Sample of a Municipal Water Efficiency Plan

City of Shallow Creek
Fiction County, CO

August 2012

Prepared for:

Colorado Water Conservation Board
1313 Sherman St., Room 721
Denver, CO 80203

Prepared by:

Aquacraft, Inc.
2709 Pine St.
Boulder, Colorado 80302

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PURPOSE AND SCOPE OF THIS DOCUMENT

This Sample Municipal Water Efficiency Plan (Sample Plan) is a complementary resource to the Municipal Water Efficiency Plan Guidance Document (Guidance Document), both developed by the Colorado Water Conservation Board (CWCB). These documents, in conjunction with the water conservation and efficiency information and resources on CWCB's website, serve as reference tools that water providers and local governments throughout the state may use to develop local water efficiency plans.

The Guidance Document provides a comprehensive background on municipal water efficiency planning and recommends water efficiency planning steps and components useful in developing a local plan. This Sample Plan provides an example of how the Guidance Document may be used to develop a municipal water efficiency plan. The Sample Plan closely corresponds with the guidelines and template provided in the Guidance Document.

This Sample Plan was developed for a fictitious municipality called Shallow Creek. Shallow Creek is representative of a "typical" municipal water provider in Colorado, exhibiting the following traits:

- Shallow Creek is of small to medium size serving water to a residential service area population of approximately 20,000 people in addition to commercial and municipal end users.
- The location of Shallow Creek is described under neutral pretenses; in other words, it is not located within a specific basin or region of the State.
- Shallow Creek's water supply system is representative of the water supply systems existing in municipalities throughout the State (i.e. snowmelt-driven surface water hydrology, direct flow and storage rights, surface water storage, groundwater wells and augmentation supplies, etc.)
- Challenges faced by Shallow Creek are similar to the typical challenges many municipalities in the State are confronted with (i.e. anticipated growth, limited funds, uncertainties related to drought cycles and climate change, etc.).
- Shallow Creek uses planning tools of moderate sophistication for forecasting the availability of its water supplies on an annual basis as well as for estimating the firm yield of its water supply system.

ACKNOWLEDGEMENTS

The development of the Sample Plan was a collaborative effort led by the CWCB. The Steering Committee included municipalities, conservancy and conservation districts, and Colorado-based water efficiency experts. All played an integral role in the development of the Sample Plan. The stakeholder process included a careful review of the overall utility and main components of the Sample Plan.

The CWCB and project team would like to thank the following stakeholders for their time and input on this document:

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Executive Summary

Profile

The City of Shallow Creek (City) is located at the base of the Rocky Mountains in north Fiction County, Colorado. Shallow Creek provides treated water and wastewater services to a 25 square mile service area with approximately 20,000 people. The current population is expected to grow and eventually more than double as Shallow Creek's popularity as a tourist destination and regional business hub increases.

The City typically relies on a combination of direct flow water rights and storage water rights. The City typically diverts water directly from Shallow Creek during spring runoff and releases water stored in Castle and Crown Reservoir in the mid-summer through the winter season.

Population

At buildout, the City currently estimates it will provide water service to 55,000 people. This represents an increase of 175% over the 2012 population served. Shallow Creek acknowledges the variability of any buildout projection that assumes achievement of a hypothetical maximum population in the future. Experience has shown that buildout seldom, if ever, really occurs. Instead, cities adapt to new conditions and development realities as they grow to their urban boundaries. What is considered buildout in 2012 could be very different from what will be considered buildout in 2050.

This conservation plan covers a 25 year period from 2012 – 2036. In 2036 it is estimated that the population in Shallow Creek will double to 40,000.

Future Demand

As part of the water efficiency planning process, a baseline demand forecast starting from 2012 and going out 25 years to 2036 was prepared. This baseline forecast did not include the impact of water conservation of any kind, even passive water savings beyond measures already adopted as part of the conservation plan adopted in 2002 and existing Federal plumbing codes and standards. Baseline water demand in 2011 was 6,311 acre-feet (AF) and under the baseline forecast is expected to increase by 4,344 AF to 10,655 AF in 2036.

Using the baseline forecast described above and prepared by the City, a demand forecast that includes the impact of the City's planned water efficiency program measures was prepared. Under this forecast, it is estimated that water demand at 2036 will be reduced by approximately 2,100 AF as result of passive and active water conservation measures in Shallow Creek. Another 2,625 AF will be provided through a combination of a new fully consumable groundwater supply and a new non-potable reuse system. These new supply options are expected to come on line between 2018 and 2020.

Efficiency Goal

The City has identified that demand reductions accomplished by a combination of passive and active water efficiency measures will reduce the water supply gap by approximately 2,100 AF in 2036. Based on careful analysis of current demands and expected growth the City believes this level of savings to be readily achievable. This goal will be re-evaluated on a regular basis, as Shallow Creek intends to update the Water Efficiency Plan every 5 to 7 years. This means that three or more additional plan updates will be completed before 2036, affording ample opportunity to update and refine the City's conservation program and goals as needed.

Efficiency Program

The City of Shallow Creek has implemented a variety of water conservation program measures starting in 2002. They City's first water efficiency plan was prepared in 2007. The 2007 conservation plan called for savings of at least 575 AF by 2020, which was equivalent to 10% of the baseline demand. However, over the past five years the City has adopted a more aggressive growth plan that is expected to double the population over the next 25 years. The City determined that a more aggressive water efficiency program would be advantageous and could result in significant cost savings over almost all of the new supply options under consideration.

The City of Shallow Creek has had a full time water conservation coordinator since 2003. The position is currently held by Betty Bodean who was hired in 2005. In addition, the City hires seasonal labor and outside contractors such as the Center for Resource Conservation to help implement some efficiency program activities.

The City's water conservation program incorporates a mix of measures, but is highlighted by an informational water budget program that is expected to encourage efficiency and assist in targeting outdoor efficiency measures. Other significant efficiency activities include an ordinance to require all new residential construction to meet the EPA WaterSense new home specification and a conservation oriented tap fee program that provides financial incentive to builders who incorporate water efficiency into their new buildings.

Efficiency Planning Process

The City carefully developed this conservation plan in accordance with the Colorado Water Conservation Act of 2004 so that it meets or exceeds all statutory requirements. The City utilized the Colorado Water Conservation Board's *Municipal Water Efficiency Plan Guidance Document* to inform and guide the development of this conservation plan.

Stakeholder Participation

City water customers were invited to participate in several phases of the planning process. Volunteers were solicited through a series of announcements made at Shallow Creek City Council meetings and an invitation published in the Shallow Creek Tribune newspaper. The City established a nine member volunteer stakeholder committee that met regularly with City staff

during the plan development process. The stakeholder committee was instrumental in helping to select the water efficiency program measures included in this plan.

1.0 PROFILE OF EXISTING WATER SUPPLY SYSTEM

1.1 Overview

The fictional City of Shallow Creek (Shallow Creek) is located at the base of the Rocky Mountains in north Fiction County, Colorado. Shallow Creek provides treated water and wastewater services to a 25 square mile service area with approximately 20,000 people. The current population is expected to double over the next 25 years as Shallow Creek's popularity as a tourist destination and regional business hub increases. Historically, Shallow Creek's economy was primarily based on the surrounding agricultural community. Although the general demographic is shifting to a stronger emphasis in tourism and business, agriculture will continue to have a prominent role in Shallow Creek's economy and community life.

The major components of Shallow Creek's water supply system are illustrated in Figure 1. Shallow Creek typically relies on a combination of direct flow water rights and storage water rights. The City typically diverts water directly from Shallow Creek during spring runoff and releases water stored in Castle and Crown Reservoirs in the mid-summer through the winter season. Shallow Creek also has four alluvial wells that are used to irrigate nearby parks and open spaces with raw water via a substitute water supply plan. The City has filed for an augmentation plan to augment these wells using some recently purchased agricultural water rights.

The City has two raw water storage reservoirs: Crown and Castle Reservoirs. The specifications of these reservoirs are provided in Table 1. This table shows the assumed starting storage for the reservoirs in the 25 year operations model, the maximum available storage, and the monthly losses from the reservoirs due to evaporation and seepage, and the estimated average and dry year storable flows from the City's water rights.

Table 1: Reservoir Information

RESERVOIR SYSTEM #1: Crown Reservoir	
Total Useable Storage	5,000 AF
Monthly Loss %	1.0%
Average/Dry/Drought Year Yields	5,000/2,500/1,000 AF
RESERVOIR SYSTEM #2: Castle Reservoir	
Total Useable Storage	3,800 AF
Monthly Loss %	1.0%
Average/Dry/Drought year yields	3,800/1,900/500 AF

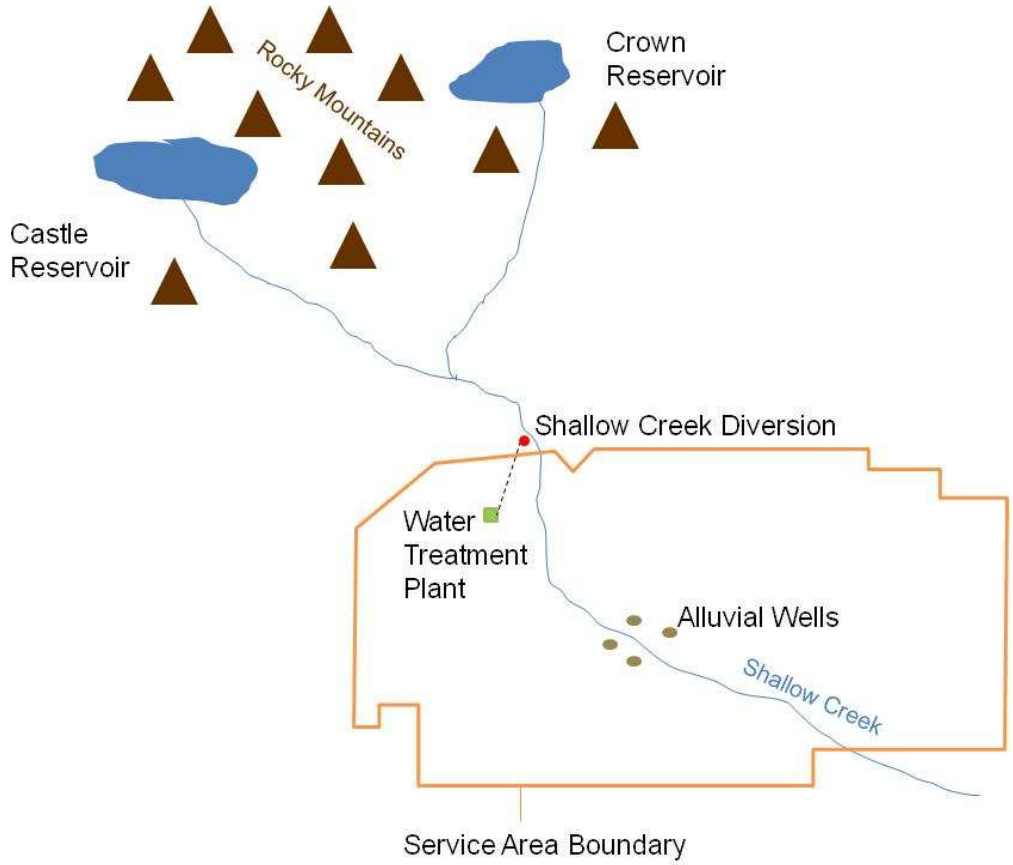

Figure 1: Shallow Creek Water Supply System[1]

1.2 Water Supply and Reliability

Shallow Creek has a reliable water supply capable of meeting current raw water demands in all but the driest years in Colorado. Shallow Creek uses an in-house spreadsheet model, Shallow Creek Integrated Supply, Operations, and Efficiency Model (SCISOEM), to project water supplies under various hydrologic, growth, and demand scenarios. The SCISOEM model indicates that Shallow Creek currently has a dry year yield from surface water rights of 4,555 AF assuming 2002 drought conditions. In other words, Shallow Creek's existing surfaced water rights are expected to deliver up to 4,555 AF of water under drought conditions of the same magnitude experienced during the 2002 drought.

The one new water supply that Shallow Creek knows it will have available is 2000 AF of fully consumable water from its groundwater supply. These wells are part of an augmentation plan that involved a group of senior agricultural rights that the City purchased and changed to

[1]Some water providers may prefer to not disclose the location of water supply or conveyance facilities for public safety reasons. In those cases, this type of figure may be beneficial where the precise facility locations are not specified, yet a conceptual schematic of the water system is provided for discussion purposes.

municipal use. The groundwater system is scheduled to go on line in 2018. Since this is a definite project it has been included in the baseline operations model.

