or at the Town's discretion pay cash-in-lieu, or may dedicate a combination of C-BT and native rights. The Town annually assigns a calculated water volume to Central Weld's Carter Lake Water Treatment Plant for treatment and delivery to the Town's system. Central Weld requires the Town to provide C-BT water in a volume equal to the volume delivered through the Town's master meters plus an additional 20 percent of the total delivered volume to cover system losses.

The water volume available from one unit of C-BT is dependent on the quota assigned to it by Northern. Northern considers existing storage volume, projected stream flows, projected demands and other factors when assigning the quota for C-BT. Typical quotas average 0.7 acre-feet per unit. Quotas can vary considerably from year to year with the lowest recent quota of 0.3 acre-feet per unit in November of 2002 as a result of a series of drought years.

2.2 Left Hand Water District

Left Hand Water District (Left Hand) delivers potable water to the residences, and businesses within Town limits on the west side of Interstate 25. The Town does not intend to change the existing arrangement and therefore, the potable demand and water rights for the west side residences were not closely considered in this plan for the Town. Left Hand currently has an approved Water Conservation Plan on file with the Colorado Water Conservation Board.

2.3 Existing Water Rights in Local Irrigation Companies (Non-Potable Supplies)

The Town owns local water rights to provide raw water for irrigation (non-potable) supply. The direct flow supply is supported by the Town's local storage rights including Lower Boulder Extension Reservoir (a.k.a. Milavec Lake), Baseline Reservoir, and other pond storage rights that are currently being processed for legal decree(s) and are directly associated with the raw water system. The Town also has a policy in-place to allow the option of acquiring native water rights on lands within its planning boundary (primarily Boulder Creek and Idaho Creek rights). However, the Town does not currently believe it is economically prudent to treat these native water rights, so their use is limited to raw water irrigation until they could be treated or a plan is in-place where they could be used to exchange for upstream higher quality water.

The Town currently owns 5 shares of New Consolidated Lower Boulder Ditch Common water, 20 shares of New Consolidated Lower Boulder Ditch Preferred water, 8 shares of Coal Ridge Ditch water, the Milavec Lake and three ponds storage rights, and a partial share of the Baseline Land and Reservoir Company. Lower Boulder Ditch water has historically been applied to lands within the Town's planning area and the Lower Boulder Ditch is used to fill Milavec Lake.

2.4 Physical Characteristics of the Existing Water System

2.4.1 Service Area

The Town water service area is located along Colorado's Front Range east of Interstate 25 and north of SH52 in southwestern Weld County. The Town's Water Conservation Planning Boundary includes approximately 11.5 square miles (Figure 1).

2.4.2 Water Distribution System

In 1988 the Town stopped treating local water and entered into an agreement to be supplied potable water with C-BT water treated and delivered to the Town's system by Central Weld County Water District (Central Weld). Central Weld treats the Town's C-BT water at the Carter Lake Water Treatment Plant and delivers the potable water through an underground pipe network to the Town's master meters located east of Interstate 25.

The Town owns one water storage tank located on Weld County Road 17 (WCR 17) east of downtown. The tank has a total holding capacity of 2.86 million gallons. Central Weld has additional storage in the area and the Town's supply is currently gravity fed. Each master meter contains a pressure reducing valve to adjust the pressure of the distribution system for town customers grouped into two primary pressure zones.

The treated water flows from the tank and master meters through approximately fifty miles of pipelines ranging in diameter from four inch to twelve inch. The pipe diameters and their length in miles are shown in Table 2.1.

Table 2.1: Pipeline Distribution System

Diameter	Miles
10" to 12"	7
8"	40
6" and below	3

2.5 System Limitations

Potential limitations exist in the current distribution system. Those limitations are identified as unaccounted-for losses, infrastructure, and storage.

Unaccounted-for losses occur in every water system to some level. With surveillance and a strong repair program many of these losses can be identified, addressed and repairs made keeping them to a minimum. As the Town's system ages the infrastructure becomes more vulnerable to disruption and breakage. As part of water conservation the Town plans to continue its leak detection program by targeting areas of high activity and older infrastructure. The Town conducted a water leak survey in 2009 at the cost of $10,000 and no significant leaks were detected. The Town plans to continue to monitor pipe pressures, un-accustomed spikes in billing statements, surveillance by maintenance personnel.

Current and future infrastructure limitations have been identified for the Town. Those infrastructure limitations are identified as improvements to the current system, 10 year, and 20 year upgrades. These recommendations are based on existing infrastructure and projected water demand.

As development occurs within the planning area east of the downtown area; a future elevated storage tank within the low pressure zone east of Frederick Way will be needed to provide the area with adequate water pressure.

3.0 WATER USE & DEMAND FORECAST

3.1 Tap & Water Demand Projections

The *Water Conservation Planning Boundary Map* (Figure 1) generally depicts existing and proposed land uses within the Town. The planning area is east of I-25 with a 2010 estimated population of 7,509 and an average household size of 2.75 persons per single family equivalent (SFE). The number of single-family new house construction building permits has dramatically decreased in the last few years since the peak occurring in year 2000 as shown in Table 3.1. There was a rebound in 2010 and activity is expected to increase.

Table 3.1: Single Family New House Construction Permits

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Permits	62	34	32	292	413	317	280	293	250	311	151	102	54	24	57

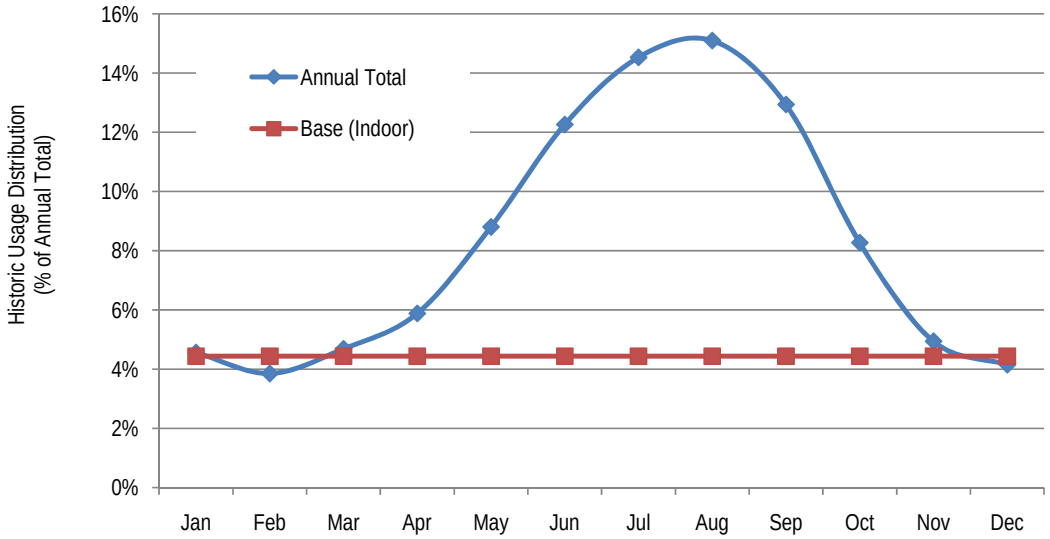
The Town's water system currently serves only those residents east of I-25, therefore, the population projections for this plan reflects the potential increase in growth east of I-25. Currently, potable water demands include residential, industrial and commercial consumption, public and system losses. Following is a brief discussion of the Town's current and projected demands for the area east of I-25.

3.2 Potable Water

Data from the Town indicates that water usage was 1,956 acre-feet (this is the required amount of water the Town transferred to Central Weld, 1630 acre-feet were metered through the Town's master meters) in water year 2010. This number includes an additional twenty percent (326 acre-feet) of the total water that was provided to Central Weld to account for system losses per the Town's existing contractual obligation. For the purposes of this study all current and future water

usage will be based on just the amount of water delivered through the master meters. Per the 2009 rate study approximately 64 percent of total Town water use occurs during the summer months (May through September) based on Central Weld's master meter reports. Using winter (December through February) consumption as the base for indoor usage for the community, an estimated 53 percent (4.4% x 12 months) of the total annual water volume delivered to the Town was for base or indoor use and the balance (47 percent) was for summer seasonal use (lawn/park irrigation typically). The figure below describes the average monthly water use distribution for the Town.

Figure 3.1 Monthly Water Use Distribution



Potable water demand projections are based on the projected growth rate percentages described in the table below. Average annual usage per residence was estimated from Town water use records to be approximately 194 gallons per capita per day (gpcd). This usage rate is reasonable by comparison to neighboring communities indicating 150 to 210 is a reasonable estimate in Colorado.

Table 3.4: Town Water Use Projections

Year	Residential Customers (East of I-25)	Projected Growth Rate (%)	Projected Water Use (ac-ft)
2010	7,509	-	1,630
2011	7,584	1%	1,647
2012	7,736	2%	1,679
2013	7,968	3%	1,730
2014	8,287	4%	1,799
2015	8,618	4%	1,871
2016	8,963	4%	1,946
2017	9,322	4%	2,024
2018	9,695	4%	2,105
2019	10,082	4%	2,189
2020	10,486	4%	2,276
2021	10,905	4%	2,367

Typical monthly potable water consumption demands were extrapolated from the Town's existing consumption records as shown on the table below.

Table 3.5: Potable Water Consumption

Gallons Consumed Per Month	Percentage of Customers
Less than 5,000	40%
5,001 to 10,000	20%
10,001 to 15,000	15%
15,001 to 20,000	8%
20,001 to 25,000	5%
25,001 to 30,000	4%
30,001 to 50,000	5%
Greater than 50,000	3%

Source: Town of Frederick Water Accounting Data, October 2004

The available usage data indicated that 37 percent of the total potable water used by Town water customers was used by the three percent of customers using greater than fifty thousand gallons per month. Typically, the customers using greater than fifty thousand gallons per month are public entities (school district and Town), a master metered subdivision and non-residential taps including private industries. The Town has specific billing agreements with some of these entities making it difficult to apply across-the-board rate changes. Therefore, it is recommended that the Town review each tap with use exceeding 50,000 gallons per month (in any given month).

3.3 Non-potable Water

Currently, most neighborhood parks and open spaces are irrigated with potable water supplied by the Town's potable water system. Raw water is used to irrigate Bella Rosa Golf Course, Frederick Recreation Area at Milavec Lake, Colorado Boulevard (Weld County Road 13) trail landscaping (east side of WCR 13 between Hwy 52 and WCR 16), 4) Crist Park in the downtown area; and Centennial Park. These areas are irrigated with water stored in Centennial Park and Milavec Lakes. This plan does not analyze the raw water irrigation systems or existing raw water infrastructure as it focuses on the Potable System making up the largest portion of water used in the Town.

The *2009 Rate Study* made a recommendation that the Town's monthly potable water rates be changed as summarized below.

Table 3.6: Existing & Proposed 5/8-inch Rates

Charge Rate	Frederick (Existing)	Frederick (Proposed)
Base Charge	$22.50	$22.50
0 to 5,000 gallons	$1.10	$1.10
5,000 to 10,000 gallons	$1.35	$1.35
10,000 to 15,000 gallons	$1.50	$1.60
15,000 to 20,000 gallons	$1.75	$2.00
20,000 to 25,000 gallons	$2.00	$2.25
25,000 to 30,000 gallons	$2.25	$2.25
30,000 to 40,000 gallons	$2.25	$2.50
over 40,000 gallons	$2.25	$2.50

High-volume users who have inappropriately small taps will continue to be motivated by the rate structure to purchase larger, more appropriate taps or conserve water. Table 3.7 restates the existing rate schedule for taps larger than 5/8-inch which is recommended to remain unchanged:

Table 3.7: Proposed Potable Usage Rate for Large Taps

Use (gal)	3/4"	1"	1-1/2"	2"	3"
Base Cost =	$29.10	$50.00	$95.40	$151.60	$283.60
(0 to 30K)	$1.10	$1.10	$1.10	$1.10	$1.10
(30K to 60K)	$1.35	$1.10	$1.10	$1.10	$1.10
(60K to 100K)	$1.50	$1.35	$1.10	$1.10	$1.10
(100K to 200K)	$1.75	$1.50	$1.35	$1.10	$1.10
(200K to 300K)	$2.25	$1.75	$1.50	$1.35	$1.10
(300K to 400K)	$2.25	$2.25	$1.75	$1.50	$1.35
(400K to 500K)	$2.25	$2.25	$2.25	$1.75	$1.50
(500K to 600K)	$2.25	$2.25	$2.25	$2.25	$1.75
(> 600K)	$2.25	$2.25	$2.25	$2.25	$2.25

Note: 1. Base costs are not changed from existing.

Two of the fees charged for the purchase of water service including Capital Improvement Fees and Tap Installation Fees are proposed to increase by ten percent in 2011 and again in 2015. However, Cash-in-lieu fees for water shares are actually recommended to decrease to reflect market value of these shares. It is also recommended that the Town adopt a policy or ordinance (as appropriate) that requires that no less than fifty percent of the water dedicated to the Town be in the form of cash-in-lieu to help fund the NISP costs.

Table 3.8: Proposed Fee Increase

	2009 Fees (Existing)			*2011 Fees (Proposed)*			*2015 Fees (Proposed)*		
Tap Size	Capital Imp. Fee	CBT Share (CIL)	Tap Install. Fee	Capital Imp. Fee	CBT Share (CIL)	Tap Install. Fee	Capital Imp. Fee	CBT Share (CIL)	Tap Install. Fee
5/8"	$1,000	$16,800	$750	$1,100	$14,400	$825	$1,210	$15,840	$908
3/4"	$1,500	$25,200	$1,050	$1,650	$21,600	$1,155	$1,815	$23,760	$1,271
1"	$3,000	$50,400	$1,650	$3,300	$43,200	$1,815	$3,630	$47,520	$1,997
1-1/2"	$6,000	$100,800	$3,650	$6,600	$86,400	$4,015	$7,260	$95,040	$4,417
2"	$10,000	$168,000	$5,150	$11,000	$144,000	$5,665	$12,100	$158,400	$6,232

An additional capital improvement fee of $1,200 is recommended for all taps to be served by the future elevated storage tank (i.e. within the low pressure zone east of Frederick Way). This fee will be used to help fund the construction of the tank needed to provide the area with adequate water pressure.