The 2002 drought was the driest year on record statewide in terms of streamflow. In terms of repeat period, the 2002 drought is considered between a 300 and 500 year drought. River administration was extremely tight with senior calls much earlier in the season than normal. Shallow Creek's direct flow rights were called out of priority in late May, when, under normal conditions, they traditionally extend into late June. While Shallow Creek's storage rights were of sufficient seniority to allow for the legal filling of both reservoirs, there was a shortage of physical supply. Snowpack above Castle and Crown Reservoirs was 50% of normal in late April and storage in Crown and Castle reservoirs was 56% and 57% of normal, respectively, by July 1, 2002.

While Shallow Creek had sufficient supplies to meet demands in 2002, water restrictions were enforced as a precautionary response in recognition that the drought could extend into the following year and drought response would be essential to meeting future 2003 demands. The short term drought response system employed in 2002 reduced total annual demands by 20% compared to the 5-year pre-drought average.

In normal to wet years, Shallow Creek typically has excess water available from their surface water rights. Excess water is stored in the City's two reservoirs to the maximum extent possible to provide a drought reserve for the future. One of the requirements of the operation plan is to maintain at least 1,000 AF of reserve supply in storage that will be available for use during times of drought and not used during normal years to supply system demands. In extreme emergencies there is a 1000 AF pool of dead storage in the reservoirs that could be pumped out for use.

Shallow Creek's water supply reliability planning efforts focus on the ability of the City's water supply system to meet the needs of its customers during times of stress. This reliability depends on a multitude of factors including the City's water source(s), seniority of water rights, storage capacities, and rate of customer demand growth – which is directly tied to water efficiency efforts described in this plan.

1.3 Supply-Side Limitations and Future Needs

The City has developed a water operations model called Shallow Creek Integrated Supply, Operations, and Efficiency Model (SCISOEM), to project water supplies under various hydrologic, growth, and demand scenarios. This model tracks water demands for existing and new customers over a 25 year planning period. It is capable of incorporating changes in existing and new customer water demands in response to conservation measure implementation. The SCISOEM also includes the estimated yields of the City's water rights and available reservoir storage. A monthly water operations model *integrates* the water demands and water supply information into a single operational system and tracks deliveries, reservoir contents and shortages to the system. This model was used as the main tool for determining how the system

is expected to operate over time under a range of both supply side and demand side modifications. A thorough assessment of Shallow Creek's water supplies was last conducted in 2009 when Shallow Creek updated its Raw Water Master Plan. As part of that planning effort Shallow Creek decided to adopt a three-pronged approach to meeting new demand on the system. This approach includes: (1) an aggressive water conservation program; (2) a new fully consumable groundwater supply purchased by the City; and (3) a new non-potable reuse system. This three-pronged approach is described in more detail later in this plan.

A summary of water supply limitations and future needs is shown in Table 2. This table is based on Worksheet B from the CWCB guidance document.

Table 2: Water supply limitations and future needs (based on Worksheet B from CWCB guidance document)

Future Need/Challenge	Yes	No	Comments on Limitation/Future Need	How is Limitation/Future Need Being Addressed
System is in a designated critical water supply shortage area		X		
System experiences frequent water supply shortages and/or emergencies		X		
System has substantial real or apparent water losses.		X		
Experiencing high rates of population and demand growth	X		Population is expected to double in the next 25 years.	Water conservation, new supply development, reuse.
Planning substantial improvements or additions	X			New groundwater and reuse supplies are planned.
Increases to wastewater system capacity anticipated	X		Additional wastewater treatment capacity may be needed.	Wastewater system expansion is currently being studied.
Need additional drought reserves	X		Population is expected to double in the next 25 years.	Water conservation, new supply development, reuse.
Drinking water quality issues		X		
Aging infrastructure		X		
Issues with water pressure in portions of distribution system		X		

2.0 Shallow Creek Water Demands and Historical Demand Management

2.1 Demographics and Service Area Characteristics

Shallow Creek provides treated water and wastewater services to a service area with approximately 20,000 people. The current population is expected to grow as Shallow Creek's popularity as a tourist destination and regional business hub increases.

Shallow Creek was founded in 1888, but remained a small town of less than 2,000 residents until post-WW II era when it was discovered as a tourism destination and the GI Bill helped fuel a housing boom because of its proximity to the Denver-metro area. Shallow Creek experienced another growth surge from 1989 - 2004 as it doubled in size over a 15 year period. The housing stock in Shallow Creek is a mix of old and new buildings equipped with a wide range of water using fixtures and appliances. Over the past 20 years Shallow Creek has seen a dramatic increase in the number of automatic irrigation systems installed in new landscapes and retrofit for older, established landscapes. As a popular summer tourist destination, Shallow Creek has seen rapid growth over the past 15 years in the hospitality sector including hotels, motels, and restaurants. Shallow Creek's peak demand occurs in June, July, and August. The peak day typically occurs between July 1 and 15. Shallow Creek has also experienced significant growth in the multi-family housing sector over the past decade.

To better understand water use among different categories of customers, Shallow Creek uses the following customer category assignments for its water service accounts. Each water account is assigned one of the category designations below.

- Single family residential (detached single family homes)
- Multifamily residential (attached and detached residential housing containing 2 or more units)
- Irrigation (dedicated irrigation accounts)
- Public/Municipal (includes City properties and schools)
- Commercial, Institutional, and Industrial
- Water loss

Customer information is stored in the utility's customer billing system. Shallow Creek is working to provide all relevant utility departments access to this and other account level information that is often needed on a daily basis.

2.2 Historical Water Demands

According to the data from the billing department, the annual metered use of the customers averaged 5,696 AF for the period from 2005-2011. These data were based on meter data, and were adjusted upwards by 3% to correct for the meter errors. This brought the total estimated customer demands to 5,869 AF per year. Water losses of 7% were added to account for real losses from the system. It should be kept in mind that real losses can be reduced, and this will results in additional water supply for the system. Reducing apparent losses through improved meter accuracy increases utility revenue, but does not create new supply.

As shown in Table 3, single-family residential and multi-family housing comprise over half of Shallow Creek's water demands. The commercial, institutional, and industrial (CII) category is the largest non-residential water user followed by dedicated irrigation accounts. City government facilities are the smallest user. These uses include the washing of City vehicles, indoor use by City staff, outdoor landscaping on City-owned facility property, etc.) Real and

apparent water losses combined were estimated at 7% and 3% respectively using the AWWA M36 methodology. The demands and percentages for each customer category are shown in Table 3 and as a pie chart in Figure 2. Historical water demands (including real losses) from 2005 – 2011 are shown in Figure 3. The number of metered service connections by customer class is presented in Table 4. Average monthly demand in Shallow Creek from 2005 – 2011 is presented in Figure 4. These figures and tables are designed to provide important information on water use patterns and trends in Shallow Creek over the past seven years.

Table 3: Historic average water demand and percentage by customer category, 2005 - 2011

Category	Percent of Total Annual Water Deliveries	Baseline Demands (AF)
Single Family Residential	33%	2,117
Multifamily Residential	19%	1,173
Irrigation Accounts	15%	938
Public/Municipal Accounts	6%	410
Commercial, Institutional, & Industrial	20%	1,231
Water Loss* (real = 7%)	7%	442
Total	100%	6,311

*An adjustment to account for the 3% apparent loss due to under reporting meters is included in the baseline demand of each customer category.

The five largest customers in Shallow Creek in terms of annual water use are:

1. Shallow Creek Park – a 5 acre park located near the north end of the City.
2. Shallow Creek Hotel and Resort – a full service hotel located in the downtown area.
3. Shallow Creek Recreation Center – a City run recreation center which includes two swimming pools.
4. Shallow Creek Community College – a small community college campus at the south end of the City.
5. Shallow Creek Mall – a retail shopping complex that includes Up the Creek Car Wash – a large self-service car wash (the only car wash in town).

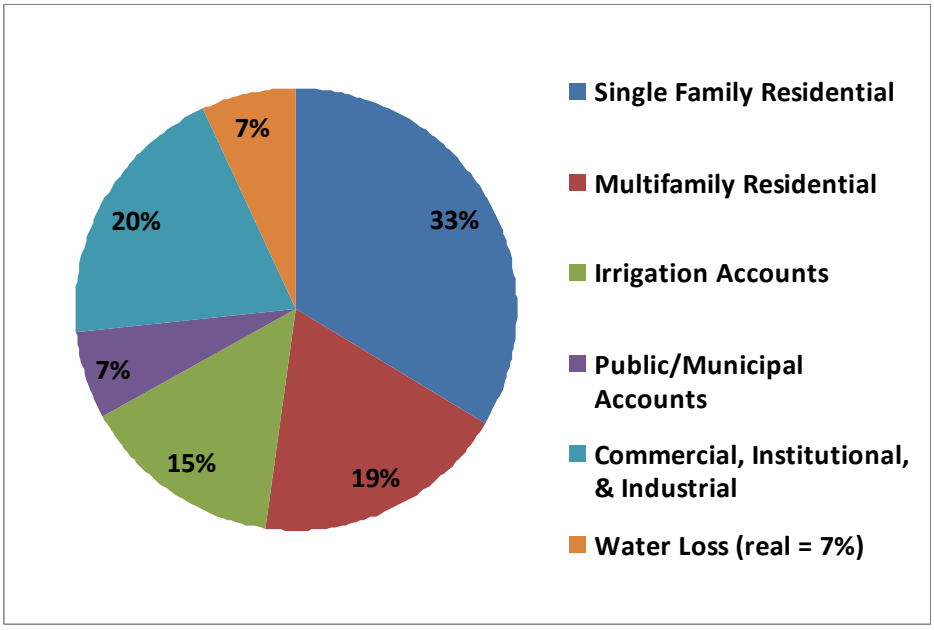

Figure 2: Pie chart of historic water demands

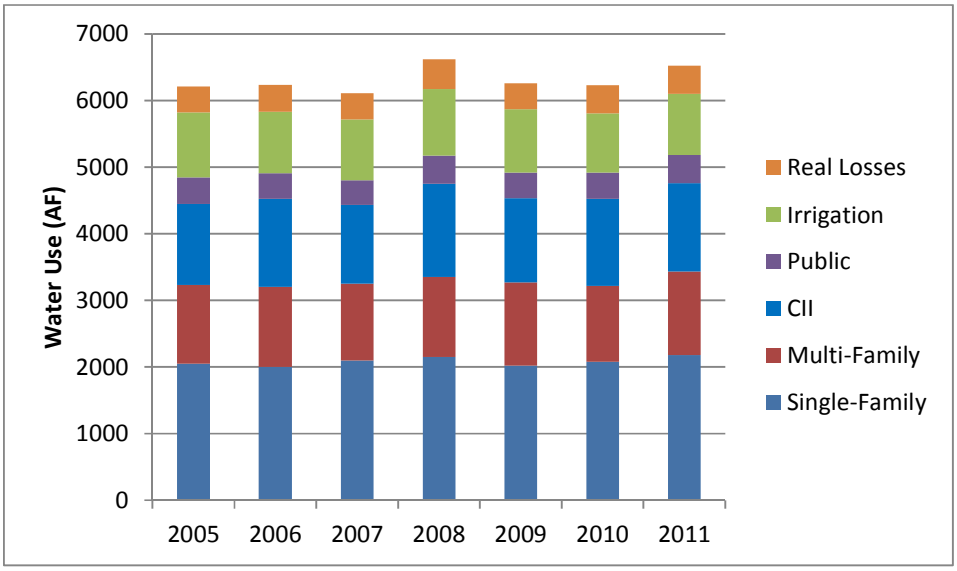

Figure 3: Shallow Creek treated water demands, 2005 – 2011

Table 4: Metered connections in Shallow Creek by customer category, 2005 - 2011

Year	Single-Family	Multi-Family	CII	Public	Irrigation	Total
2005	3772	365	414	34	78	4663
2006	3884	375	427	35	82	4803
2007	4000	385	441	36	85	4948
2008	4120	396	455	37	88	5096
2009	4243	407	469	38	92	5250
2010	4370	418	485	39	96	5407
2011	4500	430	500	40	100	5570

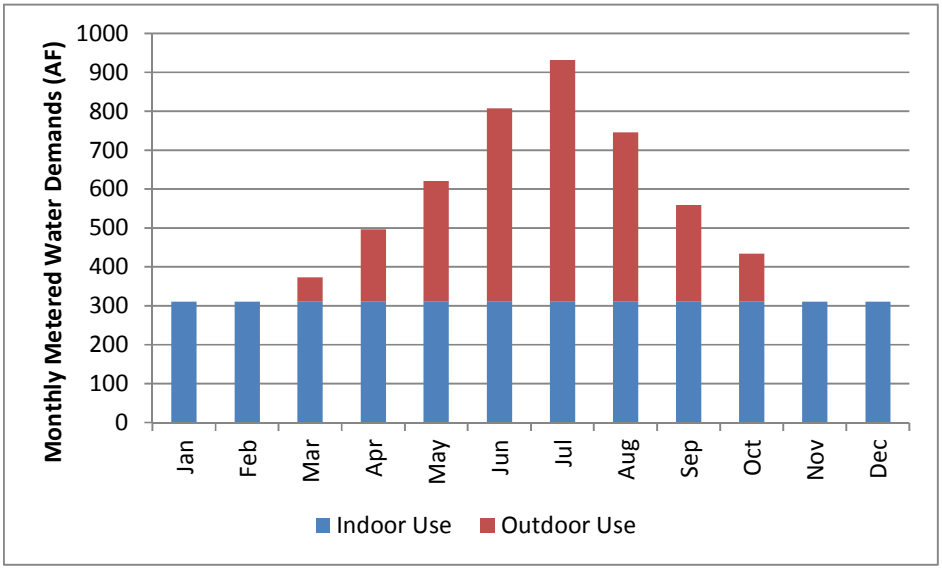

Figure 4: Average indoor and outdoor monthly metered water use (2005 – 2011)

System Water Losses

Shallow Creek conducts an annual water loss audit using the methodology prescribed by the AWWA M36 manual. The results of this analysis have shown that there are two primary categories of losses in Shallow Creek: real and apparent. The real losses include physical losses of water either through leakage or theft, while apparent losses were found to consist mainly of meter errors that underestimate actual customer demands. Real losses have been estimated at 7% and apparent losses at 3%.

Annual Peak Day Demands

The peak day demand in Shallow Creek in 2011 was 16.9 million gallons (MG) and the average day demand in 2011 was 5.8 MG. Shallow Creek has a peak factor of approximately 2.9 which means that the peak day demand is typically 2.9 times higher than the average day demand.

Shallow Creek's peak demand is largely driven by summer irrigation demands and typically occurs between July 1 and July 15.

In 2001 Shallow Creek completed construction of the Cottonwood Water Treatment plant, a facility capable of treating 19 million gallons per day. Analysis conducted as part of the water conservation planning process indicates that the capacity of this plant will be sufficient to meet the water treatment needs of Shallow Creek through buildout and beyond. As a result, reducing peak day demands in Shallow Creek was not considered a primary objective of this water efficiency plan although a number of the program measures described later in this document are expected to contribute to declining peak demands in the coming years.

2.3 Past and Current Demand Management Activities

The City of Shallow Creek has implemented a variety of water conservation activities since 2007 when the last water conservation plan was prepared. The 2007 conservation plan called for savings of at least 575 AF by 2020, which was equivalent to 10% of the baseline demand. The City estimates that implementation of the plan has conserved approximately 270 AF to date and based on this, Shallow Creek is on track to achieve the 2020 conservation goal on or ahead of schedule. Shallow Creek has performed an analysis of billing records to estimate water savings achieved through the implementation of these conservation measures. It was found that the economic downturn that began in 2008 impacted home building in Shallow Creek and almost no new homes were constructed in 2009 and 2010.

The conservation measures that have been implemented since 2007 are shown in Table 5 which is based on Worksheet A from the Municipal Water Efficiency Plan Guidance Document. Table 5 helps meet statutory requirements including C.R.S. 37-60-126 (4) that requires all State approved water conservation plans to include an estimate of the amount of water saved through previous demand management efforts. Savings estimates included in Table 4 were estimated with the help of two references: (1) *Guidebook of Best Practices for Municipal Water Conservation in Colorado* (2010 Colorado Water Wise); (2) *Handbook of Water Use and Conservation* (2001 Amy Vickers). The Colorado Best Practices Guidebook includes savings range estimates for a wide variety of efficiency measures. The Vickers Handbook provides some assistance for estimating water savings from different activities as well. For on-going water savings estimates, Shallow Creek plans to use the Alliance for Water Efficiency's (AWE) Water Conservation Tracking Tool (available free to all AWE members).

Approximately 46% of the water savings from the past and current water efficiency and conservation program measures in Shallow Creek result from passive savings and 54% are from active programs. Passive savings are the water savings achieved when customers (without any utility incentive) replace old and inefficient fixtures and appliances with new more water efficient models. This happens as old fixtures and appliances reach the end of their useful life or as a result of remodeling and renovations. National plumbing codes and the Federal Energy Policy Act of 1992 ensure that toilets, showers, and faucets meet established water use efficiency criteria. Department of Energy standards govern the water use of clothes washers.

EnergySTAR rated clothes washers currently use substantially less water than machines build just a few years ago.

Residential passive savings were estimated using Equation 3 (modified for Shallow Creek) from the Municipal Water Efficiency Plan Guidance Document:

Passive water savings rate per year = [(65 gpcd – 55 gpcd)/65 gpcd]/5 years

Non-residential passive savings were estimated to be 30% of the residential savings rate.

Table 5: Current and past water efficiency program measures and estimated water savings (based on Worksheet A from CWCB Guidance Document)

Water Efficiency Activities	Period of Implementation	Annual Water Savings for Past Five Years (AF)					Total Five-Year Water Savings	Average Annual Savings
		2007	2008	2009	2010	2011		
Foundational Activities								
Increasing block rate structure	**1984 - present**	5	5	5	5	5	**25**	**5**
Passive indoor savings (Res. & CII)	**1994 - present**	25	25	25	25	25	**125**	**25**
Subtotal		**30**	**30**	**30**	**30**	**30**	**150**	**30**
Targeted Technical Assistance and Incentives								
Toilet rebate program	**2007 - 2009**	3	5	5			**13**	**4.3**
Clothes washer rebate program	**2007 - 2010**	3	3	6	6		**18**	**4.5**
Xeriscape loan program	**2009 - present**			6	8	12	**26**	**8.7**
Commercial indoor audits	**2008 - 2010**		3	4	6		**13**	**4.3**
Assistance with CII efficiency plans	**2007 - present**	2	3	4	4	4	**17**	**3.4**
Subtotal		**8**	**14**	**25**	**24**	**16**	**87.0**	**17.4**
Ordinances and Regulations								
Outdoor watering time restrictions	**1999 - present**	4	4	4	4	4	**20**	**4.0**
Water waste ordinance	**2002 - present**						**0**	**0.0**
Landscape reqs. for new homes	**2004 - present**	5	7	0	0	2	**14**	**2.8**
Subtotal		**9**	**11**	**4**	**4**	**6**	**34**	**6.8**
Education Activities								
Provide historic use data on water bill	**2010 - present**						**0**	**0.0**
Public information and education	**1993 - present**						**0**	**0.0**
Xeriscape demonstration garden	**1999 - present**						**0**	**0.0**
Subtotal		**0**	**0**	**0**	**0**	**0**	**0**	**0.0**
	Total Savings	55	47	55	59	58	52	**271.0**

2.4 Demand Forecast

As part of the preparation of the water efficiency plan, the City prepared an "unmodified" baseline demand forecast that does not include any impacts from water conservation and efficiency. This forecast shows demand starting in 2012 and going through the planning horizon of 2036 (25 years). The baseline forecast is based on a combination of anticipated demographic and land use changes in Shallow Creek. In the baseline forecast, indoor demands increase proportionally with the population at the current rate of usage. Outdoor use increases proportionally based upon the planned increase in irrigated area and current irrigation application rates.

Population is expected to grow from the current level of 20,000 people in 2011 to 40,175 people in 2036, a 100% increase. The population forecast is shown in Figure 5.

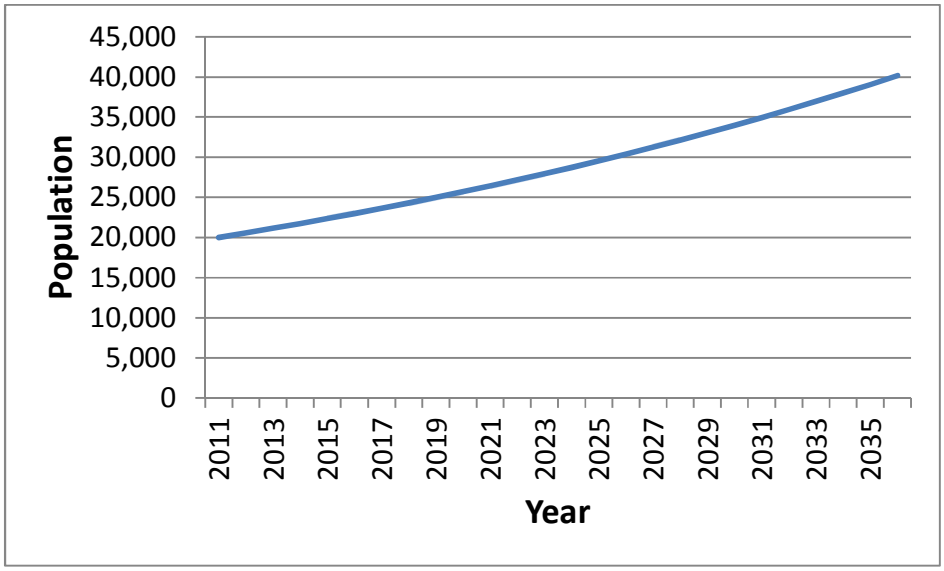

Figure 5: Population forecast, Shallow Creek, CO (2011 – 2036)

The baseline water demand forecast is shown in Figure 6. Under this baseline forecast, water use in Shallow Creek increases from 6,445 AF in 2012 to 10,655 AF in 2036, an increase of 4,210 AF or 65%. The beginning average year yield from Shallow Creek's surface water rights are 9,034 AF which is sufficient until 2027 under the baseline forecast, but the dry year yield of 4555 AF, rising to 6555 in 2019, is insufficient to meet expected demands even in 2012. In addition, while the average yields of the rights are sufficient their yields are variable, and do not always provide the average amounts. The variability of the supply and its vulnerability during droughts have both provided main impetus to the water efficiency plan, which is to provide for system flexibility, establish a drought reserve, and maintain system reliability during droughts, while also providing water for growth at the lowest possible cost.