4.0 PROPOSED FACILITIES

The Town has projected a five year Capital Improvement Program (CIP) that anticipates the construction of several improvements to the system. Other CIP items that are likely to occur beyond the Town's current 5-year projection were estimated for planning purposes. The Town also plans to add water to its supply via the NISP and native water rights. The Water Capital Improvement Fund (WCIF) and Water Share Fund (WSF) planned expenditures are summarized below:

4.1 Water Capital Improvement Fund

The following are the major ongoing expenditures proposed in the Town's capital improvement plan.

- Elevated Storage Tank proposed to serve new development east of Frederick Way (Yr 2018; $800,000);
- Raw Water Reservoir proposed to indicate a planning point for increasing local storage in a reservoir west of I-25 to facilitate growing water rights portfolio and potential for local treatment (Yr 2014; $2.5 million funded monies collected plus a future loan).
- Central Weld Line Purchase Program proposed to purchase existing trunk lines from Central Weld (Annual; $100,000);
- Bond for 2003 Milavec Lake expansion at $80,500 annually ending at 2024.

4.2 Water Share Fund Annual Expenditures

- Raw Water Purchase Program (varies: $100K - $400K)
- Northern Integrated Supply Project (NISP) (varies: $98K - $4.3 million)
- Miscellaneous includes cost to complete the Substitute Water Supply Plans (2009 - 2010, $50k per year) and contractual carriage agreement costs with Lower Boulder Ditch (Annual: $20k).

5.0 IDENTIFY CONSERVATION GOALS

System losses contribute to the Town's water consumption. Leakage losses are expected to be most prevalent in the Old Town area of Frederick where the Town would propose to locate abandoned and/or leaking water lines for proper abandonment or repair/replacement. The Town will also develop a plan to identify and correct currently unmetered

usage which is a loss to the Town's system. The water consumption data equates to an approximate per capita water usage of 194 gpcd based on measured Town water use data and population information from the Town's records. The Town's potable water usage is broken down into four sectors since switching to our current accounting software (9 months of data) and has the following percentages of usages:

- Public 6.09% (5.4%);
- Industrial 3.42% (3.0%);
- Commercial 5.94% (5.1%); and
- Residential 84.54% (73.5%).
- Unaccounted Losses (13%)

The percentages in parenthesis include unaccounted losses. Table 5.1 below reports the water usage by category.

Table 5.1: Water Usage Table

							Average Day			
Year	Total Supply	Total less shrink	Average Day	Capita	gpcd	Unaccounted Loss 13.0%	Residential 73.5%	Commercial 5.1%	Industrial 3.0%	Public 5.4%
	(af)	(af)	(gal)			(gal)	(gal)	(gal)	(gal)	(gal)
2005	1,633	1,361	1,214,953	5,574	218	157,944	893,173	62,364	35,938	65,535
2006	1,994	1,662	1,483,538	5,893	252	192,860	1,090,623	76,150	43,883	80,022
2007	1,893	1,578	1,408,394	7,289	193	183,091	1,035,381	72,293	41,660	75,969
2008	1,894	1,578	1,409,138	7,318	193	183,188	1,035,927	72,331	41,682	76,009
2009	1,829	1,524	1,360,778	7,435	183	176,901	1,000,376	69,849	40,252	73,400
2010	1,956	1,630	1,455,468	7,509	194	189,211	1,069,988	74,709	43,053	78,508
2011	1,976	1,647	1,470,023	7,584	194	191,103	1,080,688	75,456	43,483	79,293
2012	2,015	1,679	1,499,424	7,736	194	194,925	1,102,301	76,965	44,353	80,879
2013	2,076	1,730	1,544,406	7,968	194	200,773	1,135,370	79,274	45,684	83,305
2014	2,159	1,799	1,606,183	8,287	194	208,804	1,180,785	82,445	47,511	86,637
2015	2,245	1,871	1,670,430	8,618	194	217,156	1,228,017	85,743	49,411	90,103
2016	2,335	1,946	1,737,247	8,963	194	225,842	1,277,137	89,173	51,388	93,707
2017	2,428	2,024	1,806,737	9,322	194	234,876	1,328,223	92,740	53,443	97,455
2018	2,526	2,105	1,879,006	9,695	194	244,271	1,381,352	96,449	55,581	101,354
2019	2,627	2,189	1,954,167	10,082	194	254,042	1,436,606	100,307	57,804	105,408
2020	2,732	2,276	2,032,333	10,486	194	264,203	1,494,070	104,320	60,116	109,624
2021	2,841	2,367	2,113,627	10,905	194	274,771	1,553,833	108,492	62,521	114,009
Average (2012-2021)	*2,398*	*1,999*	*1,784,356*	*9,206*	*194*	*231,966*	*1,311,769*	*91,591*	*52,781*	*96,248*

Residential usage constitutes an estimated 73.5 percent of the total Town potable water use and thereby represents the greatest source of conservation. It is the Town's goal to reduce the residential usage to approximately 114 gpcd. The Town has determined a total reduction goal of eighteen percent (18.4%) which equates to approximately 36 gpcd. Table 5.2 below presents the water conservation goals for the uses described above.

Table 5.2: Conservation Goals

Water Use Type	Existing Usage (2010)		Study Period (2012 - 2021)			
	Water Use	Capita 7,509	Water Use	Reduction		Capita 9,206
	acre-feet	gpcd	acre-feet	%	acre-feet	gpcd
Residential	1,198	142	1,469	20%	294	114
Commercial & Industrial	132	16	162	5%	8	15
Public	88	10	108	5%	5	10
Unaccounted-for Losses	212	25	260	23%	60	19
Total	1,630	194	1,999	18.4%	367	158

Notes: Water use for 2010 is based on metered usage from November 2009 to October 2010. Capita is based on Rate Study Projections. The study period water use is the average use from 2012 to 2021, 18.4% total reduction is the total reduction divided by the total study period water usage.

5.1 Residential Use

The residential water use is targeted for a reduction of 20%. This category represents the Town's largest use with a majority of the water being used outdoors. For clarification, residential use is how many gallons of water the average residential water customer uses per day. The annual use per residence (Section 3.2) was calculated dividing the Town's annual water usage by the number of water users and then dividing that by 365 days. This includes all of the commercial, industrial and public water uses which increase the water use per residence as shown as the total in table 5.2.

5.2 Commercial Use

The commercial category represents few users but large water use per tap make the potential for savings likely. This category will be targeted by the Town for a reduction of 5%.

5.3 Public

This category will target both public organization users such as schools and the Town. This category is targeted for a reduction of 5%.

5.4 Unaccounted-for Losses

Unaccounted-for losses are defined as the difference between the water provided to the Town and the water billed to customer meters. Losses are identified as thirteen percent of the water provided which is slightly higher than the acceptable range for most water systems. With the Town's dedication to monitoring, leak detection and repair to reduce waste a reduction of 23% is deemed reasonable. This is an aggressive goal and equates to an overall reduction of 3%, which means reducing unaccounted for losses from 13% to 10%.

5.5 Goal Development Summary

Development of goals was based in part on review of billing records, existing planning documents, review of other municipal entity plans and Town Staff input. Development of the data showed the highest use customers, seasonal usage, system limitations, and identified losses. The largest water demand categories were evaluated to determine where potential water conservation lies. A list of measures and programs was developed to achieve the percentage goals based on the probability of success considering costs to implement, potential water savings and potential for public acceptance.

6.0 IDENTIFY CONSERVATION MEASURES & PROGRAMS

Civil Resources and Town staff have identified various conservation measures that could be implemented within the Town's potable water system. These measures are grouped by category and contain supply side, demand side, education and water audits. Below is a summary of the water conservation measures that will be analyzed in more detail.

Table 6.1: Proposed Measures

WCP Measures	Implementation	Further Evaluation
Supply Side Programs		
Utility Maintenance	Existing	Ongoing
Leak Detection and Repair Program	Existing	Ongoing
Billing Software Upgrades	Yes	Ongoing
Meter Testing and Replacement Program	Existing	Ongoing
Irrigation equipment improvements at parks and open space areas (Potable water)	Existing	Yes
Recycling WTP Filter Backwash	None	Not at this time
Sub-Meter Master Metered Communities	None	Not at this time
Leak Detection for Master Meter Communities	None	Not at this time
Water Reuse System	None	Not at this time
Install Meters in the Distribution System	None	Not at this time
Regulatory Control and Standards		
Waste Water Ordinance	Existing	Ongoing
Temporary Irrigation Taps for Native Landscaping	Existing	Ongoing
Removal of Phreatophytes	Partial	Ongoing
High Efficiency Appliance Requirements/Standards	None	Not at this time
Water Rate Structure Changes	Existing	Ongoing
25% of Lot Irrigation Restriction	None	Not at this time
New Car Wash Standards	None	Yes
Decorative Water Feature Requirements	None	Not at this time
Use of Wetting Agent at Parks and Open Space	None	Yes
Irrigation System Requirements/Standards for New Construction	None	Not at this time
Restrictive Covenants Ordinance	None	Not at this time
Soil Amendment Ordinance for New Landscaping	None	Not at this time
Requiring Wind/Rain Sensors for Commercial and Open Space Irrigation	None	Yes
Mandatory Outdoor Watering Restrictions	Partial	Ongoing
Point System	None	Not at this time
Educational Programs		
Billing Statements that Encourage Water Savings	Partial	Ongoing
Children's Water Festival	None	Yes
Post Business, Industrial and Public BMPs on Website or as Bill Stuffers	None	Yes
Send ET Irrigation Scheduling in Water Bill	None	Yes
Online Access to Water Bill and History	None	Yes
School Education Program (K-12 Education)	None	Yes
Website Water Use Calculator	None	Yes
Public Education - Bill Stuffers & Website	Partial	Ongoing
Water Conservation Website Upgrades	Existing	Ongoing
Designated Water Conservation Officer	None	Not at this time
Xeriscape Gardening Classes	Partial	Ongoing

Xeriscape Program for Commercial	Partial	Ongoing
Xeriscape Program for Open Space (HOAs)	Partial	Ongoing
Rebates and Incentive Programs		
Commercial Toilet Rebates	None	Not at this time
Distribute Pre-rinse Spray Heads to Restaurants & Institutions	None	Not at this time
High Efficiency Clothes Washers	None	Not at this time
High Efficiency Dishwashers	None	Not at this time
Low Flow Faucets	None	Yes
Low Flow Showerheads	None	Yes
Rebates ET (SMART) Controllers Sprinklers System Controller, Irrigation System Efficiency Device Rebates	None	Not at this time
Irrigation System Rebates	None	Not at this time
Turf Replacement and Xeriscape Incentives	None	Not at this time
Wind and/or Rain Sensor Rebates for Residential	None	Yes
Audit Programs		
Commercial and Industrial Water Audits	None	Not at this time
Residential Audit Kits	None	Yes
Sprinkler System Audit Kit and Instructions, Irrigation system audit & improvements for irrigation taps, Landscape Customer Category System Audits	None	Not at this time

As presented above the Town is currently performing some of these measures identified on the column labeled "implementation" as "existing" or "partial", "none" indicates that the measure is not being implemented.

6.1 Screening Criteria

Screening criteria has been established to maximize savings and minimize cost to the Town. The criteria looked at current rates and estimated water savings. In this plan we compared the water usage savings to the implementation costs and lost revenue. The result was a final conservation measures list as presented in Sections 7.8 and 7.9.

6.2 Screen Conservation Measures & Programs

Some measures have already been screened, these measures are: 1) Install Meters in the Distribution System; 2) Leak Detection for Master Meter Communities; 3) Recycling WTP Filter Backwash and 4) Sub-Meter Master Metered Communities; 5) Water Reuse System; 6) Decorative Water Feature Requirements; 7) Soil Amendment Ordinance for New Landscaping and 8) Designated Water Conservation Officer and 9) Distribute Pre-rinse Spray Heads to Restaurants & Institutions – The Town will not analyze this program due to the lack of restaurants and institutions.

1) Install Meters in the Distribution System – Installing meters in the distribution system to pinpoint leak areas is not being considered as internal looping within the Town system will prevent this measure to be useful and all the Town's water is being metered into the Town's system through numerous master meters.

2) Leak Detection for Master Meter Communities - While the Town does not have any authority or responsibility for the system past the master meters, there may be some water savings potential through reducing system losses. The Town will not evaluate this measure at this time.

3) Recycling WTP Filter Backwash – The Town does not currently have a water treatment plant. The potable water is delivered to the Town post treatment. This program might be considered in the future if the opportunity arises.

4) Sub-Meter Master Metered Communities – The only master metered community is also individually metered. This community has its own water system. The Town has no jurisdiction past the master meter, and this community can monitor and compare the individual meter readings to the master meter readings. The Town will not evaluate this

measure further.

5) Water Reuse System – The Town does not currently own any water rights that allow reuse.

6) Decorative Water Feature Requirements - Fountains and water features with a surface area of 25 square feet or less would be allowed. Any larger water feature would need to receive an exemption to be permitted. This measure is unnecessary at this point and would not result in significant water conservation. In the case of a very large water feature appropriate water rights would need to be obtained and the water feature would have to meet the Water Waste Ordinance if applied. This measure will not be evaluated further.

7) Soil Amendment Ordinance for New Landscaping - This measure would require new development to add specific soil amendments to the landscaping areas based on site soil tests. Town will not evaluate this measure further at this time.

8) Designated Water Conservation Officer - The Town's Public Works department could add a water conservation officer to help Town residents with water conservation including irrigation audits and design. Numerous nearby Towns and Cities have added either a water conservation department or a water conservation officer. This service might be handled through a partnership with the Center for ReSource Conservation. Assistance with water conservation will continued to be performed with existing Town staff and possible future partnerships. The Town will not consider adding this position at this time.

9) Distribute Pre-rinse Spray Heads to Restaurants & Institutions – The Town will not analyze this program due to the lack of restaurants and institutions.