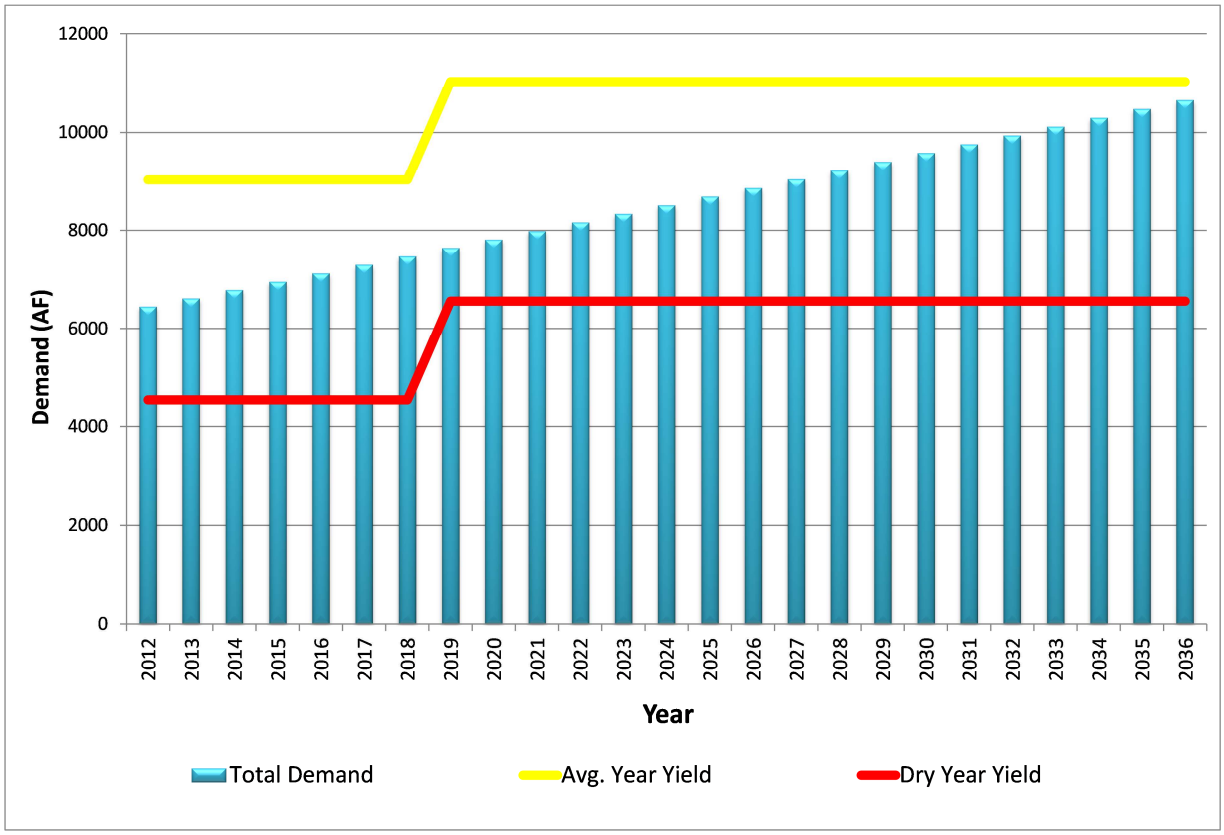

Figure 6: Baseline demand forecast and current water rights yield, City of Shallow Creek

3.0 INTEGRATED PLANNING AND WATER EFFICIENCY BENEFITS AND GOALS

The City of Shallow Creek practices integrated resources planning (IRP) in which all supply options including developing new supplies and implementing water efficiency programs are compared and evaluated at the same time in a fair and balanced manner. Because Shallow Creek has exhausted all sources of less expensive new supply, water efficiency has taken on a greater importance. Shallow Creek's next increment of new supply is to purchase new shares of the Colorado Trans-Mountain Delivery (CTMD) project or to invest in one of the proposed new pipeline projects that plan to bring more west slope water to the Front Range. In either case it is anticipated that the lowest cost for obtaining new surface water supplies is $20,000 per acre-foot. Some of the new supply options Shallow Creek has investigated deliver water at $30,000 per acre-foot or more.

3.1 Water Efficiency and Water Supply Planning

Water efficiency is of great importance to the water supply future of Shallow Creek. The City has managed through dry periods relying on storage and emergency demand restrictions, but under the baseline demand scenario shown in Figure 6 and assuming hydrology similar to the 30 year period from 1980 – 2010, there will not be sufficient supply to meet future dry year

demands. Figure 7 shows the output from the City's reservoir storage model. This operations model assumed no new water efficiency measures and no new water supplies beyond the 2,000 AF from the groundwater system in 2018. The results of this show that without savings from water efficiency programs described in this plan, or an alternative new supply from imported water, the City's system will fail to deliver water under forecast conditions.

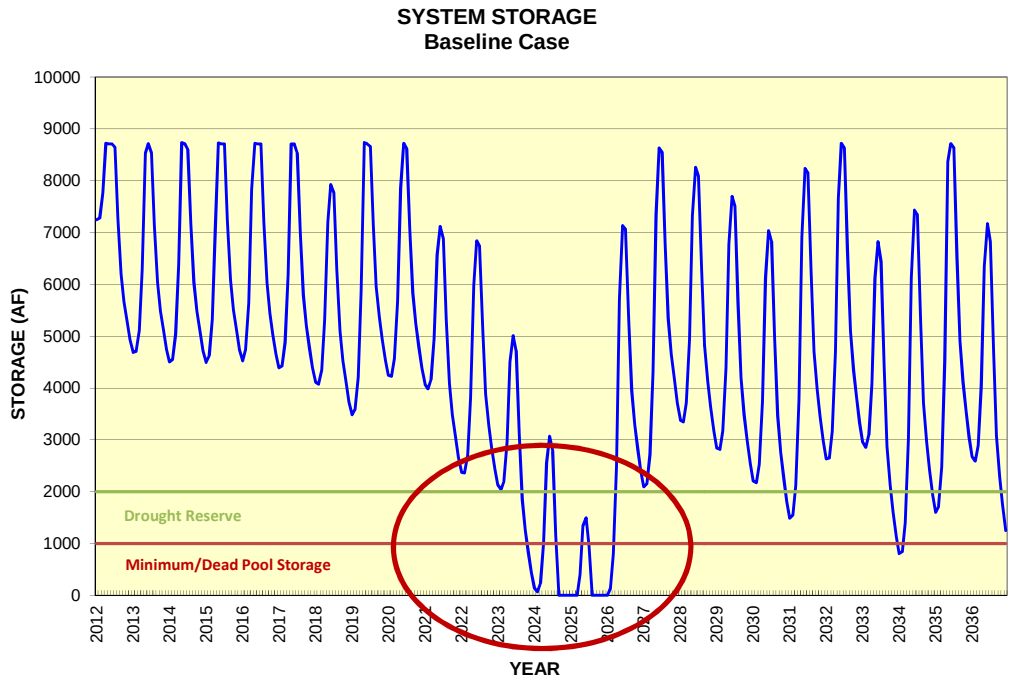

Figure 7: Baseline forecast storage levels in Shallow Creek reservoirs, (2012 – 2036)

The shortages caused by the drought hydrology shown in Figure 7 would be catastrophic for Shallow Creek. There would essentially be no water supply available for months and months over a period of three years from 2024 – 2026. This is clearly an unacceptable situation.

Three-Pronged Approach to Future Supply

To address this looming problem the City of Shallow Creek is implementing a three-pronged approach to expand, enhance, and improve its water supply over the next 25 years. This approach includes the following three elements:

1. An aggressive water efficiency program that will reduce demand by about 2,100 AF by 2036.
2. 2,000 AF of fully consumable new groundwater supply (2,000 AF in a dry year) purchased by the City. The rights were purchased from a local agricultural user and transferred to the

City's new well field by means of an augmentation plan.[2] This supply will come online in 2018, but is only available April – October.

3. Non-potable reuse to supply 625 AF of the City's dedicated irrigation demand (approximately 50%) by 2022. This assumes reuse of the effluent generated from the new groundwater supply.

The goal of this three-prong approach is to develop and conserve at least 4,725 AF of water over the next 25 years. Figure 8 shows the relative contribution of each of the new supply sources for Shallow Creek. The alternative to this approach considered by Shallow Creek would be to import water through a trans-mountain diversion project.

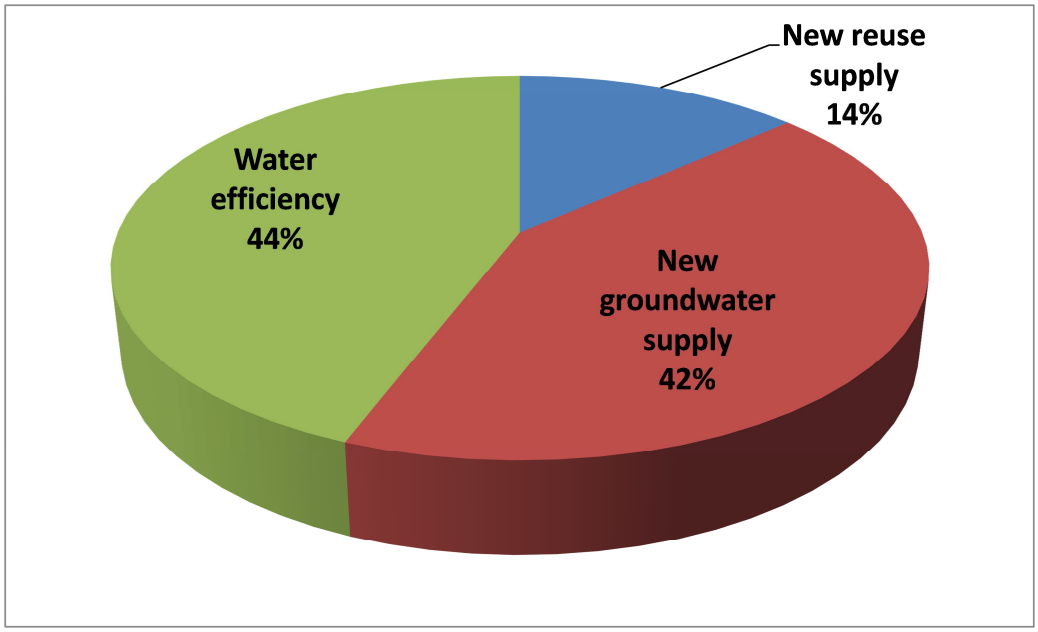

Figure 8: Sources of new water supply for Shallow Creek (2012 – 2036)

Capital Improvement Plan Harmonization

Shallow Creek has a Capital Improvement Plan (CIP) that is updated every 2 – 3 years. The Shallow Creek CIP was updated to include the elements of the three-prong supply approach described here including the new reuse supply and the new groundwater supply. These elements have been part of Shallow Creek's CIP for a number of years, but the timing of construction was adjusted in the CIP to ensure exact correspondence with this water efficiency Plan.

[2] An augmentation plan is a court-approved plan, which is designed to protect existing water rights by replacing water used in a new project. Augmentation plans are usually required in areas where there is a shortage of water during part or all of the year.

Revised Demand Forecast

A modified demand forecast that includes the impacts of the proposed water efficiency program was prepared for Shallow Creek. This forecast is shown in Figure 9. A comparison of efficiency program demands to the baseline demands that includes the estimated passive and active components of water efficiency is shown in Figure 10. The steep reduction in potable demand between 2020 and 2021 shows the impact of Shallow Creek's new water reuse system coming on-line. The increases in the average and dry year yields shown between 2018 and 2019 are the result of the new groundwater supply coming on-line.

Under the revised forecast, it is estimated that total demands in Shallow Creek in 2036 will be about 1,500 AF greater than they are in 2012 even though the population is expected to double over that period of time. Shallow Creek plans to accomplish this level of water efficiency improvements through a carefully designed program than ensures new customers are already water efficient when they join the City's system, passive and active water savings from existing customers in the residential and non-residential sectors, and development of a water reuse system that will replace 625 AF of irrigation demand.

The impact of the Shallow Creek three-pronged future water supply approach on reservoir storage levels is shown in Figure 11. In this example, no drought restrictions are enacted and the system is capable of delivering water and meeting all demands even through the synthetic drought hydrology that resulted in severe shortages in the baseline example (Figure 7). The City has a 1,000 AF drought reserve that is only used during one year of the model run. The City must also maintain a minimum of 1,000 AF in storage (i.e. dead pool storage) through these dry years. In a "worst case" drought scenario Shallow Creek could install pumps to access the dead pool storage. It is assumed that mandatory drought restrictions would be put in place during such a dry period which would result in higher storage levels than are estimated in Figure 11. The key result from this analysis is that Shallow Creek's three-pronged approach of efficiency, new supply, and reuse is capable of helping the City meet future demands without purchase of an expensive new surface water supply.