7.0 EVALUATE & SELECT CONSERVATION MEASURES

The Town will focus initial efforts on leak detection, public education, self -guided water audits, identifying unaccounted-for losses and incentive programs to reduce overall usage. Administrative controls in the form of municipal code, new development requirements, along with infrastructure improvements will follow. Current 2010 residential per-capita water use is estimated to be 142 gpcd. Below is a list of measures grouped by: 1) Supply Side Programs; 2) Regulatory Controls and Standards; 3) Educational Programs; 4) Rebates and Incentive Programs and 5) Audit Programs. Each measure is described in more detail below. Only conservation measures in "**bold**" will be implemented as part of this plan.

7.1 Supply Side Programs

• Utility Maintenance

Utility maintenance is an ongoing part of the Town's due diligence in keeping the water system in good working order. The Town will continue to perform maintenance such as valve exercising, flushing and repairs.

• Leak Detection and Repair Program

The Town had a professional Leak Detection Company come out and perform a leak detection survey for the portion of Town referred to as Old Town. The Town will continue to use leak detection surveys in the future as the need arises.

• Billing Software Upgrades

The Town has recently upgraded their billing software and will keep this practice going.

• Meter Testing and Replacement Program

The Town's Public Works Department and Utility Billing Department have met this year and discussed implementing a meter testing and replacement program. The program will consist of sending in meters to be tested and rebuilt using a systematic approach.

• Irrigation equipment improvements at parks and open space areas (Potable water)

Audits could be performed for Town owned facilities to improve their efficiency based on improved technology and replacing worn-out parts. A schedule would need to accompany these audits to keep track of this conservation measure.

• *Recycling WTP Filter Backwash*
The Town does not currently have a water treatment plant. The potable water is delivered to the Town post treatment. This program might be considered in the future if the opportunity arises.

• *Sub-Meter Master Metered Communities*
The only master metered community is also individually metered. This community has its own water system. The Town has no jurisdiction past the master meter, and this community can monitor and compare the individual meter readings to the master meter readings. The Town will evaluate this measure further if another master metered community is developed and connected to the Town's water system.

• *Leak Detection for Master Meter Communities*
The master meter community is a manufacture home neighborhood. While the Town does not have any authority or responsibility for this system past the master meters, there may be some water savings potential through reducing system losses. The Town will not evaluate this measure further and inform this community and future master metered communities of possible water conservation measures available to them.

• *Water Reuse System*
The Town does not currently own any water rights that allow reuse. The Town is planning on having NISP water in the future which should have reuse allowed to some degree. Windy Gap water which can be reused can be dedicated to the Town or the Town could buy it but the Town does not own any Windy Gap water. This measure will be reviewed and considered once the Town owns water such as Windy Gap or NISP.

• *Install Meters in the Distribution System*
Install meters in the distribution system to pinpoint leak areas is not being considered since all the Town's water is being metered into the Town's system through numerous master meters. Internal looping within the Town system will prevent this measure to be useful.

7.2 Regulatory Control and Standards

• *Water Waste Ordinance*
This ordinance prohibits overwatering landscape in two ways: directly watering impervious surfaces (streets, driveways, or other hardscaped areas) to the extent that water is flowing into storm drains; and overwatering to the extent that the soil can no longer absorb water, which then flows off the landscape into the street or down parking lots. Violators would receive written notice of violation. Repeated or flagrant violators would receive civil penalties.

• *Temporary Irrigation Taps for Native Landscaping*
Temporary irrigation systems may be used to irrigate native or drought resistant plants if it is shown that those plants, after established, will not need water beyond normal rainfall. Temporary irrigation may also be used to establish erosion control seeding.

• *Removal of Phreatophytes*
Phreatophytes are typically deep rooted trees and plants that consume considerable amounts of water; these include trees such as willows, boxelders and cottonwood. The Town prohibits Russian Olives, which is a phreatophyte and a noxious weed, and will continue to do this; however, the Town will not expand this effort or evaluate this measure further.

• *High Efficiency Appliance Requirements/Standards*
Require high efficiency appliance in all new construction including: toilets, showerheads, hot water recirculation, zero water use urinals, washing machines, etc. These requirements are addressed in State and National Plumbing standards

and codes.

• *Water Rate Structure Changes*
The Town currently uses an increasing block rate structure for water billing. The rate structure is based on the gallons used in relationship to the water user's tap size. There are typically 5 tiers and they are linear. This incline rate structure promotes water conservation and the Town is planning on adding a high water surcharge for those users that consume more water then they dedicated to the Town. The Town has used this rate structure since 2005. The water rates are reviewed and adjusted as needed. This is an existing and ongoing measure.

• *25% of Lot Irrigation Restriction*
The Town does not limit new lots to developing 25% or less of the lot in irrigated landscape at this time. This regulation could encourage landscape conservation.

• *New Car Wash Standards*
Full water recycling systems would be mandatory for all new full service commercial car wash facilities. Water recycling systems could also be mandatory for new self service commercial car wash facilities.

• *Decorative Water Feature Requirements*
Fountains and water features with a surface area of 25 square feet or less would be allowed. Any larger water feature would need to receive an exemption to be permitted. This measure is unnecessary at this point and would not result in significant water conservation. In the case of a very large water feature appropriate water rights would need to be obtained and the water feature would have to meet the Water Waste Ordinance if applied.

• *Use of Wetting Agent at Parks and Open Space Areas*
The Town could add wetting agents or other soil amendments to the soil on Town properties that have high watering requirements, such as parks, landscape areas, and open space. These soil amendments would be added to the soil for the purpose of increasing the effectiveness of the irrigation, thus reducing the required water consumption.

• *Irrigation System Requirements/Standards for New Construction*
These kinds of standards could be reviewed by the Town Planning and Engineering Departments and enforced in the Town's Land Use Code. These standards would consist of limiting the type and extent of site landscaping along with reviewing and approving only efficient irrigation systems for new development.

• *Restrictive Covenants Ordinance*
This measure would prohibit covenants from both restricting water conservation measures such as using Xeriscaping measures and requiring minimum amounts of landscape areas to be planted with turf grasses.

• *Soil Amendment Ordinance for New Landscaping*
This measure would require new development to add specific soil amendments to the landscaping areas based on site soil tests. Soil amendments are also called soil conditioners and they can help the soil get water to plants and turf and reduce the amount of water wasted.

• *Requiring Wind and or Rain Sensors for Commercial and Open Space Irrigation*
Smart controllers automatically adjust the irrigation based on current weather conditions or standard weather conditions. The Town will consider requiring smart controllers on commercial/industrial and open space new irrigation systems.

• *Mandatory Outdoor Watering Restrictions*
The Town Board can activate the mandatory outdoor watering restrictions based on the severity of the water supply shortage. This item was adopted by the Town through the ordinance process. This measure will only be used as seen necessary by the Town board and it is expected not to be activated very often. Therefore this measure will not conserve

water on a yearly basis and will not account towards the water conservation goals as part of this plan.

• *Point System for New Residential Development that Rewards Developers for Implementing Water Conservation within the Development*
A point system would be created and each new development could participate in this program. This system would award specific points for water conservation measures that the development incorporates. Based on the development point totals they could receive a variety of concessions.

7.3 Educational Programs

• *Billing Statements that Encourage Water Savings*
The Town implemented billing software last year that has the capability to provide water users with a wide array of water usage information. This information could include year to date water usage, current water usage versus previous year's usage, possibility of running into a high water surcharge fee, and could help indicate water leaks on the water user's side of the water meter.

• *Children's Water Festival*
A children's water festival can bring about much discussion at the dinner table concerning water saving and the benefits for the communities. The Town will look at teaming up with other water providers and schools concerning a water festival.

• *Post Business, Industrial and Public BMPs on Website or as Bill Stuffers*
Place BMPs regarding commercial businesses on the Town's website or send out as bill stuffers to encourage commercial water use conservation. A list of helpful BMPs would be gathered and posted on the Town's website or sent out as bill stuffers.

• *Send ET Irrigation Scheduling in Water Bill*
The Town could prepare ET irrigation schedules at the start of each irrigation season. Since the Town could use this information for its own system, it would provide this information on the Town's website or include them or a link to them with the water bills. The Town could also provide additional information so that water users could adjust the schedules to meet their circumstances. Links to helpful websites that include this information are currently on the Town's website including Northern Water's link.

• *Online Access to Water Bill and History*
The Town could make water users bill and water use history available through the Town's website. This could assist users in seeing patterns and trends in their water usage and adjust some of their water use accordingly.

• *School Education Program (K-12 Education)*
School education can bring about much discussion at the dinner table concerning water savings and the benefits for the communities. The Town will look at teaming up with other water providers and schools concerning education in the classroom.

• *Website Water Use Calculator*
The website based calculator can assist in landscape design based on the required water requirements. The user would enter site specific information based on their current landscape design and the calculator will provide the user with the approximate water requirements. The user could then determine if the required water amount is too high for their preferences or higher than what is permitted. The Town will incorporate this tool into its water conservation webpage.

• *Public Education –Bill Stuffers and Website*
The Town provides water users with water conservation measures on its website, and at Town Hall, engineering department. The website is an available resource all times of the year. The Town could partner with Northern Water

Conservancy District and St. Vrain School District to put on a Water festival to help educate young students. Another option is to provide an education program with this partnership similar to the festival but at a smaller scale. Educational programs could also be provided for water users in a form of xeriscape classes and demonstrations. The Town's newsletter has addressed water conservation in the past. This program will continue and be evaluated for additional possibilities including the use of bill stuffers.

• *Water Conservation Website Upgrades*
This measure could include general website upgrades that include customer surveys, EPA Water Sense Program Promotion, Car Wash BMPs, Hospitality Industry BMPs, Restaurant BMPs, update links to new sites/pages and putting a residential water use calculator on the Town's website. The Town currently upgrades its website periodically and will continue and expand this measure.

• *Designated Water Conservation Officer*
The Town's Public Works department could add a water conservation officer to help Town residents with water conservation including irrigation audits and design. Numerous nearby Towns and Cities have added either a water conservation department or a water conservation officer. The Town will not consider adding this position at this time. This service might be handled through a partnership with the Center for ReSource Conservation. Assistance with water conservation will continued to be performed with existing Town staff and possible future partnerships.

• Xeriscape Programs
Xeriscape programs are currently available to Town residents through Northern Water Conservancy District. The Town will continue to promote these services and make these services known to a wider audience.

7.4 Rebates and Incentives

• *Commercial Toilet Rebates*
This measure would provide rebates to commercial water users to install or replace toilets and urinals with low-flow models.

• *Distribute Pre-rinse Spray Reads to Restaurants and Institutions*
The Town will not analyze this measure due to the lack of concentration of institutions and restaurants. As the population grows and more infrastructure is built the Town will revisit this measure.

• *High Efficiency Water Fixture Rebates*
This program would provide rebates for residential users who install high-efficiency toilets, clothes washers, dishwashers, faucets, and/or showerheads.

• *Rebates for ET (SMART) Controllers Sprinkler System Controllers, irrigation System Efficiency Device Rebates*
Smart controllers automatically adjust the irrigation based on current weather conditions or standard weather conditions.

• *Irrigation System Rebates*
New or existing water users could get a rebate for installing automated irrigation systems. Old Town has a majority of lots that are manually irrigated and could conserve a considerable amount of water if they are switched over.
• *Turf Replacement and Xeriscape Incentives*
For new development rebates could be obtained for incorporating xeriscape into the design. Existing development could get rebates by replacing high water demand landscaping with xeriscape.

• *Wind and/or Rain Sensor Rebates for Residential*
Wind and rain sensors automatically adjust the irrigation based on current weather conditions or standard weather conditions. The Town will consider wind and rain sensors on new residential irrigation systems and possible retrofitting older systems.

7.5 Audit Programs

• Commercial and Industrial Water Audits

Commercial and Industrial water users are a growing water use category in the Town. Because of the large variance in water uses in the category an individual water audit could be very effective. The opportunity for water conservation is high for parts of this category and the additional benefits of reducing the water usage costs would be a motivator for the user to get positive results with this measure.

• Residential Audit Kits

Residential audit kits could be provided to water users to assist them in improving their irrigation systems and help them locate areas that could be upgraded. These kits could include items like soil probes, catch cans, marking flags, testing cones and leak detection tablets. Getting residential customers familiar with water conservation could get them more active in branching out into more conservation measures and spreading the word to their neighbors.

• Sprinkler System Audit Kits and Instructions, Irrigation System Audit & Improvements for Irrigation Taps, Landscape Customers Category System Audits

Sprinkler system audit kits could be provided to water use customers similar to the residential audit kits. The ET irrigation information could be included in the kit and posted on the Town's website. This measure could be combined or used in conjunction with other similar water conservation measures dependent on what measures the Town adopts.