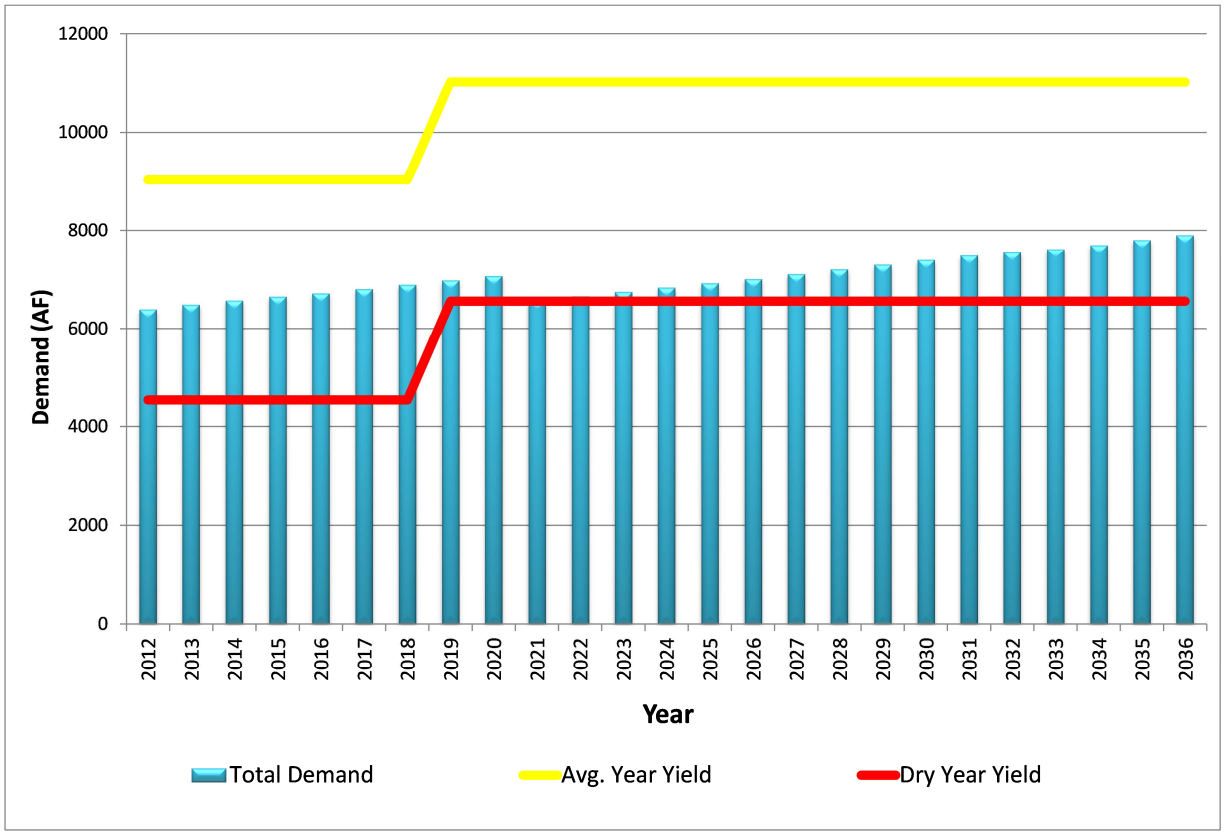

Figure 9: Demand forecast for Shallow Creek with conservation and new supply, (2012 – 2036)

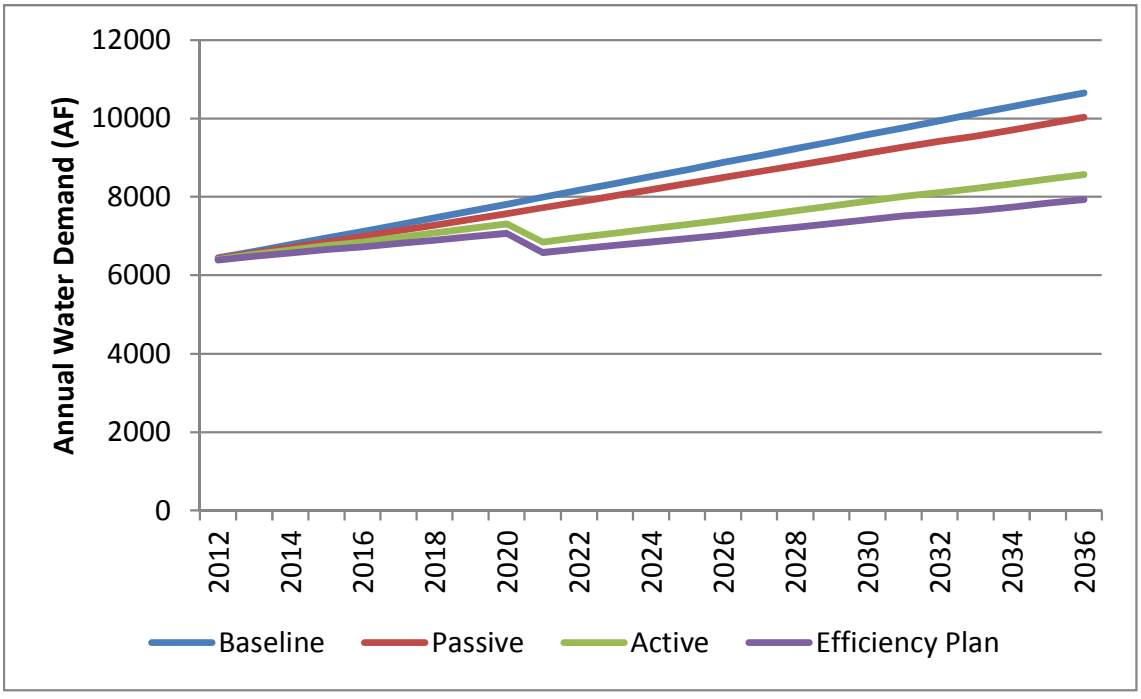

Figure 10: Comparison of efficiency plan demands to baseline demands

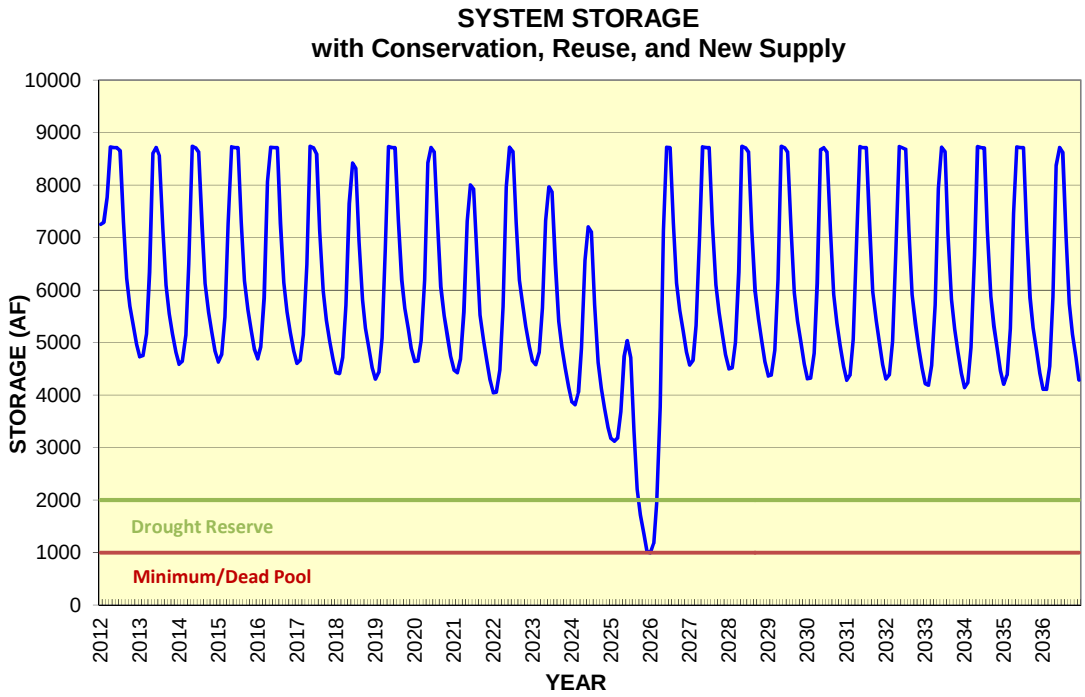

Figure 11: Revised reservoir storage forecast for Shallow Creek, with conservation and new supply (2012-2036)

Short Term Drought Response

The City has instituted a short term drought response system that requires demand reductions from all categories of customers based on the maximum and minimum storage levels in the reservoirs. Table 6 shows the triggers for the short term demand management program. The first triggers are based on the maximum storage achieved by the two system reservoirs in the spring. In any year which they fail to exceed 8,000 AF of contents, the customers are required to reduce their outdoor by 10% and this 10% reduction is to remain in effect until the reservoir contents exceed 8,000 AF in the following spring or later. A 10% reduction in outdoor use has the effect of a 5% reduction in total annual water use. Details on how drought response reductions will be enforced can be found in the *Municipal Drought Management Plan for the City of Shallow Creek*.

Table 6: Shallow Creek drought response triggers

Maximum Storage (June)	Minimum Storage (Fall)	Indoor Reductions	Outdoor Reductions	Total Annual Reductions
8,000 AF or Less		0	10%	5%
	Less than 4,000	5%	15%	10%
6,000 AF or Less		10%	15%	12.5%

The second trigger occurs if the minimum reservoir contents in the fall drop below 4000 AF. When this happens the customers are required to reduce their indoor use by 5% and their outdoor use by 15%, for a 10% net annual reduction in use. These restrictions remain in place until the maximum storage is reached the next spring. If this exceeds 8,000 AF then the restrictions shall be lifted. If however, the maximum storage fails to exceed 6,000 AF then additional restrictions are put in place and customers are asked to reduce their indoor use by 10%, resulting in an annual reduction in use of 12.5%.

The specific measures employed to achieve these savings are spelled out in the City's drought response plan, and they consist of both voluntary and mandatory demand reduction measures such as outdoor watering restrictions.

Figure 12 shows a third revision of the Shallow Creek reservoir storage with short term demand management measures included. The result of adding the short term demand management option to the system is that the system storage levels never fall below 2,000 AF, which allows for both the dead storage and the drought reserve to be maintained. If conditions had not improved in 2026 the City would still have had both the drought reserve and the emergency water in dead storage to fall back on.

Table 7 shows the trigger point and resulting demand reductions used in the system model.

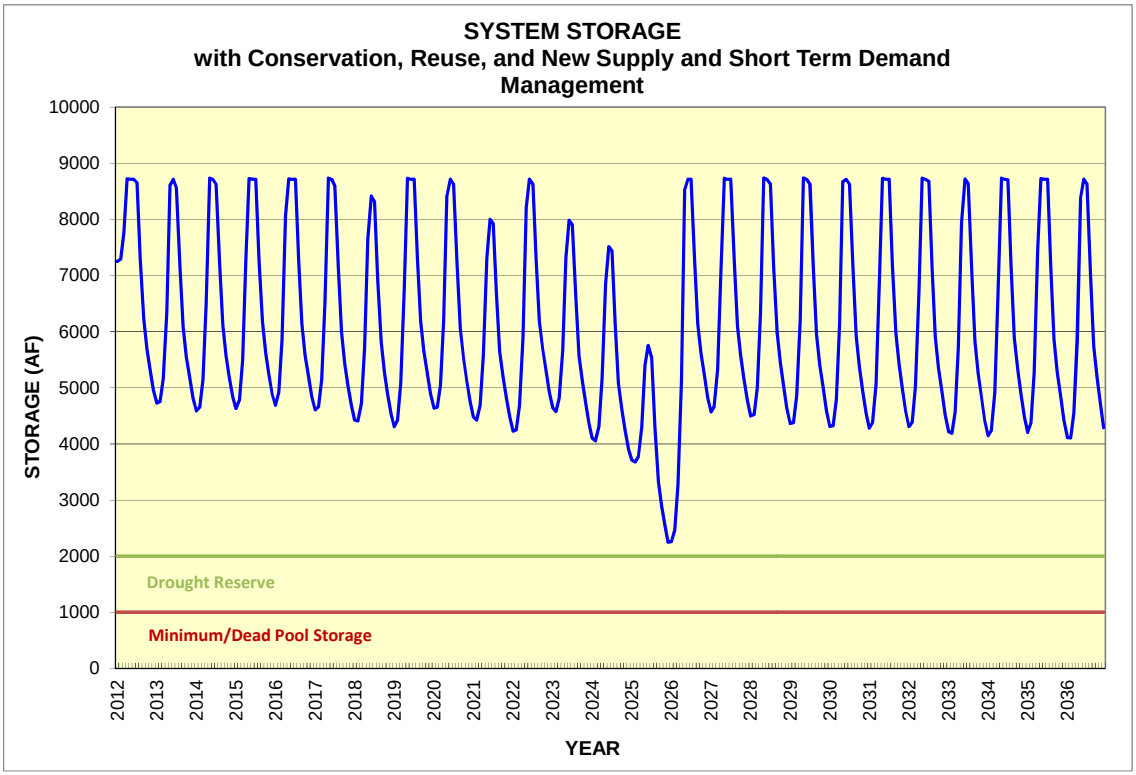

Figure 12: Revised reservoir storage forecast for Shallow Creek, with conservation, reuse, new supply, and short term demand management (2012 – 2036)

Table 7: Projected drought response reductions included in reservoir storage analysis

Date	System Storage (AF)	Annual Demand Reduction
July 2021	8,001	Begin 5% annual reduction
June 2022	8,718	End restrictions
June 2023	7,986	Begin 5% reduction
December2024	3,897	Begin 10% reduction
June 2025	5,756	Begin 12.5% reduction
June 2026	8,713	End restrictions

Estimated Cost of New Supply Options

All three of these new sources are necessary if Shallow Creek is to realize its growth goals while maintaining adequate water supplies and a reasonable drought reserve for existing customers at the lowest reasonable cost. The new groundwater supply is the least expensive option at $1,500 per AF. This is the lowest cost source of new water for the City and would be implemented in any new supply scenario. When comparing the cost of new supply options, Shallow Creek compared water efficiency and reuse against a new surface water supply.

The average per acre-foot cost for the water efficiency program and water reuse infrastructure is $6,570/AF. This represents the blended costs of water efficiency and water reuse. The estimated cost for water efficiency component is $4,000 per AF, the estimated cost for the reuse component is $15,000 per AF. If these water sources were not available, Shallow Creek's next increment of new supply would be to invest in one of the proposed new trans-mountain diversion projects that plan to bring more west slope water to the Front Range. It is anticipated that the lowest cost for obtaining new trans-mountain surface water supplies is $20,000 per acre-foot. Some of the new supply options Shallow Creek has investigated deliver water at $30,000 per acre-foot or more. The water efficiency approach is estimated to provide water at an average cost of $6,570/AF which is less than 1/3 of the per acre-foot cost of new surface water supply.

If Shallow Creek were to develop a new surface water source to meet anticipated demands (at $20,000/AF) the estimated cost of developing the necessary 2,725 AF of water would be $54,360,000.

Under the three-pronged approach outlined above, Shallow Creek expects to meet anticipated future demands at a cost of $6,570/AF or less for a maximum cost of $12,015,500. This represents a savings of $42,344,500 to Shallow Creek when compared to developing new surface water supplies.

3.2 Water Efficiency Goals

The City of Shallow Creek has established the goal of reducing forecast baseline demand by approximately 2,100 AF over the next 25 years through water efficiency. This amounts to an average annual reduction in demand of 83 AF per year.

To accomplish the goal of conserving 2,100 AF, Shallow Creek will continue to implement and expand its water efficiency program. The City's water efficiency program (described in detail below) was designed to encourage efficiency among all water users in Shallow Creek – residential and non-residential and new and existing. The goal also incorporates municipal water efficiency through replacement of potable water with reuse water to irrigate parks and through reductions in physical (real) water loss in the City's water distribution system.

The City's water efficiency goal was developed through an iterative process where a variety of water efficiency and new supply options were considered on the basis of cost and anticipated efficacy. The mixture of efficiency, new supply, and reuse described in this plan was developed after careful analysis of all options. The anticipated costs of this option were among the lowest (per AF) that the City considered. Furthermore, the anticipated benefits of implementing this three pronged approach are expected to be substantial from a water supply, service and reliability standpoint while helping to keep water rates as low as reasonably possible.

The goal of conserving 2,100 AF by 2036 represents a significant shift in planning for the City of Shallow Creek. The 2007 water conservation plan called for just 570 AF of water savings by 2020. However in 2007, the expected growth potential for the City was considered to be much lower. Since that time the City has expanded its urban growth boundaries and embraced a high growth planning approach where the population is expected to double over the next 25 years. At the same time the cost for developing new surface water supplies for the City has increased dramatically, effectively increasing the benefits associated with the lower cost water efficiency program.

These changes meant that previous water planning efforts were not adequate and needed to be re-visited. This 2012 conservation plan was prepared in response to these changes. The City plans to update this plan in five years to ensure the water efficiency goal is being met and to incorporate any changes necessary to ensure the savings goal is achieved by 2036.

4.0 Selection of Water Efficiency Activities

The City of Shallow Creek considered a wide variety of water efficiency programs and measures before selecting the final components for inclusion in this plan. Efficiency measures were screened using a variety of criteria including:

- Feasibility and practicality – can this measure be implemented in Shallow Creek?
- Estimated cost per AF – Is this measure cost effective when compared with the supply alternatives?

- Water savings – are the water savings likely to be significant? Do they justify the effort of implementing the activity?

Shallow Creek used the activity selection worksheets developed by CWCB to assist in the screening process. Copies of these worksheets are provided in Appendix A to this efficiency plan.

4.1 Summary of the Selection Process

The City implemented a three tier screening and selection process for evaluating potential water efficiency activities. Existing activities were included in the list of measures, but were not screened. Unless duplicative, existing efficiency activities are expected to continue as part of the ongoing water efficiency program.

Initial Screening. An initial screening was conducted by Shallow Creek Water Conservation Coordinator Betty Bodean and Customer Service Manager Fiona Badger. They used the CWCB screening and evaluation worksheets and used the *Guidebook of Best Practices Guidebook for Municipal Water Conservation in Colorado* (CWW 2010) as their key technical resource. Activities that made it through the initial screening were assembled on CWCB guidance document Worksheet H and passed along to the stakeholder committee for screening.

Stakeholder Screening. A stakeholder committee was assembled by the City from citizen volunteers and members of the City's Water Resources Advisory Board, and interested City staff. The stakeholder group met shortly after the initial screening to review the activities recommended for the water conservation plan. The stakeholder committee provided additional input on the measures selected and excluded in the initial screening.

Final Screening. The final level of screening and final selection of water efficiency activities was made by Betty Bodean – Water Conservation Coordinator, Francis Falconer – Water Resources Coordinator, and Rick Roberts – Public Works Director. During the second screening care was taken to select a suite of activities capable of achieving the level of water savings needed by Shallow Creek to achieve the stated water efficiency goals.

The final suite of water efficiency measures selected for the plan, with input and advice from the citizens, were incorporated into the City's in-house spreadsheet model - the Shallow Creek Integrated Supply, Operations, and Efficiency Model (SCISOEM), to project water supplies under various hydrologic, growth, and demand scenarios.

4.2 Components of Water Efficiency Plan

The water efficiency plan investigated by the City and Citizen advisory board consisted of four major components. Specific descriptions of efficiency program measures are provided in section 4.3.

4.2.1 Residential Indoor Efficiency Improvements

This component of the plan assumed that over the 25 year planning period all new and existing residential units would be brought up to WaterSense specifications. The net effect of this would be to reduce the per-capita indoor demands for residences from an average of approximately 70 gpcd to 40 gpcd. It is recognized that this will involve actions on the part of the city to increase adoptions of new, high efficiency devices over and above the levels that would occur it the City simply relied on passive savings from normal retrofits. The water budget system, building codes for new construction and the public education programs are all intended to support this effort. If future demand tracking shows it is needed then an ordinance requiring upgrades on sale of properties will be considered by council. Analysis of system demands under this program show that total annual demands would drop by 1130 AF over the 25 year period.

4.2.2 Residential Irrigation Efficiency Improvements

The second component of the efficiency plan was a residential irrigation efficiency program. This element assumes that the average irrigation use can be reduced by 25% over the 25 year planning period in existing and new single family residences and that new multi-family residences will irrigate a maximum of 18 gpsf over an average per site irrigated area of 20,000 sf per MF account. The total saving attributed to this element of the program amounted to 623 AF.

4.2.3 ICI Efficiency Program

The ICI efficiency program targeted commercial customers, public accounts and irrigation only accounts. Commercial irrigation in new accounts was reduced by 2% per year over the planning period, but existing commercial accounts were left as-is. Use of water for cooling towers in existing and new systems was targeted for reduction at 0.5% per year as a result of the cooling tower tune-up program. Bathroom use was targeted at 1% per year reduction through replacement of plumbing fixtures. Kitchen and laundry use was also targeted for reductions through improvements in dishwashing and more efficient commercial clothes washers. The total additional savings attributed to the ICI programs amounted to 330 AF.

4.2.4 Non Potable Reuse System

The final component of the efficiency plan is the construction of a non-potable irrigation system using consumable effluent from the groundwater supply, and applying it to several large irrigated parks and golf courses after advance treatment. This program is expected to reduce demands of the potable system by 635 AF when implemented

4.3 Demand Management Activities

In order to accomplish the goals of the water efficiency plan the City of Shallow Creek has undertaken specific activities aimed at ensuring that the water savings anticipated by the plan actually occur. The City has had a full time water conservation coordinator since 2003. The

position is currently held by Betty Bodean who was hired in 2005. In addition, the City hires seasonal labor and outside contractors such as the Center for Resource Conservation to help implement some efficiency program activities.

Table 8 presents the new and updated water efficiency activities selected for inclusion in this plan. Each measure is described in more detail in the sections below.

Table 9 shows the projected water savings by customer category along with all of the water efficiency activities that will impact demand in that category. This method of summarizing water savings ensures that no savings are double counted.

Figure 13 shows the percent of water efficiency savings by customer category as a pie chart.

Table 8: New and updated water efficiency activities

Water Efficiency Activities	Sectors Impacted	Implementation Period of New Activities
Foundational Activities		
Individualized, Informational Water Budget Program	All, indoor & outdoor	2013 - 2036
Enhanced Water Loss Control	Municipal	2012 - 2036
Targeted Technical Assistance and Incentives		
Expanded Multi-Family Toilet and Clothes Washer Rebates	Multi-family, indoor	2012 - 2036
Targeted Irrigation Audits and Landscape Efficiency Rebates	All, outdoor	2012 - 2036
Pre-Rinse Spay Valve Direct Installation	CII, indoor	2012 - 2036
Cooling Tower Efficiency Tune Ups	CII, indoor	2012 - 2036
Ordinances and Regulations		
Conservation Oriented Tap Fee Ordinance	CII, indoor & outdoor	2013 - 2036
All New Residential Development Must Meet EPA WaterSense New Home Specifications	SF & MF residential, indoor & outdoor	2014 - 2036
Water Efficient Landscape Ordinance	All, outdoor	2011 - 2036
Certification of Landscape Professionals	All, outdoor	2010 - 2036
Education Activities		
Public Information and Education	All	2010 - 2036
K-12 Education	SF & MF residential,	2010 - 2036

Table 9: Projected water savings by customer category

Sector	Water Efficiency Activities Impacting Sector	Projected Water Savings 2012 - 2036 (AF)
SF & MF Residential - Indoor	Individualized, Informational Water Budget Program	1130
	Expanded Multi-Family Toilet and Clothes Washer Rebates	
	All New Residential Development Must Meet EPA WaterSense New Home Specifications	
	Public Information and Education	
	K-12 Education	
SF & MF Residential - Outdoor	Individualized, Informational Water Budget Program	630
	Targeted Irrigation Audits and Landscape Efficiency Rebates	
	All New Residential Development Must Meet EPA WaterSense New Home Specifications	
	Water Efficient Landscape Ordinance	
	Certification of Landscape Professionals	
	Public Information and Education	
	K-12 Education	
CII Indoor & Outdoor & Dedicated Irrigation	Targeted Irrigation Audits and Landscape Efficiency Rebates	340
	Pre-Rinse Spay Valve Direct Installation	
	Cooling Tower Efficiency Tune Ups	
	Conservation Oriented Tap Fee Ordinance	
	Water Efficient Landscape Ordinance	
	Certification of Landscape Professionals	
	Public Information and Education	
Dedicated Irrigation	Water Reuse System	625
Total Projected Savings		**2,725**

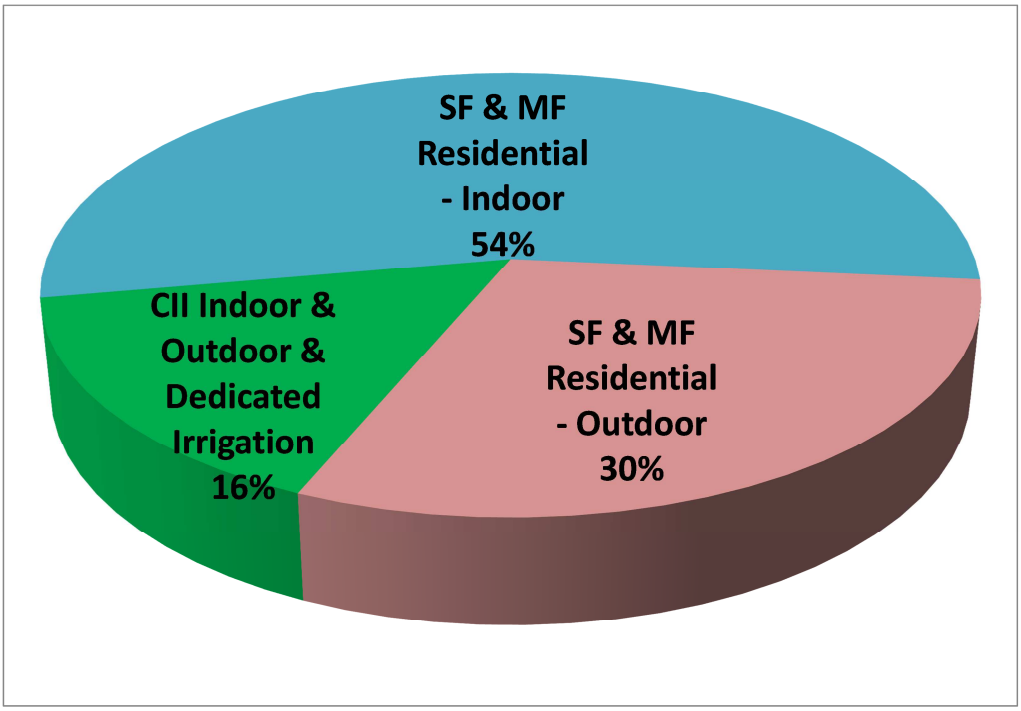

Figure 13: Projected water savings percent by customer category

4.3.1 Foundational Activities

Individualized, Informational Water Budget Program

Shallow Creek is fully metered, bills monthly, and has in place an inclining-block rate structure. The rate structure for single-family residential customers is shown in Table 10. This rate structure encourages conservation by sending a financial signal to customers who use large amounts of water. This rate structure, first implemented in 1999 has provided stable revenue to the City and sent an effective conservation price signal to customers in Shallow Creek. The rate structure remains essentially unchanged since first implemented, but the City has increased the cost of water within each block every 2 – 3 years to cover the increasing costs associated with operating the water system.