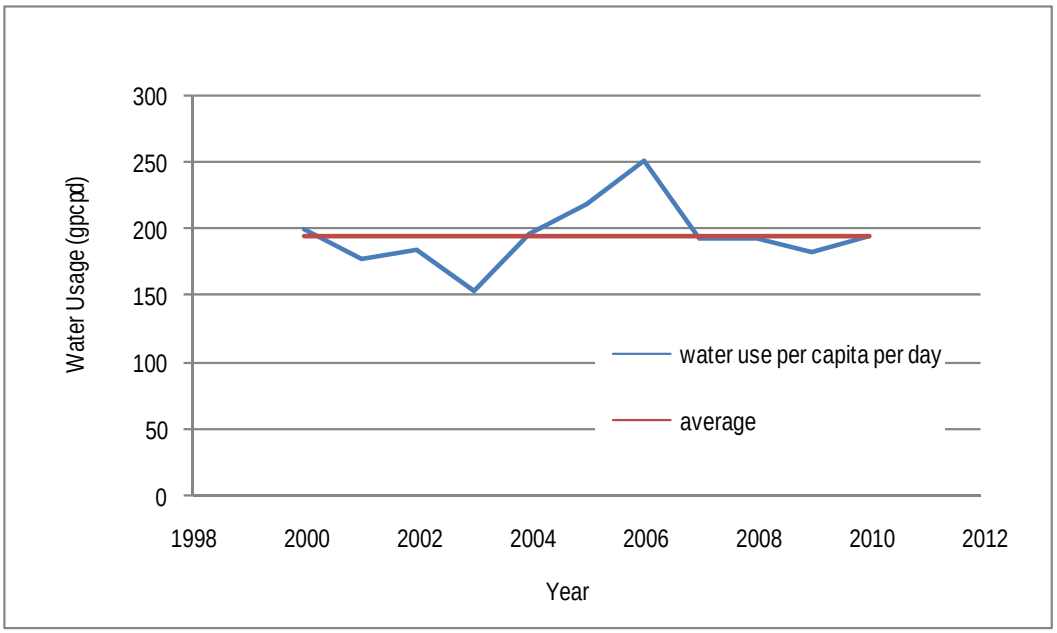
7.6 Estimated Water Savings of Current Conservation Measures

The Town has implemented conservation measures within the last twelve years largely in response to the extreme drought years of 2001 through 2002 and recognition of losses occurring in their aging distribution system. A list of these measures and the year each was implemented is presented below:

- Utility Maintenance (2000 and prior)
- Meter Testing and Replacement (2000)
- Irrigation equipment improvements at parks and open space areas (2000)
- Temporary Irrigation Taps for Native Landscaping (2000)
- Water Restriction Hours/Days, Water Waste Ordinance (2002-2003)
- Water Rate Structure Changes (2003/2004)
- Leak Detection Repair Program (2010)

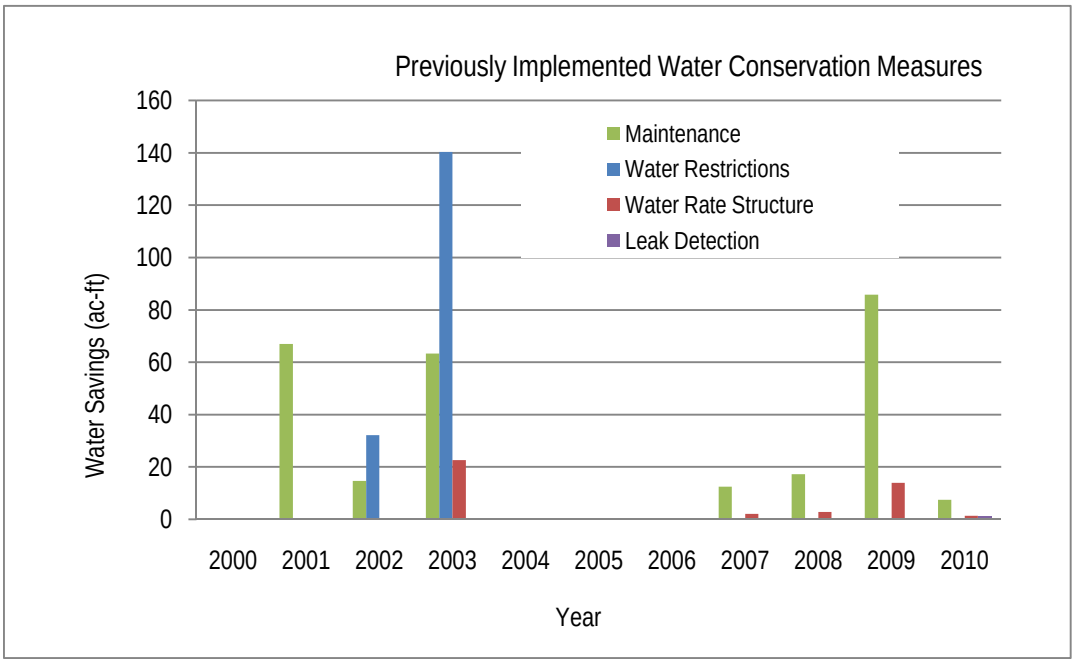
The graph below shows water use from 2000 through 2010 in gallons per day per capita (gpdpc).

Figure 7.1



Water savings were attributed to each measure based on information provided by Town staff who observed the extent of savings when each measure was implemented. The historic usage average gallons per capita per day use from 2000 to 2010 was used as a baseline (195 gpcpd) and savings were attributed to each measure as presented below:

Figure 7.2



The following conclusions were made based on the data available:

- The years of 2002 and 2003 saw drastic drops in water use (195 gpcpd to 153 gpcpd) as a result of very strict watering restrictions and enforcement during this historic drought year sequence.
- Years 2005 and 2006 were high water usage years and per discussions with Town Staff these usages are a result of removing the mandatory water restrictions and a significant loss during a water main break.
- The maintenance savings are overestimated in 2009 due to an above average rainfall in June and July (lower outdoor irrigation use) of that year.
- The *Maintenance* measure constitutes the majority of water saving prior to 2011 due the age and condition of the Town's water system (primarily in Old Town).
- The Water Rate Structure has provided a relatively small but consistent water savings;
- In summary, these ongoing measures have caused some significant water savings and the Town plans to keep implementing these in the future.

7.7 Estimate Cost & Water Savings of Future Conservation Measures

The items in section 7.5 above were either analyzed by themselves or consolidated into another group as shown in the attached Table 7.1. The conservation measures were then given a cost to start up the program which includes such items as labor, materials and miscellaneous costs. Assumptions and approximate percentage of water savings were taken from references such as Water Use and Conservation (*Vickers*) and the references stated in Section 10 of this report. Once the water savings was determined the lost revenue to the Town was calculated. This cost was based on the current Town rate structure presented in Section 3. The calculations are listed in Table 7.1.

Table 7.1 Cost & Savings of Conservation Measures

WCP Measures	INTIAL COST OF - MEASURE(S)/PROGARM(S)						WATER SAVINGS						ESTIMATED SAVINGS				Comments	Rank
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	Materials	Labor	Rebates	Marketing	Consulting or Contracting	Other	Number of units to be installed	Estimated annual water savings per unit	Total estimated annual savings for the measure/program in gallons	Expected Plan Period	Total Plan savings for the measure/program	Incremental cost of water supply	Water Savings Revenue Lost	Annual cost, including startup	Planning Period Cost	Incremental Cost to Implement		
Supply Side Programs	($)	($)	($)	($)	($)	($)	(#)	(gallons)	(gallons)	(years)	(gallons)	($/1000 gal)	($)	($)	($)	($/1000 gal)		
Irrigation equipment improvements at parks and open space areas (Potable water)	$1,000	$5,000							14,165,556	10	141,655,561	$0.44	$6,233	$12,233	$122,328	$0.86	Assumes 5% reduction in residential, public, commercial and industrial with 50% participation over the plan period and one person full time for a month.	8
Leak Detection & Repair Program					$10,000				4,233,385	10	42,333,846	-	$0	$10,000	$100,000	$2.36	Started Leak Detection & Repair program in 2009, assumes a 5% reduction on unaccounted losses. Cost from Town's 2009 contract.	14
Billing Software Upgrades		$10,000							566,622	10	5,666,222	$0.72	$408	$10,408	$104,080	$18.37	Assumes 0.1% savings on all uses. Updated Billing Software in 2009, ongoing updates. Savings on all uses. Find out approximate cost.	25
Utility Maintenance		$25,000							846,677	10	8,466,769	-	$0	$25,000	$250,000	$29.53	Assumes two public workers per week for one year (~416 hours each @ ~$30/hour), assumes 1% savings on utility repairs, savings on unaccounted losses.	27
Meter Testing and Replacement Program	$500	$10,000					10	4,015	40,150	10	401,500	-	$0	$15,000	$150,000	$373.60	Amount quantified from (http://ga.water.usgs.gov/edu/sc4.html), assumes 11 gallons per day per meter which equates to two household faucets dripping. Unaccounted losses only. Assumes two Town employees per month ~320 hours @ ~30$/hour.	32
Regulatory Control and Standards																		
Water Restrictions Hours/Days, Water Waste Ordinance		$1,000							31,730,846	10	317,308,458	$0.44	$13,962	$14,962	$149,616	$0.47	14% reduction based on documentation 80% participation, (assumes 20% in violation) and 50% of use is outdoor. Assumes, residential, commercial, industrial and public uses.	1
Temporary Irrigation Taps for Native Landscaping		$625							14,165,556	10	141,655,561	$0.44	$6,233	$6,858	$68,578	$0.48	Assumes 25% reduction 20% participation,and 50% of use is outdoor. Assumes, residential, commercial, industrial and public uses. Also the fisrt 2 years are used to establish the veegetation and no savings will occur. The total cost for the first two years was prorated over the 8 year application period.	2
Water Rate Structure Changes		$5,000							28,331,112	10	283,311,123	$0.44	$12,466	$17,466	$174,657	$0.62	Significant reductions have been reported in municipalities, this study assumes only 5% for all uses.	4
Irrigation System Requirements/Standards for New Construction		$1,000							4,833,571	10	48,335,711	$0.44	$2,127	$3,127	$31,268	$0.65	Assumes 5.5% reduction based on 50% outdoor use for residential irrigation split between; 1) New construction irrigation requirements ,2) Restrictive Covenant, 3) Soil amendment. For all uses.	5
Soil Amendment Ordinance for New Landscapes		$1,000							4,833,571	10	48,335,711	$0.44	$2,127	$3,127	$31,268	$0.65		
Requiring Wind and/or Rain Sensors for Commercial and Open Space Irrigation		$100							439,621	10	4,396,207	$0.44	$193	$293	$2,934	$0.67	Assumes wind and rain sensors for public, commercial and industrial properties with 20% participation, assumes 50% of use is outdoor and 5% savings is achieved.	6
Restrictive Covenants Ordinance		$1,000							4,833,571	10	48,335,711	$0.72	$3,480	$4,480	$44,802	$0.93	Assumes 5.5% reduction based on 50% outdoor use for residential irrigation split between; 1) New construction irrigation requirements ,2) Restrictive Covenant, 3) Soil amendment. For all uses.	10
Use of wetting agent at parks and open space areas		$1,000							909,136	10	9,091,356	$0.44	$400	$1,400	$14,000	$1.54	Assumes 5.5% reduction based on 50% outdoor use for public use. Public uses.	12
New Car Wash Standards (New Construction)		$500							249,118	10	2,491,184	$0.72	$179	$679	$6,794	$2.73	Assumes 75% reduction on 1% commercial used by car washes. Significant reductions have been reported (Vickers). Saving on commercial only.	15

Table 7.1 (continued)

High Efficiency Appliance Requirements/Standards for New Construction	$500	-	-	-	-	-	10	68,985	68,985	10	689,850	$0.72	$50	$5,050	$50,497	$73.20	Assumes 10% reduction on residential new construction, approximately 10 homes per year for a total of 100 homes at 2.7 persons per home. Assumes 70 gpcpd indoor use on residential use only.	30
Removal of Phreatophytes e.g. Cottonwoods	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	The Town does not own groundwater wells so there is no benefit from removing phreatophytes.	-
25% of Lot Irrigation Restriction	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	see mandatory restriction	-
Decorative Water Feature Requirements (New Construction)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	This is not analyzed in this WCP.	-
Mandatory Outdoor Watering Restrictions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	This measure was not analyzed but is somewhat grouped under water restrictions hours/day and water waste ordinance.	-
Point system for new residential development that rewards developers for implementing water conservation within the development	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	This was not analyzed but is comingled to some extent in high efficiency standards for new construction.	-
Educational Programs																		
Xeriscape Gardening Classes	$50			$100					1,416,556	10	14,165,556	$0.44	$623	$773	$7,733	$0.55	These xeriscape measures will be grouped together and will assumes water reduction for residential, commerical and industrial. The participation will be 5% with a water savings of 5% per measure or a total of 15%. Currently NCWCD has a xericape gradeninig class.	3
Xeriscape Program for Commercial	$50			$100					1,416,556	10	14,165,556	$0.44	$623	$773	$7,733	$0.55		
Xeriscape Program for Open Space (HOAs)	$50			$100					1,416,556	10	14,165,556	$0.44	$623	$773	$7,733	$0.55		
Billing Statements that Encourages Water Savings	$500	$500							5,314,526	10	53,145,259	$0.72	$3,826	$4,826	$48,265	$0.91	Assumes 1% savings on total water use on billing statements. Uses residential, commercial, industrial.	9
Send ET Irrigation Scheduling in Water Bill		$1,000							2,657,263	10	26,572,629	$0.72	$1,913	$2,913	$29,132	$1.10	Assumes 0.5% savings on ET irrigation schedluing on water bill. Uses residential, commercial, industrial.	11
School Education Program (K-12 Education)	$500	$3,200							2,393,491	10	23,934,905	$0.72	$1,723	$5,423	$54,233	$2.27	Assumes 0.5% savings on total water use as a result of children enforcing water conservation at home.	13
Online Access to Water Bill and History		$500			$1,000				531,453	10	5,314,526	$0.72	$383	$1,883	$18,826	$3.54	Assumes 0.5% savings due to online access to water bill and history. Uses residential, commercial, industrial.	17
Children's Water Festival	$600	$1,000		$100					478,698	10	4,786,981	$0.72	$345	$2,045	$20,447	$4.27	Assumes 0.1% savings on children's water festival. Uses residential, commercial, industrial.	18
Post Business, Industrial, and Public BMPs on Website or as Bill Stuffers	$600	$1,000		$100					439,621	10	4,396,207	$0.72	$317	$2,017	$20,165	$4.59	Assumes 0.5% savings on post business and public BMPs on Website. Uses residential, commercial, industrial.	19

Table 7.1 (continued)

Website Water Use Calculator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
Public Education Bill Stuffers & Website	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	These website measures are grouped in the above measures that utilize the internet.	-
Water Conservation Website Upgrades	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
Designated Water Conservation Officer	cost prohibitive or to be implemented with another agency							-	-	-	-	-	-	-	-	-	A designated water conservation officer is cost prohibitive and has not been analyzed in this plan.	-
Rebates and Incentive Programs																		
Wind and/or Rain Sensor Rebates for Residential		$100	$50				10		2,154,141	10	21,541,415	$0.44	$948	$1,548	$15,478	$0.72	Assumes wind and rain sensors for residential properties with 20% participation, assumes 50% of use is outdoor and 5% savings is achieved.	7
Low Flow Faucets		$500	$7				20	6,701	134,028	10	1,340,280	$0.72	$97	$737	$7,365	$5.50	Assumes 1.0 gpm reduction, (high volume faucets are 2.0 gpm with low flow being 1.0 gpm), per Vickers 8.1 minutes per sink use per person per day and 2.7 person per SFE. Reduces residential uses.	20
Low Flow Showerheads		$500	$10				20	5,223	104,463	10	1,044,630	$0.72	$75	$775	$7,752	$7.42	Assumes 1.0 gpm reduction, (high volume heads are 2.7 gpm with low flow being 1.7 gpm), per Vickers 5.3 minutes per shower per person per day and 2.7 person per SFE. Reduces residential uses.	21
Commercial Toilet Rebate (Distribute Toilet Retrofit Devices)		$500	$75				20	12,063	241,250	10	2,412,504	$0.72	$174	$2,174	$21,737	$9.01	Assumes 2.4 gallons saved per flush, (old toilets are 4 gpf with new toilets being 1.6 gpf), per Vickers 5.1 flushes per person per day and 2.7 person per SFE. Reduces commercial and industrial uses.	24
High Efficiency Clothes Washers		$500	$100				20	5,913	118,260	10	1,182,600	$0.72	$85	$2,585	$25,851	$21.86	Per Vickers, assumes 6.0 gallon per person reduction, (old washers are 16 gal per day per person with low flow washers being 10 gallons per day per person). Reduces residential uses.	26
Rebates for ET (SMART) Sprinkler System Controllers, Irrigation System Efficiency Device Rebates		$200	$75				10	3,194	31,938	10	319,375	$0.44	$14	$964	$9,641	$30.19	Assumes 5% reduction on residential outdoor use, approximately 10 homes per year for a total of 100 homes at 173,740 gallons per year per house with 50% outdoor use at 86,870 gallons per year per house outdoor use. Reduces residential, commercial and industrial uses.	28
Turf Replacement and Xeriscape Incentives		$200	$500				10	15,969	159,688	10	1,596,875	$0.44	$70	$5,270	$52,703	$33.00	Assumes 25% reduction on residential outdoor use, approximately 10 homes per year for a total of 100 homes at 173,740 gallons per year per house with 50% outdoor use at 86,870 gallons per year per house outdoor use.	29
High Efficiency Dishwashers		$500	$100				20	591	11,826	10	118,260	$0.72	$9	$2,509	$25,085	$212.12	Per Vickers, assumes 0.6 gallon per person reduction, (old washers are 1.1 gal per day per person with low flow washers being 0.5 gallons per day per person). Reduces residential uses.	31
Distribute Pre-rinse Spray Heads to Restaurants & Institutions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	This measure will not be analyzed as there is not enough volume of institutions an d restaurant in the Town.	
Audit Programs																		
Sprinkler System Audit Kit and Instructions, Irrigation system audit & improvements for irrigation taps, Landscape Customer Category System Audits		$75					20	29,565	591,300	10	5,913,000	$0.44	$260	$1,760	$17,602	$2.98	Assumes 20 gal per person per day is saved (on just outdoor use) Vickers, assuming 2.7 persons per household for 20 homes per year. Reduces residential uses.	16
Residential Audit Kit		$75					20	9,855	197,100	10	1,971,000	$0.72	$142	$1,642	$16,419	$8.33	Assumes 10 gal per person per day is saved (on just indoor use) Vickers, assuming 2.7 person per household for 20 homes per year. Reduces commercial uses.	22
Commercial Water Audits		$75					5	9,125	45,625	10	456,250	$0.72	$33	$408	$4,079	$8.94	Assumes 25 gal per business per day is saved (Vickers), for 15 businesses per year.	23

Notes: Table adapted from *Left Hand Water Districts Water Consevrtaion Plan 2009 (Clear Water Solutions, Inc.).*

(1) Materials cost for the measure.
(2) Labor cost for the measure.
(3) Rebate cost for the measure.
(4) Marketing cost for the measure.
(5) Consulting cost for the measure.
(6) Other cost for the measure.
(7) Number of units to be installed, only valid where a saving per unit is calculated.
(8) Annual water savings per unit, estimated from references described in the notes section of this table.
(9) Annual water savings, estimated from references described in the notes section of this table.
(10) Proposed plan period.
(11) Equals Column (9) multiplied by Column (10) .
(12) Incremental cost from the Town's current rate structure.
(13) Equals Column (9) divided by 1000 times Column (12).
(14) Equals the sum of Column 1) through (6) plus Column (13).
(15) Equals Column (10) times Column (14).
(16) Equals Column (13) divided by Column (9) divided by 1000.
(17) Description of each measure with references.
(18) Rank of each measure based solely on incremental costs.

7.8 Evaluation Criteria

The evaluation criteria utilized in this analysis looked at various components summarize below:

1) Central Weld charges the Town a base cost of $23,000 for approximately 16 million gallons of water per month. The Town typically do not go over the minimum for the winter season (approximately 5 months). The spring and summer season see higher water consumption above the minimums with the rate being $0.66/thousand gallons above the minimum. Central Weld's billing structure equates to an average cost to the Town of $0.93/thousand gallons.
2) As a result of Central Weld's billing structure the savings the Town could achieve varies depending on the season. For example if the savings come in the winter months and the Town has not reached its minimum the lost revenue for the 0-5K gallon usage tier would be the full $1.10 per thousand gallons because the Town has covered all of its expenses up to the minimum. If the savings are in the summer when the Town typically goes over its minimum it would have to cover the additional $0.66/thousand over the minimum. The result would be the difference between $1.10 and $0.66 or $0.44 in lost revenue. For example the lost revenue we typically would see in the summer such as *water restrictions or irrigation improvements* would equate to $0.44/thousand gallons. Some of the savings such as *billing statements that save water* would be year round savings that would save $1.10 in the winter and $0.44 in the summer so the weighted average cost of $0.72/thousand gallons is more appropriate.
3) The conservation measures were ranked by cost per thousand gallons of water saved using the billing structure discussed above. This includes start up costs such as labor, materials, and consulting. Typically the cost per thousand gallons would mimic the rate structure but in the case of high start-up costs the incremental costs go up significantly. The values reported are annual values and planning period values (10 years). The lowest incremental cost was ranked as one and each higher incremental cost ranked in sequence.
4) Staff availability was another important criterion taken into consideration. For example many of the supply side conservation measures require a fair amount of staff time, in the event employees are not available or have other projects ongoing these measures become incrementally more expensive.
5) Logistics and implementation were also factored into the selection process. For example does the Town have the ability to setup a children's water festival, do they have the staff time available, some programs require monetary rebates and these factors were taken into account when choosing the measures to apply.

Table 7.2 summarizes the rank and other criteria required to finalize the conservation measures that best suit the Town.

Table 7.2 - Selection Criteria

Measure	Rank	Use	notes
Water Restrictions Hours/Days, Water Waste Ordinance	1	yes	This is now implemented only in drought scenarios and should be implemented in the future.
Temporary Irrigation Taps for Native Landscaping	2	yes	This is already implemented and will continued to be monitored.
Xeriscape Gardening Classes	3	yes	This is a good resource that NCWCD provides and the Town will encourage residents to use this resources.
Xeriscape Program for Commercial	3	yes	
Xeriscape Program for Open Space (HOAs)	3	yes	

Water Rate Structure Changes	4	yes	This could potential save more water and this analysis only assumed 5% savings on all uses. It is hard to estimate because 40% of the town's population uses under 5k gallons of potable water so the savings will be from the higher users. The rates could also be adjusted to try and make up lost revenue from this plan.
Irrigation System Requirements/Standards for New Construction	5	no	Not implemented at this time.
Soil Amendment Ordinance for New Landscapes	5	no	Not implemented at this time.
Requiring Wind and/or Rain Sensors for Commercial and Open Space Irrigation	6	yes	This will be implemented in this plan.
Wind and/or Rain Sensor Rebates for Residential	7	yes	This is a good measure to implement, it is a rebate that promotes out water conservation and is more easily enforceable
Irrigation equipment improvements at parks and open space areas (Potable water)	8	yes	Another fairly inexpensive measure that should be implemented.
Billing Statements that Encourages Water Savings	9	yes	Another fairly inexpensive measure that should be implemented.
Restrictive Covenants Ordinance	10	no	No restrictive covenants will be analyzed.
Send ET Irrigation Scheduling in Water Bill	11	yes	This measure is an inexpensive way to keep the public informed and has seen proven savings.
Use of wetting agent at parks and open space areas	12	yes	A fairly cheap measure that should be given a trial run to see its benefits.
School Education Program (K-12 Education)	13	no	This measure could be implemented in conjunction with the St. Vrain Valley School District. Right now this will not be part of this plan.
Leak Detection & Repair Program	14	yes	This has already been implemented with a fair amount of the older leaking pipes being repaired. It will be continued.
New Car Wash Standards (New Construction)	15	yes	Car washes use a fair amount of water and any savings from their use is a benefit.
Sprinkler System Audit Kit and Instructions, Irrigation system audit & improvements for irrigation taps, Landscape Customer Category System Audits	16	no	Sprinkler system audits will not happen in this plan, it is a fairly labor intensive program that might not get used.
Online Access to Water Bill and History	17	yes	Easy way to allow customers to see their water use.
Children's Water Festival	18	yes	The water festival is a good way to promote saving in children and in turn in their parents.
Post Business, Industrial, and Public BMPs on Website or as Bill Stuffers	19	yes	Advertising keeps people aware of the impacts and how they are able to save. It is important for people to see the savings they are contributing too.

Low Flow Faucets	20	yes	This is a cheap way to save water and requires very little staff interaction.
Low Flow Showerheads	21	yes	This is a cheap way to save water and requires very little staff interaction.
Residential Audit Kit	22	yes	The residential audit kit is a good way for the public to see where savings and waste can be implemented.
Commercial Water Audits	23	no	Commercial water audits will not be implemented unless staff time can be dedicated to this measure.
Commercial Toilet Rebate (Distribute Toilet Retrofit Devices)	24	no	Commercial toilet rebate will not be implemented in this plan.
Billing Software Upgrades	25	yes	An easy way to save water use that require very little staff time and interaction.
High Efficiency Clothes Washers	26	no	The water savings are low and the rebates are high so this measure will not be implemented.
Utility Maintenance	27	yes	Costs are fairly high, this won't be implemented as a measure in the plan but is required per the Town's maintenance.
Rebates for ET (SMART) Sprinkler System Controllers, Irrigation System Efficiency Device Rebates	28	no	A low assumed participation rate (10 homes per year) this measure does not seem as effective as some others. It also requires that the system is working correctly which requires an audit of the homes participating.
Turf Replacement and Xeriscape Incentives	29	no	This would be a hard measure to implement as it would require a significant amount of labor from the residents.
High Efficiency Appliance Requirements/Standards for New Construction	30	no	Not a very good return on the money invested, might be looked at in the future as more construction comes in.
High Efficiency Dishwashers	31	no	The water savings are not very high and the rebate is pretty steep so this measure will not be implemented.
Meter Testing and Replacement Program	32	yes	This is very labor intensive with a small return on water savings.
Removal of Phreatophytes e.g. Cottonwoods	-	-	Groundwater is not used as a Town water supply and trees are a treasured resource so this was not analyzed.
25% of Lot Irrigation Restriction	-	-	Not analyzed at this time but will be looked at in the future.
Decorative Water Feature Requirements (New Construction)	-	-	Not analyzed at this time.
Mandatory Outdoor Watering Restrictions	-	-	Mandatory restrictions will not be analyzed as they are looked at under water restrictions

Point system for new residential development that rewards developers for implementing water conservation within the development	-	-	This might be analyzed in future plans.
Website Water Use Calculator	-	-	This has been grouped under other web based measures.
Public Education Bill Stuffers & Website	-	-	This has been grouped under other web based measures.
Water Conservation Website Upgrades	-	-	This has been grouped under other web based measures.
Designated Water Conservation Officer	-	-	Cost prohibitive to the Town.
Distribute Pre-rinse Spray Heads to Restaurants & Institutions	-	-	Not enough restaurants in Town, so not analyzed at this time.

7.9 Select Conservation Measures & Programs

In order to meet water conservation goals a list of water conservation measures and programs were developed and subjected to screening and cost-benefit analysis discussed above. Table 7.3 presents the final measures.

Table 7.3 - Selected Measures

Water Conservation Measure	Use	Incremental Cost ($/1000 gallons)	Total Cost ($)	Total Water Saved (1000 gallons/year)
Water Restrictions Hours/Days, Water Waste Ordinance	yes	$0.47	$14,962	31,731
Temporary Irrigation Taps for Native Landscaping	yes	$0.48	$6,858	14,166
Xeriscape Gardening Classes	yes	$0.55	$773	1,417
Xeriscape Program for Commercial	yes	$0.55	$773	1,417
Xeriscape Program for Open Space (HOAs)	yes	$0.55	$773	1,417
Water Rate Structure Changes	yes	$0.62	$17,466	28,331
Requiring Wind and/or Rain Sensors for Commercial and Open Space Irrigation	yes	$0.67	$293	440
Use of wetting agent at parks and open space areas	yes	$1.54	$1,400	909
Wind and/or Rain Sensor Rebates for Residential	yes	$0.72	$1,548	2,154
Irrigation equipment improvements at parks and open space areas (Potable water)	yes	$0.86	$12,233	14,166
Billing Statements that Encourages Water Savings	yes	$0.91	$4,826	5,315
Send ET Irrigation Scheduling in Water Bill	yes	$1.10	$2,913	2,657
Leak Detection & Repair Program	yes	$2.36	$10,000	4,233
New Car Wash Standards (New Construction)	yes	$2.73	$679	249
Online Access to Water Bill and History	yes	$3.54	$1,883	531
Children's Water Festival	yes	$4.27	$2,045	479
Post Business, Industrial, and Public BMPs on Website or as Bill Stuffers	yes	$4.59	$2,017	440
Low Flow Faucets	yes	$5.50	$737	134
Low Flow Showerheads	yes	$7.42	$775	104
Residential Audit Kit	yes	$8.33	$1,642	197
Billing Software Upgrades	yes	$18.37	$10,408	567
Utility Maintenance	yes	$29.53	$25,000	847
Meter Testing and Replacement Program	yes	$373.60	$15,000	40
Total/Average		*$20.40*	*$135,004*	*111,939*

7.10 Summary of Conservation Measures

The above water savings and costs are summarized in Table 7.4 below. The savings in the goals section of the report are currently more aggressive then what has been analyzed to this point.