Table 10: Shallow Creek's Water Rate Structure (SF residential)

Rate Tier	Water Rate Per 1,000 gallons
Tier 1 – up to 6,000 gallons/month	$2.50
Tier 2 – from 6,001 – 12,000 gallons/month	$4.50
Tier 3 – over 12,000 gallons/month	$7.50
Fixed monthly service fee	$11.50/month
Fixed monthly wastewater fee (for 5/8" or ¾" meter)	$8.50

A new efficiency activity to be implemented in Shallow Creek starting in 2013 is individualized, informational water budgets that have been developed for each customer. This program will provide useful efficiency information on each customer's water bill that will inform them if the most recent month of usage was below or above an established efficiency benchmark. The Shallow Creek water budget program is informational only and is not tied in to the City's water rate structure at this time.

The water budget created for each customer includes two components: Indoor budget and Outdoor budget.

The **indoor** component of the water budget for each customer is calculated as the smaller of the average winter monthly consumption (AWMC) used by the customer (i.e. the average of monthly consumption over the months of December, January, and February from the previous year) or the number of persons dwelling in the home times 45 gpcd. The indoor water budget is re-calculated annually, and can be adjusted to accommodate more efficient technologies over time

The **outdoor** component of each customer's water budget is based on the landscape area at the property estimated from Shallow Creek GIS parcel level data and a spectrographic analysis of recent aerial photographs of the service area that help distinguish between pervious and impervious areas. Outdoor water budgets are provided only during the irrigation season from April – October. The monthly outdoor water budget is calculated for each customer using the following equation:

Water budget (gal) = Irrigated Area (sf) x 0.8 x Monthly Net ET (inches) x 0.623 (gal/inch/square foot)

As part of the informational water budget program, starting in January 2013 each customer's water bill will include a water budget usage comparison like the example shown in Figure 14. This example shows usage through the month of July. Monthly usage that is at or below the water budget is shown in green. When usage in a month exceeds the water budget is shown in red.

An informational message is also provided each month, based on the level of usage. If usage is at or below the water budget volume the message states: "Your water use last month was 12% below your budgeted amount. Thank you for using water efficiently." If usage is above the water budget volume, the message states: "Your water use last month was 30% above your budgeted volume. Please check for leaks and contact the City of Shallow Creek for more information on how to conserve water in your home and on your landscape."

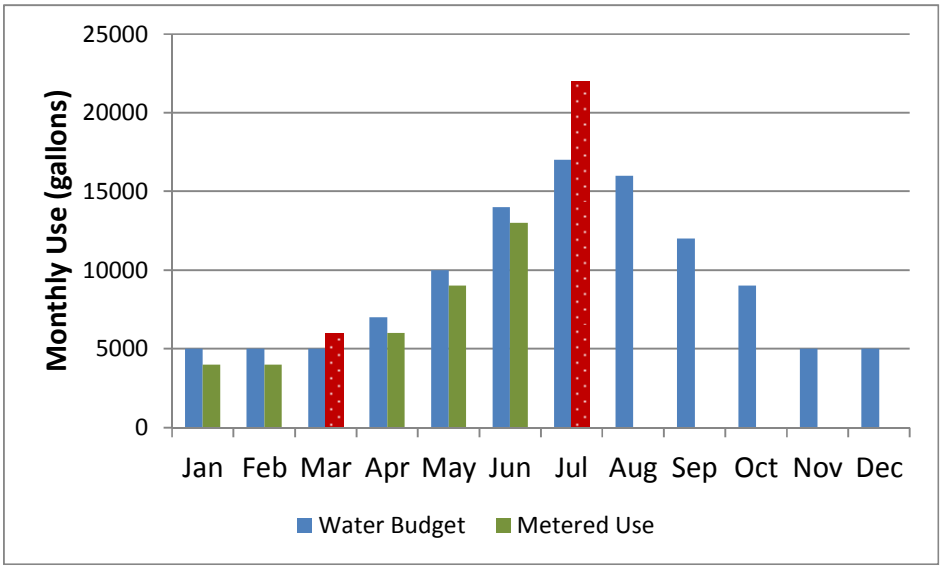

Figure 14: Sample informational water budget

There are no consequences for the customer who exceeds their water budget, but the City expects the informational component of the water budget to be a powerful motivator for water efficiency. The informational water budget program is the central feature of the City's water efficiency program and is expected to help spur efficiency in all customer classes. In addition, the City plans to use the water budgets to target water efficiency incentives at customers who regularly exceed their water budget.

The City plans to utilize social normalizing messaging to encourage water use reductions among customers who exceed their budget. For example, a customer who exceeds their water budget two months in a row will receive the following message on their water bill:

> *"You have exceeded your water budget allocation in each of the past two months. This could indicate a leak in your homes. The majority of water customers in Shallow Creek stay within their water budget every month. The City urges you to be as water efficient as possible. If you have any questions about your water use or your bill, please contact us. Thank you."*

As additional demand studies are completed, the informational water budget program will be expanded to all customers including multi-family residential and commercial customers. The goal is to develop and implement and informational water budget system for all Shallow Creek customers by January 1, 2013.

Enhanced Water Loss Control

Since 2009, the City has implemented an aggressive water loss control program that includes implementation of the AWWA Water Loss Audit methodology based on AWWA's *Water Audits*

and Loss Control Program: Manual of Water Supply Practices (M36). The City intends to expand and enhance water loss control efforts in the future.

Starting in 2012, Shallow Creek will expand its meter testing, repair, and replacement efforts to reduce apparent losses and improve meter accuracy. Starting in 2014 the City will launch a water main rehabilitation and replacement, and pressure management program that over the next 20 years will replace most water mains within the City limits. To help determine which mains to repair first, the City will rely on the age of the mains obtained from the asset management system combined with an acoustic water leak detection survey.

In 2011, real (physical) water loss in the City was estimated to be 7% (410 AF) - which is one of the lowest levels of water loss achieved in Shallow Creek over the past 20 years. The City is in the process of identifying pressure zones within the City where water pressures are higher than optimal. Reducing high pressures in these areas offer the opportunity to decrease water leakage on both the City and customer side of the meter. The proposed zones are prioritized with pressure in the oldest areas to be reduced first to maximize water savings. Reduced pressures decrease the possibility that new leaks will develop and lowers losses from existing leaks. Further water savings are achieved by reducing the flow from water use fixtures as they are used.

In 2036, at the end of the 25 year planning period discussed in this plan, the City hopes that physical water loss will remain close to the current level of 400 AF per year. This is an achievable, but challenging goal given the planned expansion to the City system.

4.3.2 Targeted Technical Assistance and Incentives

Expanded Multi-Family Toilet and Clothes Washer Rebates

Shallow Creek is relying on natural replacement of toilets and clothes washers to ensure that approximately 2% of the existing homes per year switch to WaterSense specifications over the planning period.

In order to enhance the replacement rate in low income properties, Shallow Creek has instituted a rebate program for toilet and clothes washer replacement focused on low-income households that might not ordinarily be able to afford a new efficient fixture or appliance. The program focuses on low-income households in order to reduce free-ridership. Shallow Creek plans to expand outreach for this program over the next 10 years to increase participation.

Outreach for the expanded program will include bill stuffers and brochures distributed income-qualified families. Cooperation with the Fiction County Department of Human Services helped both with targeting the ideal population as well as outreach.

The City will provide rebates of $100 per toilet and $250 per clothes washer for income-qualified families. Only toilets that meet EPA WaterSense standards are eligible for the rebate.

Clothes washers must be EnergySTAR rated with a water factor less than 4.0 to qualify for the rebate. All customers who receive a rebate also receive a free package of low-flow faucet aerators to install at the same time.

The City plans to provide up to 300 toilet rebates and 150 clothes washer rebates per year, but will update distribution targets annually based on response to the program.

Targeted Irrigation Audits and Landscape Efficiency Rebates

For customers who regularly exceed their monthly informational water budget, Shallow Creek encourages irrigation audits and also provides rebates to encourage implementation of audit recommendations for landscape efficiency.

Shallow Creek contracts landscape auditing services to the Center for Resource Conservation and provides CRC with a target list of customers who have exceeded their outdoor water budget in at least two of the past four months.

If the CRC auditor determines that the site could benefit from improvements to the irrigation system or landscape, information about the City's rebate program is provided to the customer. Landscape rebates are offered as a credit on future water bills. Landscape rebates are available to any customer pre-qualified by a CRC auditor and can be used to help pay for a variety of efficiency measures including: replacement of turf - particularly hard-to water turf strips, soil amendment, and mulch as well as for irrigation system hardware such as pressure-compensating spray heads, rain-shutoff devices, drip irrigation hardware and smart-controllers (provided they have onsite sensors). The maximum available rebate for any single property is $150.

The City plans to have CRC conduct up to 200 irrigation audits per year and expects to provide up to 150 landscape rebates per year.

Pre-Rinse Spay Valve Direct Installation

Starting in 2012, Shallow Creek will distribute and install 1.5 gallon per minute pre-rinse spray valves in all existing food service establishments in the City. A contractor hired by the City will visit every restaurant and food service establishment in the City over an 18 month period and will install a new 1.5 gpm pre-rinse spray valve (PRSV) at every site that does not already have one and that is willing to accept the free product. During this visit the contractor will check for leaks in faucets and toilets and notify the owners about needed repairs.

The City plans to install up to 100 PRSV's over the 18 month program.

Cooling Tower Efficiency Tune Ups

Shallow Creek offers free "tune-ups" for cooling towers. The City estimates there are approximately 30 commercial grade cooling towers installed in Shallow Creek. Upon request, contracted staff will conduct a detailed audit of a tower.

During the audit, the experienced contractor looks to verify that there is a meter on the makeup line, determines how make-up is currently being controlled, checks for leaks and/or basin overflow and determines the operating cycles of concentration and what (if any chemicals) are used in the system. If the measured cycles of concentration are lower than five, the auditor will present a benefit-cost analysis to the building manager. The benefit-cost analysis presents the potential financial savings for chemicals as well as water and wastewater from increasing cycles of concentration. The auditor will use an efficiency baseline of six cycles of concentration. Any cooling tower without an inflow water meter will be required to install one.

Based on Denver Water estimates, Shallow Creek plans for savings of water to be on the order of 50,000 to 1 million gallons saved for each cooling tower tuned up depending on the size of the system. The City plans to audit 2 to 3 towers each year over a 10 year period.

4.3.3 Ordinances and Regulations

Conservation Oriented Tap Fee Ordinance

The City plans to implement a conservation tap fee ordinance for all new construction starting in 2013. Under the new conservation tap fee ordinance, builders and developers can receive a reduced tap or connection fee by demonstrating reduced water demands at the site through a variety of water efficiency measures.