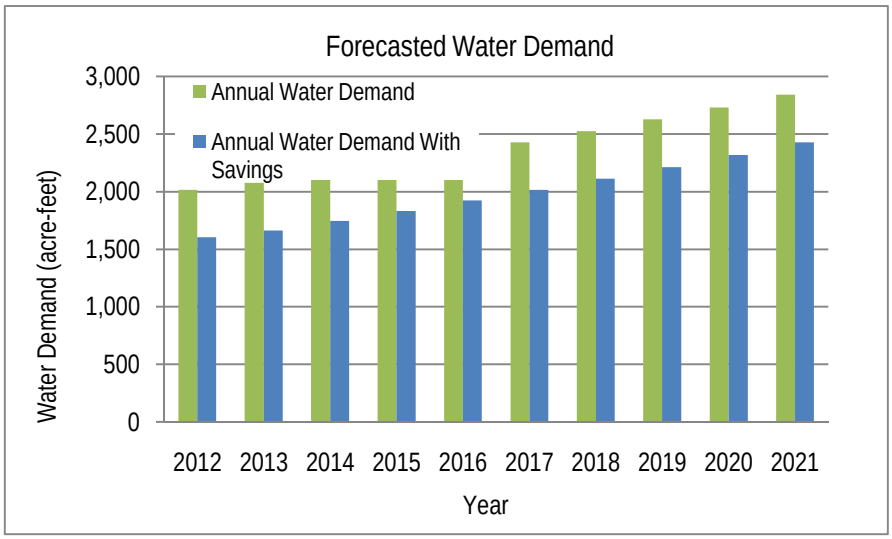
Table 7.4: Summary of Conservation Measures

	Residential	Commercial	Industrial	Public	Unaccounted Loss	Total
Plan Water Savings (acre-feet)	276	20	11	21	16	344
Goals (acre-feet)	294	5	3	5	60	367
Ave Planning Period Use (acre-feet)	1,469	102	60	108	260	1,999
Total Plan Savings (%)	19%	20%	18%	20%	6%	17.2%
Goals (%)	20%	5%	5%	5%	23%	18.4%

8.0 INTEGRATE RESOURCE AND MODIFY FORECASTS

The next step in the Water Conservation Plan is to apply the water conserved across the planning period to forecast the annual savings. The forecasted amount and the proposed savings are reported on the following graph.

Figure 8.1: Water Demand Forecast



The expenditures attributed to water supply in the Town's Rate Study are listed below under each respective fund.

Water Capital Improvement Fund

- Elevated Storage Tank proposed to serve new development east of Frederick Way (Yr 2018; $800,000);

Water Share Fund Expenditures

- Northern Integrated Supply Project (NISP) (varies: $98K - $4.3 million)

Delivery Side Savings

Currently the Town has no major water capital improvement projects scheduled for the next ten years. The Town is currently in talk to purchase some infrastructure form Central Weld but that would not be affected by this WCP. This Water Conversation Plan did not analyze any present value costs as they relate to delaying capital improvement projects since there were no significant infrastructure expansions or improvements scheduled for the future. The supply is the burden of the developer as well but a reduction in use saves the Town money in turn saving residents money.

Supply Side Savings

The Town's current water supply is solely from C-BT. Presently the Town owns 3,478 units of C-BT values at approximately 31 million dollars ($9,500 per share). It was assumed that NISP will cost approximately the same per shares. The estimated amount of growth over the 10 year study period requires 2,195 units (21 million dollars) approximately 1,100 acre-feet of water supply. The proposed savings from the water conservation measures reduces the required C-BT by 258 acre-feet or 515 C-BT shares. This is best case scenario, even in the event the Town has enough C-BT units it was assumed that there would still be some C-BT shares purchased (75 units per year). Also it is in the Town's best interest to acquire future supplies such as NISP as economic changes could occur that would require a greater water supply. The measures will have to be monitored to see if the savings are making a difference to move future water supply purchases.

As presented below in Table 8.1 the Town could potentially save approximately 4 million dollars over the planning period. The cost of implementing the plan over 10 years would be approximately 1.4 million dollars and the cost of future water supplies would be 16 million dollars, whereas the cost of future water supplies without implementing the plan would be approximately 21 million dollars, an approximate savings of 4.5 million dollars ($21 million minus ($16 million plus $1.4 million = ~$4 million).

Table 8.1: Future Supply Cost Analysis

Year	Supply Forecast	CBT Units at Current Use	Additional Units	Cost	Supply Forecast w/Savings	Forecasted Units Demand	Additional Units	Cost
	(af)	(units)	(units)	($)	(af)	(units)	(units)	($)
2011	1,976	3,487						
2012	2,015	4,031	544	$5,165,190	1,603	3,206	75	$712,500
2013	2,076	4,152	121	$1,148,751	1,664	3,327	75	$712,500
2014	2,159	4,318	166	$1,577,618	1,747	3,493	166	$1,577,618
2015	2,245	4,490	173	$1,640,722	1,833	3,666	173	$1,640,722
2016	2,335	4,670	180	$1,706,351	1,923	3,845	180	$1,706,351
2017	2,428	4,857	187	$1,774,605	2,016	4,032	187	$1,774,605
2018	2,526	5,051	194	$1,845,590	2,113	4,227	194	$1,845,590
2019	2,627	5,253	202	$1,919,413	2,214	4,429	202	$1,919,413
2020	2,732	5,463	210	$1,996,190	2,319	4,639	210	$1,996,190
2021	2,841	5,682	219	$2,076,037	2,429	4,857	219	$2,076,037
Total	Total		2,195	$20,850,467			1,680	$15,961,526

Notes:

Cost Per Unit	$9,500	CBT Quota	0.5	af/unit

9.0 IMPLEMENTATION PLAN

Town staff and financial resources are a limiting factor in implementing the developed water conservation plan. The schedule for implementation of measures and programs were based on the following:

- Water conservation in conjunction with currently planned projects and programs.
- Resources (time and effort) required to establish the measure or program.
- Initial financial investment.
- Expected water savings.

The implementation plan is shown in Table 9.1.

Table 9.1: Implementation Plan

Program	Estimated Cost	Staff Requirements	Possible Conflicts/Delays	Approximate Implementation Date
Water Restrictions Hours/Days, Water Waste Ordinance	$14,962	Monitor compliance and respond to violations	Cost and Staff Time	Implemented
Temporary Irrigation Taps for Native Landscaping	$6,858	Respond to requests	Cost and Staff Time	Implemented
Water Rate Structure Changes	$17,466	Update periodically	Cost and Staff Time	Implemented
Requiring Wind and/or Rain Sensors for Commercial and Open Space Irrigation	$293	Policy Change and review for compliance	Policy resistance / Staff Time	1/31/2012
Use of wetting agent at parks and open space areas	$1,400	Change Town practices	Cost and Staff Time	4/1/2012
Wind and/or Rain Sensor Rebates for Residential	$1,548	Policy Change, program setup and execution	Cost and Staff Time	4/1/2012
Irrigation equipment improvements at parks and open space areas (Potable water)	$12,233	Update Town practices	Cost and Staff Time	Implemented
Xeriscape Gardening Classes	$773	Advertise programs	Cost and Staff Time	Implemented
Xeriscape Program for Commercial	$773	Advertise programs	Cost and Staff Time	Implemented
Xeriscape Program for Open Space (HOAs)	$773	Advertise programs	Cost and Staff Time	Implemented
Billing Statements that Encourages Water Savings	$4,826	Update billing format	Cost and Staff Time	1/31/2012
Send ET Irrigation Scheduling in Water Bill	$2,913	Prepare flier and include in bill	Cost and Staff Time	4/1/2012
Leak Detection & Repair Program	$10,000	Hire contractor or buy equipment	Cost and Staff Time	Implemented
New Car Wash Standards (New Construction)	$679	Policy Change and review for compliance	Policy resistance / Staff Time	1/31/2012
Online Access to Water Bill and History	$1,883	Software upgrade, implementation and advertise	Cost and Staff Time	1/31/2012

Children's Water Festival	$2,045	Advertise program and implementation	Cost and Staff Time	4/1/2012
Post Business, Industrial, and Public BMPs on Website or as Bill Stuffers	$2,017	Prepare information and post on website	Cost and Staff Time	1/31/2012
High Efficiency Appliances (Low Flow Faucets)	$737	Policy Change and review for compliance	Policy resistance / Staff Time	1/31/2012
High Efficiency Appliances (Low Flow Showerheads)	$775	Policy Change and review for compliance	Policy resistance / Staff Time	1/31/2012
Residential Audit Kit	$1,642	Purchase kits, advertise and distribute	Cost and Staff Time	4/1/2011
Billing Software Upgrades	$10,408	Update Town practices with newer software	Cost and Staff Time	1/31/2012
Utility Maintenance	$25,000	Public Works to schedule require improvements	Cost and Staff Time	Implemented
Meter Testing and Replacement Program	$15,000	Public Works to schedule require improvements	Cost and Staff Time	Implemented

9.1 Public Participation

The Town is dedicated to water conservation for the public good. Development of the Town website and the other stated educational opportunities will enhance and forward the Town's water conservation efforts creating a knowledge base for staff and customers. For this water conservation planning process the public was notified of the 60-day comment period from May 2011 through June 2011 by means of an advertisement in the local newspaper and announcements at Town Board meetings throughout the period. The advertisement and announcements included the means by which customers can submit their comments and concerns. The plan is available on the Town's website and at Town Offices.

9.2 Monitoring and Evaluation

Monitoring of the plan activities includes measuring water usage as well as money spent on the measures and programs. With diligence and forethought the monitoring with existing metering as well as added meters and observations should prove quantitatively if proposed and active measures are conserving water. Persons and companies participating in the rebate programs could be individually tracked with water savings compared to pre-rebate usage. Since the programs will be phased, there will be adequate time to evaluate and establish methods for monitoring and data tracking. Table 9.2 presents a tool for more detailed monitoring of the conservation measures.

Table 9.2 Monitoring Matrix

Program	Customer Use	Water User Type	Raw Water Delivered	Per Capita Use
Water Restrictions Hours/Days, Water Waste Ordinance	X		X	X
Temporary Irrigation Taps for Native Landscaping				X
Water Rate Structure Changes		X	X	X
Requiring Wind and/or Rain Sensors for Commercial and Open Space Irrigation		X		X
Use of wetting agent at parks and open space areas				X
Wind and/or Rain Sensor Rebates for Residential	X			X

Irrigation equipment improvements at parks and open space areas (Potable water)		X		X
Xeriscape Gardening Classes	X			X
Xeriscape Program for Commercial	X			X
Xeriscape Program for Open Space (HOAs)	X			X
Billing Statements that Encourages Water Savings				X
Send ET Irrigation Scheduling in Water Bill				X
Leak Detection & Repair Program			X	X
New Car Wash Standards (New Construction)		X		X
Online Access to Water Bill and History				X
Children's Water Festival				X
Post Business, Industrial, and Public BMPs on Website or as Bill Stuffers		X		X
High Efficiency Appliances (Low Flow Faucets)	X			X
High Efficiency Appliances (Low Flow Showerheads)	X			X
Residential Audit Kit	X			X
Billing Software Upgrades				X
Utility Maintenance			X	X
Meter Testing and Replacement Program			X	X

9.3 Plan Updates and Revisions

The plan will be updated in 7 years from ratification by the Town Board. Monitoring and evaluation of programs will be done yearly in November following the close out of the Water Year in October. If higher or much lower than expected growth occurs; water conservation is much greater than anticipated, funding drops to a level where it cannot support the program, new appropriate and cost effective technology arises, or drastic water shortages occur then the plan will be revised as necessary.

9.4 Plan Adoption and Approval

This plan was presented to the Town Board on July 12, 2011, the Town Board has approved the plan and which will trigger Town employees to move forward with the selected measures per Table 9.1. See the Town Boards comments and approval in Appendix B.

10.0 CONCLUSIONS

This Water Conservation Plan was prepared to be a guide for the Town to improve water conservation with a balance of cost effective proactive programs, education, and incentives. Town staff will continue to work with internal departments and consultants to evaluate future updates to this water conservation plan.

11.0 REFERENCES

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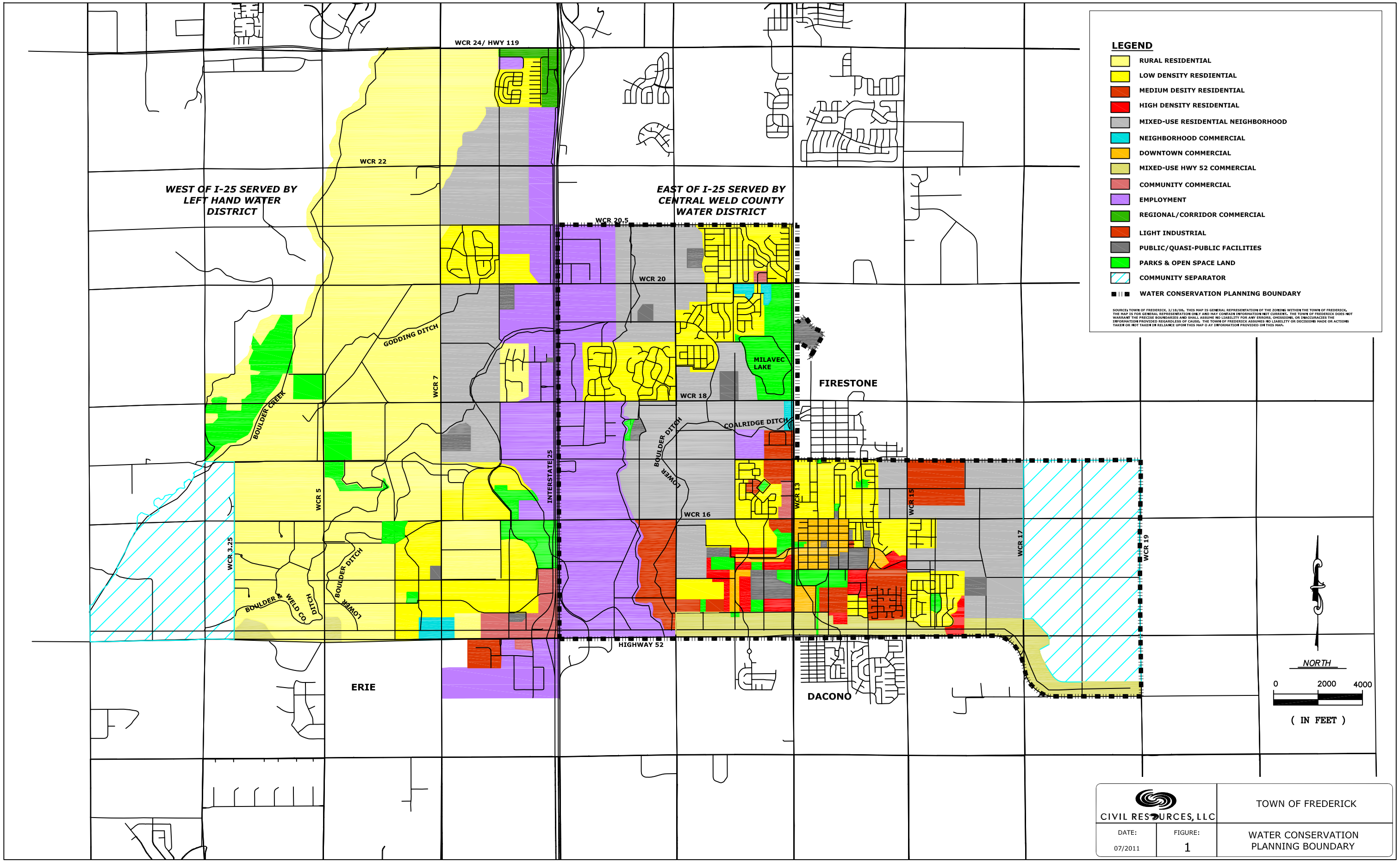
FIGURES



CIVIL RESOURCES, LLC

TOWN OF FREDERICK

DATE:	FIGURE:
07/2011	1

WATER CONSERVATION PLANNING BOUNDARY

APPENDIX A

PUBLIC PARTICIPATION

MINUTES
TOWN OF FREDERICK
BOARD OF TRUSTEES
Frederick Town Hall
March 8, 2011
7:00 p.m.

Attendance: Mayor Eric Doering, Mayor Pro Tem Tony Carey, Trustees Rafer Burnham, Sue Wedel, Amy Schiers, Jim Wollack and Fred Skates. Also present were Town Administrator Derek Todd, Assistant Town Attorney Cyril Vidergar, Town Clerk Nanette Fornof, Administrative Services Director Bryan Ostler, Planning Director Jennifer Simmons and Engineering Director Dick Leffler. Audience was also present.

ROLL CALL Mayor Doering opened tonight's meeting at 7:05p.m. Roll call was taken; all Trustees were present.

PLEDGE OF ALLEGIANCE Mayor Doering led the audience in the Pledge of Allegiance.

ADDITIONS OR DELETIONS TO THE AGENDA Mayor Doering indicated there were no additions or deletions.

PUBLIC COMMENTS

Laura Brown, Frederick Arts Commission Frederick Arts Commissioner Laura Brown updated the Board of Trustee with what the Frederick Arts Commission is currently working on and thanked Finance Manager Sidonna Foust and Community Relations Specialist Megan Barber for their hard work in providing a Financial Report to the Commission. The Commission has several projects to consider, they are; art piece at the New Frederick High School, repairs and maintenance to the established art pieces and the possibility of erecting an art piece in the median along Colorado Boulevard. The Frederick Arts Commission and the Parks and Open Space Commission will be working together to add art work to the Frederick Recreation Area and to consider painting a mural on the pump house located at Milavec Lake. There is the possibility local students would be considered to paint the pump house; additional information will be provided at a later date.

Jennie Buzcek United Power indicated she is seeking re-election and would like the Board's support. Buzcek provided brief details about new legislation mandates, electric supply and demands and electric rates. Buzcek thanked the Board for their support and stated she had enjoyed the partnership between the Town of Frederick and United Power.

STAFF REPORTS

Administrative Report Town Administrator, Derek Todd, provided the Board with the Administrative Report which highlighted the following items: Upcoming Board of Trustees Work Sessions, University Scholarship Program, Adopt a Place Program, Community Programs Webpage and Miners Day Entertainment. The Administrative Services Department provided information about Information Technology Committee, Utility Billing, Audit, Public Works Director Recruitment and Other Recruitment Efforts. The Engineering Department provided

information about Tipple Parkway/Weld County Road 16 Bridge Closure Update. The Planning Department provided information about the Longmont Intergovernmental Agreement, Land Use Billing and Parks, Open Space Master Plan. The Police Department provided information about Construction Zone Enforcement Activities, Juvenile Issues and Oil and Gas Inspections.

Planning Director Jennifer Simmons provided information about the cost per acre of land located west of Milavec Lake; the cost was not comparable to other land acquisitions and the Board indicated not to move forward on the purchase of the land.

Town Attorney Report Assistant Town Attorney Cyril Vidergar provided the Board of Trustees with a written Status Report and indicated the report's format had changed to help define land use statuses.

DISCUSSION AGENDA

IM 2011-003, Discussion of 75% Water Conservation Plan The Town of Frederick was awarded a Colorado Water Conservation Board's grant for the purposes of drafting a Water Conservation Plan. The plan will list a variety of water conservation measures to consider implementing for the reduction of water consumption. The Frederick Municipal Code currently addresses water conservation, which the proposed Water Conservation Plan will consider. The Plan will provide educational programs and tools, rebates and more stringent Town standards. Staff indicated there are five measures the Town can consider using, they being; Supply Side Programs, Regulatory Control and Standards, Educational Programs, Rebates and Incentive Programs and Audit Programs. If the Water Conservation Plan is approved staff will make the required changes to the Frederick Land Use Code, Frederick Municipal Code and the Design Standards and Construction Specifications.

There was discussion regarding leakages within the system. Engineering staff has identified areas where broken water meters need to be replaced or repaired, which will help in reporting water usage. Staff will provide additional information at a later date.

CONSENT AGENDA

Motion by Trustee Wedel to approve the Consent Agenda with the following items; Approval of List of Warrants for March 8, 2011, AM 2011-027, To Consider the First Amendment to the Memorandum of Agreement for Public Improvements by approving Resolution 11R006, A RESOLUTION REGARDING THE FIRST AMENDMENT TO THE MEMORANDUM OF AGREEMENT FOR PUBLIC IMPROVEMENTS FOR JOHNSON FARM SUBDIVISION AND THE CREATION OF A PARK FUND ESCROW TO SUPPORT PERFORMANCE OF PUBLIC IMPROVEMENT OBLIGATIONS OF DEVELOPER OR SUCCESSOR, and Approval of the February 22, 2011, Regular Meeting Minutes, Trustee Burnham seconded the motion and motion carried unanimously.

MAYOR AND BOARD REPORTS

Trustee Skates had nothing to report.

Trustee Wedel had nothing to report.

Trustee Schiers provided information about the Frederick High School After Prom; April 6, 2011, volunteers are being requested.

Trustee Burnham made comment about the new Facebook posting; how the naming of Frederick came about. Trustee Burnham also inquired about travel expenses for those Public Works Director applicants, the road closure impact due to the bridge damage.

Mayor Pro Tem Carey made comment about the Building Department Roofing Memo, Fix Auto Frederick Grand Opening/Ribbon Cutting, and the prairie dog email which was received by the Board. Mayor Pro Tem Carey also indicted that he will be missing the March 22, 2011, Regular meeting and possibly the April 5, 2011, Special meeting.

Mayor Doering provided information about the two joint meetings with the St. Vrain Valley School District and the City of Longmont, to be held in April. Mayor Doering also provided information about the proposed meeting with the Mayor from the Town of Erie and the Denver Bronco community opportunity. Mayor Doering with great pleasure indicated Town Administrator Derek Todd was nominated to the "Forty under 40" leaders in the State of Colorado.

Trustee Wollack requested a five minute recess to talk with the Town Attorney; the recess lasted from 8:07 to 8:11p.m. Trustee Wollack made comment about what the Miner's Day Commission will be discussed at their next meeting.

There being no further discussion, the regular meeting was adjourned at 8:18p.m.

Nanette S. Fornof, MMC
Town Clerk

TOWN OF FREDERICK INCORPORATED 1907

Approved by the Board of Trustees

Eric E. Doering, Mayor

TOWN OF FREDERICK
M E M O R A N D U M

Engineering Department

TO: Town Board

FROM: Brian Frank, Civil Engineer I

DATE: April 12, 2011

SUBJECT: TOWN WATER CONSERVATION PLAN PUBLIC OUTREACH

Town Staff (Brian Frank) along with Civil Resources (Andy Rodriguez) held a public meeting from 4 PM to 6 PM on Thursday, May 12, 2011 at the Town Hall, 401 Locust Street. The public was invited to attend this meeting and encouraged to provide comments on the Plan. Written input and suggestions outside of the meeting are also being encouraged and need to be received by June 15, 2011.

The meeting only had one couple from the Savannah Subdivision attend the meeting. Brian and Andy spoke with them from approximately 4 – 4:30 pm. Discussing what the WCP included along with the history of the project and history of the Town's water conservation measures. We encouraged the couple to review the draft plan we provided them and to contact us with feedback. They seemed very enthused and stated they would like for the Town to enforce the waste water ordinance; which includes verbal warnings and fines for water users that allow irrigation run-off to enter the Town's drainage system.

Brian Frank
Civil Engineer I
Town of Frederick

TOWN OF FREDERICK
M E M O R A N D U M

Engineering Department

TO: Town Board

FROM: Brian Frank, Staff Engineer I

DATE: May 4, 2011

SUBJECT: Frederick's Water Conservation Plan Press Release

NEWS RELEASE
FOR IMMEDIATE RELEASE:

CONTACT:
Contact Person: Megan Barber
Organization: Town of Frederick
Voice Phone Number: 720.382.5512
Email Address: mbarber@frederickco.gov
Website URL: www.frederickco.gov

FREDERICK WANTS YOUR FEEDBACK ON WATER CONSERVATION PLAN

FREDERICK, Colorado (May 4, 2011) – The Town of Frederick is holding a public outreach meeting to get feedback on their Water Conservation Plan on Thursday, May 12, 2011 from 4-6 PM at Town Hall, 401 Locust Street. The draft water conservation plan, which is available on the Town's website, outlines the water conservation measures now in place, as well as the Town's goal to further reduce its water consumption by just over 18% through a variety of water conservation measures.

Because the Town of Frederick is located on the semi-arid plains 20 miles east of the foothills of the Rocky Mountains, the Town Board and Staff have adopted improved water conservation as a reasonable goal for the citizens and customers of the Town water system. With increasing population growth rates expected and ongoing competition among diverse interests for a limited resource, wisely managing the Town's water supply to "stretch" it forward into the future by conservatively using this resource is the responsible action to take.

The Town will focus renewed efforts on leak detection, public education, self-guided water audits, identifying unaccounted-for losses and incentive programs to reduce overall usage.

Administrative controls in the form of municipal code revisions, new development requirements, along with infrastructure improvements will follow. The goal for this plan, as discussed with the Colorado Water Conservation Board following award of the grant for this study, is to reduce the Town's water use by 18.4% or 367 acre-feet per year over the next 10 years. This savings will come from the identified water use categories of 1) residential, 2) commercial, 3) industrial, 4) public, and 5) unaccounted-for losses.

The water that will be conserved will help reduce the need of obtaining additional water. Future water supplies that the Town is currently invested in include the Northern Integrated Water Supply Project (NISP). Water conservation will help reduce the need for additional water but will not eliminate it and therefore the Town needs a project such as NISP. NISP itself is a water conservation plan for the State of Colorado. It could provide the NISP participants with 40,000 acre-feet of water annually by storing water that would otherwise leave Colorado unused. This is water that would otherwise be obtained through "buy and dry" of irrigated farm land. For further information on water conservation practices or NISP visit the Town's or Northern Colorado Water Conservancy District's website.

ABOUT THE TOWN OF FREDERICK –With its close proximity to the Denver metro area and the Northern Front Range, the Town of Frederick is a dynamic community at the center of commerce, industry and education. Multiple recreational and residential facilities make the Town of Frederick a retreat full of diverse opportunity that continues to respect its heritage as a mining town incorporated in 1907.

- END -

TOWN OF FREDERICK
M E M O R A N D U M

Engineering & Utilities Department

TO: Andy Rodriguez

FROM: Brian Frank, Civil Engineering I

DATE: June 16, 2011

SUBJECT: Water Conservation Plan – Public Comment

The Town's Draft Water Conservation Plan (WCP) public feedback period that ran from April 15, 2011 to June 15, 2011 ended yesterday. I have forwarded you all of the email correspondence that I received as feedback from the public comment period. This included numerous emails I received along with feedback from the Facebook Group that we created. Also included in my email correspondence to you was my meeting summary from the Public Outreach Meeting (POM) that was held at Town Hall on June 15, 2011.

I only received one phone call from the public asking about the WCP. The Town resident that called asked if we would be restricting the water allowance similar to a drought scenario. I informed her that we did not have a measure that would restrict the water customer's water allowance during a non-drought period. I told her that the plan should consist of incentive programs and educational tools that could help the Town's water users reduce their water usage. She told me she agrees with water conservation and will continue to do what she can to conserver water and then thanked me for the information I provided. I did not receive any mailed or in person feedback with the exception of the POM.

Thank you,
Brian Frank
Civil Engineer I
Town of Frederick

TOWN OF FREDERICK
M E M O R A N D U M

Engineering Department

TO: Town Board

FROM: Brian Frank, Civil Engineer I

DATE: June 16, 2011

SUBJECT: TOWN WCP PUBLIC COMMENT QUESTIONS

Question #1 (Email):
Don't allow communities to have covenants requiring lawns. Ban Kentucky Bluegrass sod or seed. Public or large private grass should have some sort of humidistat so the sprinklers don't run during rain storms. Date: 5/4/2011 8:11 PM

Response Q1:
Thank you for your comments. We did analyze a restrictive covenant ordinance that would address lawn requirements. We are moving forward with smart controllers that could include rain sensors. *Date: 5/5/2011 9:03 AM*

Question #2(Facebook):
If you want the residents to conserve water you might want to stop watering the street. Colo Blvd for one. Date: 5/5/2011 8:37 AM

Response Q2:
A break in our irrigation system happened along Colorado Blvd early this week and Public Works has repaired it. We will continue to improve the Town's irrigation system which includes adjusting our watering to prevent runoff. We have already this year made improvements to the Town's irrigation control system to allow for a more efficient, automated system. Thank you for your comment. *Date: 5/5/2011 10:28 AM*

Question #2 Follow-up:
good work then. Date: 5/10/2011 3:21 PM

Question #3 (Email):
We were out of town on the 12th and missed the meeting. I started wading through your plan and couldn't find an answer to a fundamental question. That is, why are we doing this? I see that the study is being paid for by the CO Water Conservation Board and it references CRS 37-60-126 and the Water Conservation Act of 2004. I briefly looked at some of the CRS, but could not find the mandate or reason for doing what we're doing.
Could you forward me the requirement document so I can get my arms wrapped around that before I try to digest your report. Date: 5/17/2011 11:57 AM

Response Q3:
Thank you for your feedback on the Town's Water Conservation Plan (WCP).

The Town is not required to have a WCP and therefore there is no document stating it as a requirement.
Here is a list of reasons to have a Colorado Water Conservation Board (CWCB) adopted plan (from CWCB's website):

- Avoid or reduce the need to develop or acquire new water supplies.
- Postpone, downsize or avoid altogether the need for new water treatment or wastewater treatment infrastructure.
- Reduce operating costs related to water and wastewater treatment and source water production.
- Improve supply reliability/margin and mitigate impacts of future droughts.
- Comply with regulations.
- Improve public credibility by demonstrating stewardship of natural and financial resources.
- Promote sustainable use of finite water supplies.

The Town of Frederick has a number of water conservation measures already in place and will continue to implement measures that make sense. Another reason to proceed with this WCP is to be eligible for CWCB grants and low-interest loans for future public improvements that otherwise would not be available to the Town. One such project the Town plans to proceed with is an elevated water tank to serve the eastern portions of the Town (this project is addressed in the Town's Water Rate Study, this area will have an additional capital improvement fee charged to the future development that will be served by the water tower).
Please follow up with me on any questions, clarifications or concerns.
(Attached is CRS 37-60-126 for your reference) *Date: 5/17/2011 5:00 PM*

Question #4 (Email):
If we are trying to conserve water , why are we sponsoring a tree planting program? Trees use a lot of water . Date: 6/8/2011 7:28 PM

Response Q4:
As part of the water conservation plan we analyzed a water conservation measure that would remove certain high water using trees (phreatophytes).
These trees include Willows, Boxelders, Cottonwoods and Russian Olives. Russian Olives are considered a noxious weed and are not allowed to be planted.
We did not go forward with this measure because we believe that trees are a great asset and by far outweigh their water usage. In addition they are not seen to be a large draw on the Town's potable water system.
Please let me know if you have additional questions or concerns. *Date: 6/9/2011 9:47 AM*

Question #5/Response Q5: (Question posted on Facebook for feedback):
Date Posted: 6/13/2011 9:09 AM
What is your top water conservation priority for Frederick?
Promote water conservation while minimizing impacts on current water uses. (3 votes)
Do not waste water but still use it for recreational activities. (2 votes)
Reduce water use including irrigation as much as possible. (0 votes)

APPENDIX B

TOWN BOARD APPROVAL

TOWN OF FREDERICK, COLORADO
RESOLUTION NO. 11-R-009

A RESOLUTION OF THE TOWN OF FREDERICK, COLORADO, APPROVING THE ADOPTION OF THE FINAL WATER CONSERVATION PLAN

WHEREAS, the Town understands responsible management of water supplies is wise and prudent for both water supply reliability and environmental stewardship; and

WHEREAS, the Town engaged Civil Resources, LLC (Civil) to assist the Town to formulate a publicly supported Final Water Conservation Plan that expands upon the Town of Frederick's existing water conservation measures; and

WHEREAS, Town staff and Civil have compiled a list of water conservation measures to implement, with the coordination of staff, Town water users, Board of Trustees, and other interested parties, in preparing the Final Water Conservation Plan; and

WHEREAS, the Final Water Conservation Plan was prepared in accordance with the Water Conservation Act of 2004 and to meet the appropriate portions of the C.R.S. Section 37-60-126.

NOW THEREFORE BE IT RESOLVED BY THE BOARD OF TRUSTEES OF THE TOWN OF FREDERICK, COLORADO, AS FOLLOWS:

Section 1. The Board of Trustees adopts the Final Water Conservation Plan, dated July 2011, to help ensure an adequate supply, and said water conservation plan is an effective component of sustainable water resource management.

Section 2. Effective Date. This resolution shall be become effective immediately upon adoption.

Section 3. Repealer. All resolutions, or parts thereof, in conflict with this resolution are hereby repealed, provided that such repealer shall not repeal the repealer clauses of such resolution nor revive any resolution thereby.

Section 4. Certification. The Town Clerk shall certify to the passage of this resolution and make not less than one copy of the adopted resolution available for inspection by the public during regular business hours.

INTRODUCED, READ, PASSED AND ADOPTED THIS 12TH DAY of JULY 2011.

ATTEST:

By _____
Michele Kelley, Interim Town Clerk

TOWN OF FREDERICK

By _____
Eric E. Doering, Mayor

TOWN OF FREDERICK
M E M O R A N D U M

Engineering Department

TO: Town Board

FROM: Brian Frank, Civil Engineer I

DATE: July 13, 2011

SUBJECT: WCP Town Board Feedback

Frederick Town Board approved the 2011 Water Conservation Plan at the July 12, 2011 Town Board Meeting. The Town Board wanted to clarify what measures are going to be implemented with this Water Conservation Plan and which ones might be considered in the future that are not currently being implemented. The discussion was within Sections 7.1 – 7.5 and as a result the measures that will be implemented as part of the 2011 Water Conservation Plan are titled in **bold**. A note has been added to sections 7.0 stating, "Only conservation measures in "**bold**" will be implemented as part of this plan."

The second clarification the Town Board wanted to see was the difference between the average annual use per residence in gallons per capita day (gpcd) and the average residential use in gpcd. The annual use per residence was calculated dividing the Town's annual water usage by the number of water users and then dividing that by 365 days. This includes all of the commercial, industrial and public water uses which increase the water use per residence. The average residential water use is how many gallons of water the average residential water customer uses per day. A note has been added to Section 5.1 clarifying these two figures.

The third item a few Town Board members wanted to note was that Regulatory Water Conservation Measures that restrict the irrigated landscape area (25% of Lot Irrigation Restriction) are water conservation measures that are not acceptable at this time. In the future if water conservation measures such as this one are considered they should be heavily scrutinized.

The fourth item the Town Board questioned was how the Town of Frederick compares to other water users. Here is how the Town compares to a variety of other water users:

*Colorado Water Conservation Board (CWCB) has published these water usage numbers:
2010 Colorado Baseline Water Usage was 172 gpcd.
Estimated 2050 Baseline Water Usage based on three levels of saving strategies:
Low = 142 gpcd; Medium = 126 gpcd; High = 113 gpcd

*Colorado Water Conservation Board. "SWSI 201 Municipal and Industrial Water Conservation Startegies." January 2011: Page 60

Table** – Water Usage Comparison for NISP Municipalities

Participant	1999-2009 Average Gallons per Capita per Day (GPCD)
Dacono	111
Eaton	156
Erie	156
Evans	148
Firestone	176
Fort Lupton	122
Fort Morgan	177
Frederick	185
Lafayette	132
Severance	145
Windsor	104
Average	***147***

**Information from Table III-2: Harvey Economics. "Final Report – Water Supplies and Demands for Participants in the Northern Integrated Supply Project." 21 January 2011: page 24

APPENDIX C

CWCB COMMENTS

COLORADO WATER CONSERVATION BOARD
Conservation Plan Submittal Required Plan Elements Checklist

Name of Entity: Town of Frederick
Date Submitted: August 4, 2011

Required Conservation Plan Elements	Completed?
1. Name and contact information	Yes__x__ No_____ Comment: cover letter
2. Organizations and individuals assisting with plan development	Yes__x___ No_____ Comment: in front of plan
3. Quantified retail water delivery?	Yes__x___ No_____ Comment:
4. Identified population served by retail water delivery?	Yes___x__ No_____ Comment: pg. 3 and 4
5. Public comment period completed? (60 days or local regulation)	Yes__x___ No_____ Comment: appendix A
6. Signature with authority to commit resources of the submitting entity?	Yes_x____ No_____ Comment: cover letter
7. All required water saving measures and programs considered?	Yes__x__ No_____ Comment:
I. Fixtures and appliances – toilets, urinals, showerheads, faucets, etc.?	Yes_x__ No_____ Comment: low flow faucets, showerheads, residential audit kits
II. Waterwise landscapes, drought resistant vegetation, removal of phreatophytes, efficient irrigation, etc.?	Yes_x___ No_____ Comment: pg. 13-Audits and irrigation equipment improvements at parks and open space areas
III. Water efficient industrial and commercial processes?	Yes_x___ No_____ Comment: xeriscape programs for commercial and open space (HOA), requirement for wind and rain sensors for commercial and open space irrigation; car wash recycling standards
IV. Water reuse systems?	Yes__x No_____ Comment: pg. 12-The town doesn't have water rights that allow re-use
V. Distribution system leak ID and repair?	Yes__x___ No_____ Comment: pg. 12 pg. 18 Table 7.1
VI. Information, public education, audits,	Yes__x___ No_____

Required Conservation Plan Elements	Completed?
demos?	Comment: pg. 15-16; children water festival, bill stuffers on BMPs, ET irrigation scheduling in water bill, online access to bill and history, website water use calculator, general public bill stuffers, website
VII. Conservation oriented rate structure and billing system?	Yes__x___ No_____ Comment: pg. 14 and pg. 6
VIII. Regulatory measures designed to encourage water conservation?	Yes_x___ No_____ Comment: pg. 13-14 water waste ordinance, car wash standards, banning and removal of phreatophytes; requiring wind and rain sensors for commercial and open space irrigation
IX. Incentives, rebates to encourage conservation implementation?	Yes___x__ No_____ Comment: pg.16- rebates for HE toilets, clothes washers, dishwashers and showerheads. Pg. 17-Wind and rain sensor rebates for residential customers
8. Role of water conservation plan in overall water supply planning?	Yes_x_____ No_____ Comment: pg.26 & 27 Frederick evaluated savings against CIP and new supply
9. Steps to implement, monitor, review, and revise conservation plan including time period not to exceed 7 years?	Yes_____ No_____ Comment: pg. 28-29: Implementation plan and timeline Pg. 29 : timeline not to exceed 7 years for revision **See comments below on monitoring plan**
10. Estimates of water saved through previous conservation efforts AND water saved through plan implementation?	Yes_____ No___ _____ Comment: pg. 25 and 26 for selected measures. **See comments below for previous measures**

Plan Review Findings

_____ Approved

_____ Conditional Approval

_____ Disapproval with Modifications

Plan review comments:

This plan review was completed by Kevin Reidy of the Colorado Water Conservation Board. The final review was completed and approved by Veva Deheza. Questions about the review itself and the comments provided can be directed to Kevin. Questions about the plan review process and the statutory requirements can be directed to Veva.

Monitoring and evaluation plan: While Frederick has outlined one example (e.g. rebate customers) for monitoring the quantitative successes of the proposed conservation measures, the section is not complete enough. The plan should have a more detailed account of the monitoring and evaluation plan. Here is an example of a table that has more detail and would complement the section:

Table 9.1 – Tracking Matrix for Monitoring Water Conservation Measures

Conservation Measures and Programs	Number of Rebates/ Giveaways	Individual Customer Water use	Customer Class Water Use	Per Capita water use	Unaccounted for Water	Peak & Annual Treated & Total Water Demand
	(A)	(B)	(C)	(D)	(E)	(F)
AMI FlexNet				X	X	X
Leak Detection & Repair Program				X	X	X
Meter Testing & Replacement		X		X	X	X
Develop Ordinance & Standards for New Development			X	X		X
Water Restrictions			X	X		X
Water Rate Structure Changes			X	X		X
Billing Statements that Encourage Water Savings				X		X
Water Conservation Website Upgrades/ Public Education				X		X
Xeriscape Demonstration Garden				X		X
Xeriscape Gardening Classes				X		X
Children's Water Festivals				X		X
School Education Program				X		X
Property Manager/HOA Training & Education			X	X		X
Indoor Rebates	X	X		X		X
Irrigation System Efficiency Device Rebates	X	X		X		X
Water Conservation Upgrades at City Facilities - Indoor			X	X		X
Water Conservation Upgrades at City Facilities - Outdoor			X	X		X
Residential Water Audits			X	X		X

NOTES:

(A) The number of rebates and/or giveaways will be tracked for those installations that have been proven.
(B) Water use prior and post installation will be tracked to determine if a savings has occurred.
(C) These measures affect specific customer classes that can be tracked to determine savings.
(D) A reduction in the Gallons per Capita Water Use will show an overall savings
(E) These measures track uses that are not billed but are supply-side related.
(F) Reductions in peak and annual water use will show an overall savings

Previous savings: The savings from previous conservation efforts isn't really spelled out in the plan. I think between tables 7.2 and 7.3 you have the information there. I would suggest adding a column in table 7.3 to indicate the ongoing programs vs. the proposed programs. Then indicate the total of savings that have been achieved from the ongoing programs. This could be done as an annual number. We realize that this can be difficult to obtain but that also it is an only an estimate.