By tying tap fees in part to anticipated future demands, Shallow Creek encourages developers to install water conserving fixtures and landscapes during the construction phase. The tap fee program applies to all water customers, including non-residential customers. The informational water budget (described earlier) will be established at the same time the tap fee is set. This will allow for proposed water efficiency measures to be included in the water budget.

Shallow Creek's new tap fee structure is modeled on the system implemented in Westminster, CO and described in the *Best Practices Guidebook for Municipal Water Efficiency in Colorado* (2010). The tap fee for a proposed new building is calculated based on the expected service commitment, which is a measure of the size and anticipated water demand of the new property. Next, three charges are applied based on the service commitment. These three charges are: the water resource charge, the treated water investment charge, and the connection charge. The meter connection fee is based on the meter size selected for the property. The meter size is based on the anticipated peak demand of the building. The charges are shown in Table 11.

Table 11: Charge schedule for tap fee calculations

Fee	Charge Per Service Commitment Unit*
Water resources fee	$2,250
Treated water investment fee	$7,880
Meter connection fee	Based on meter size.
Fire connection fee	$161

*Each service commitment unit is equivalent to 150 kgal of annual water demand

Staff from the City of Shallow Creek plan to work with applicants who upon learning about their impending tap fee are expected to seek significant ways to reduce demands through efficient plumbing fixtures and water wise landscape design. By reducing expected demands the applicant can obtain a substantially lower tap fee from the City. Reduction of a single service commitment (150 kgal) results in a tap fee reduction of $10,291.

It is anticipated that this new tap fee structure will promote significant water efficiency as new developments are built in Shallow Creek. A copy of Shallow Creek's tap fee ordinance is provided in Appendix B.

All New Residential Development Must Meet EPA WaterSense New Home Specifications

Over a five year period from the adoption of the plan Shallow Creek shall require all new residential development (both single and multi-family) to meet EPA WaterSense New Home specifications. This measure will ensure that all new residential construction in Shallow Creek will be built with proven water efficiency measures built-in and will not require water efficiency interventions or retrofits for the foreseeable future.

The EPA WaterSense New Home specification includes the following mandatory criteria all of which are verified through an inspection process (paid for by the builder).

- **Leaks** – No detectable leaks from any fixtures, appliances, equipment.
- **Service Pressure** – Maximum of 60 psi. Pressure reducing valve may be necessary.
- **Hot Water Delivery System** – No more than 0.6 gallons of water shall be collected from a hot water fixture before hot water is delivered.
- **Toilets** – WaterSense labeled 1.28 gpf HETs.
- **Bathroom faucets** – WaterSense labeled 1.0 gpm aerators.
- **Kitchen sink faucets** – 2.2 gpm max flow (1992 EPAct standard)
- **Showerheads** – WaterSense labeled 2.0 gpm showerheads.
- **Dishwashers** – ENERGY STAR qualified
- **Clothes washers** – ENERGY STAR qualified with water factor less than or equal to 6.0 gallons per cycle per cubic foot of capacity
- **Evaporative cooling systems** – Maximum of 3.5 gallons per ton-hour of cooling. Blowdown based on time of operation. No once through/single pass systems.
- **Water softeners** – Self-regenerating water softeners shall meet NSF/ANSI 44 standard.

- **Drinking water treatment systems** – Must meet applicable NSF/ANSI standards.
- **Landscape** –Landscape must be designed with the *WaterSense Water Budget Tool.*

Water Efficient Landscape Ordinance

Starting in 2011, the City requires an approved landscape plan, soil amendments (4 cubic yards per 1,000 square feet of area), and an inspection for any new automatic irrigation system for all new non-residential landscapes. Automatic irrigation systems are not required. A landscape architect reviews landscape plans. An Official Development Plan Inspector inspects amended soil and reviews irrigation system audits, which must include an analysis of the application rates for all zones in inches per hour, and a schedule that ensures that the controller applies no more than the budget to the landscape. All new landscapes have a maximum 15 gallons per square foot landscape water requirement. A summary of the water efficient landscape ordinance is provided in Appendix C.

New residential construction (both single and multi-family) will cover this requirement through compliance with the WaterSense Specification.

Certification of Landscape Professionals

A 2010 City ordinance requires that the design and installation of any non-residential landscape in Shallow Creek be managed or supervised by certified professionals. Certification must be obtained from any one of the applicable programs listed in Table 12.

Table 12: Landscape professionals must be obtained from one of these organizations:

Certification Program	Sponsoring Organization
Licensed Landscape Architect	State of Colorado
Professional Land Care Network (PLANET)	Various programs
- Landscape Industry Certified Technician (formerly CLT)	Professional Land Care Network (PLANET) and Associated Landscape Contractors of Colorado (ALCC)
- Certified Landscape Professional (CLP)	Professional Land Care Network (PLANET)
- Certified Turfgrass Professional	Professional Land Care Network (PLANET)
Colorado Certified Nursery Professional (CCNP)	Colorado Nursery and Greenhouse Association (CNGA)
Certified Greenhouse Growers Program (CGG)	Colorado Nursery and Greenhouse Association (CNGA)
Certified Arborist	International Society of Arboriculture (ISARMC)
Board Certified Master Arborist	International Society of Arboriculture (ISARMC)
Irrigation Association	Various Programs
- Certified Irrigation Contractor (CIC)	Irrigation Association
- Certified Water Conservation Manager – Landscape (CWCM-L)	Irrigation Association
- Certified Irrigation Designer (CID)	Irrigation Association
- Certified Landscape Irrigation Auditor (CLIA)	Irrigation Association
- Certified Golf Irrigation Auditor	Irrigation Association
- Certified Agricultural Irrigation Specialist (CAIS)	Irrigation Association

4.3.4 Information and Education

A key component of Shallow Creek's water efficiency program is public education, information, and outreach. While these educational measures may not directly save water, Shallow creek believes these measures are the mortar that holds together all other program elements. Raising awareness about efficiency, conservation, and water use is fundamental to getting people to take the next step and doing something practical that saves water directly.

The City engages in the following information and education activities around water efficiency and conservation:

- Provides information to customers about ways to conserve water and avoid water waste through flyers and bi-monthly bill stuffers.
- Active member of Colorado Water Wise and the Alliance for Water Efficiency
- Maintains a library of conservation materials and information that are available upon request.
- Prepares regular press releases about water efficiency activities for the local media (newspaper and public radio)
- Education and informational materials address both indoor and outdoor water use.
- Information oriented water budget and customer usage feedback included on all water bills (discussed in a previous section) helps customers understand and contextualize their use.
- Utility web site with dedicated conservation information and links to:
    - Home Water Works (water efficiency for the home with online calculator)
    - Alliance for Water Efficiency (up to date information and clearinghouse of efficiency research and info)
    - Colorado Water Wise (information on efficiency in Colorado)

K-12 Education

Shallow Creek's education efforts extend annually into the local public schools and community college. The City provides Project WET educational curriculum to the Shallow Creek School District for their 4th grade focus on water and environmental science and for any K-12 teacher interested in adding a water education component to their syllabus.

The City offers regular field trip tours of the water and wastewater treatment plants for students and as part of the tour efficiency demonstration projects are featured. During these tours discussions of water conservation behaviors and water efficiency figure prominently.

The City also participates in an annual water festival sponsored by the Shallow Creek Community College every April.

5.0 IMPLEMENTATION AND MONITORING PLAN

5.1 Implementation Plan

Betty Bodean, Water Conservation Coordinator for the City, is chiefly responsible for implementation of this plan. Ms. Bodean has been successfully implementing the City's water conservation program for since 2005 and is one of Colorado's most experienced water conservation professionals. The City will continue to work to budget money and pursue CWCB water efficiency grants to further its water conservation goals.

The City has developed a phased implementation approach to the conservation plan and implementation began in 2010, but many key activities will be implemented in the 2012 – 2014 time frame. Starting in 2010 with required landscape contractor certification and the 2011 landscape ordinance, the City will implement a series of programs and ordinances designed to encourage water efficiency. The implementation schedule is shown in Table 13.

Table 13: Water efficiency activity implementation schedule

Water Efficiency Activities	Implementation Period of New Activities
Foundational Activities	
Individualized, Informational Water Budget Program	2013 - 2036
Enhanced Water Loss Control	2012 - 2036
Targeted Technical Assistance and Incentives	
Expanded Multi-Family Toilet and Clothes Washer Rebates	2012 - 2036
Targeted Irrigation Audits and Landscape Efficiency Rebates	2012 - 2036
Pre-Rinse Spay Valve Direct Installation	2012 - 2036
Cooling Tower Efficiency Tune Ups	2012 - 2036
Ordinances and Regulations	
Conservation Oriented Tap Fee Ordinance	2013 - 2036
All New Residential Development Must Meet EPA WaterSense New Home Specifications	2014 - 2036
Water Efficient Landscape Ordinance	2011 - 2036
Certification of Landscape Professionals	2010 - 2036
Education Activities	
Public Information and Education	2010 - 2036
K-12 Education	2010 - 2036

5.1.1 Revenue Stability

Revenue stability is an important concern for Shallow Creek as it moves forward with the water efficiency program. The City has developed a basic rate and revenue model that projects future

revenues from water sales, fixed charges, wastewater charges and other rate components. An analysis of future utility revenues under the demand projections established in this conservation plan is shown in Figure 15.

Under the analysis shown in Figure 15, water rates increase at 1% per year. The average cost of 1 kgal of water in Shallow Creek in 2012 will be: $3.50. In 2036, the average cost of 1 kgal of water is projected to be: $4.44. The average monthly fixed service charge for a customer in Shallow Creek in 2012 will be: $14.69. In 2036, the combined average of fixed service charges are projected to be: $23.49.

As shown in Figure 15, overall revenue from water sales and fixed charges will increase from 2012 to 2036. Shallow Creek has concluded that the rates customers will pay under the water efficiency plan will be substantially lower than they would be if the City were forced to purchase new surface water supplies at a cost of $20,000/AF or more.

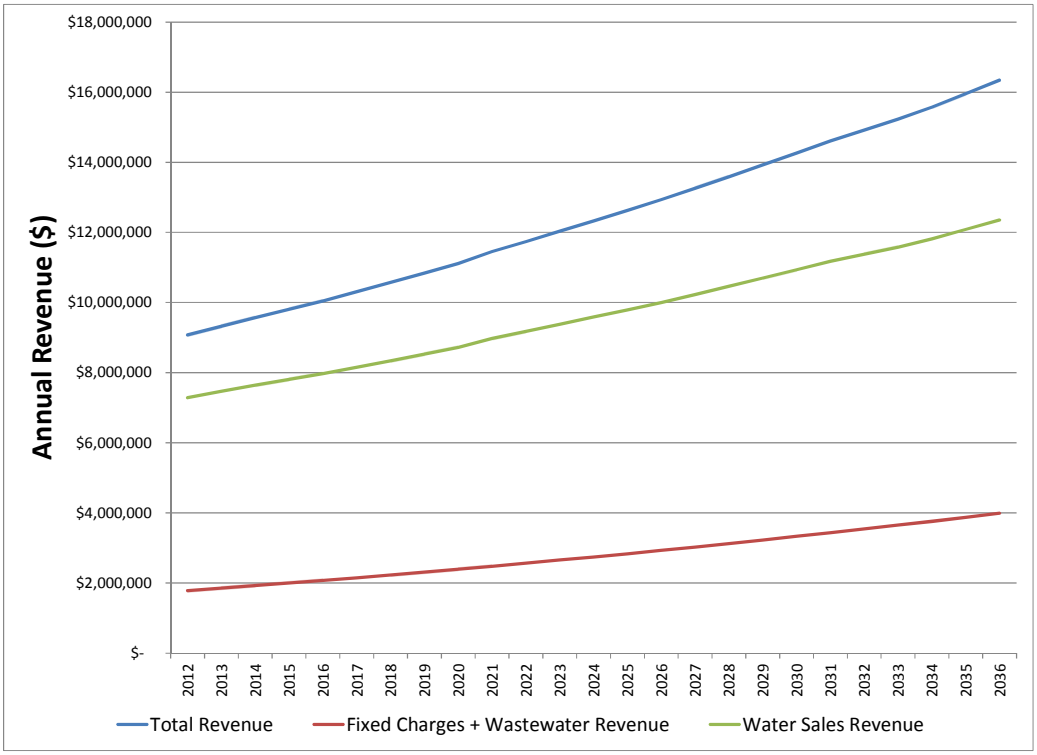

Figure 15: Shallow Creek water system revenue projection

5.2 Monitoring Plan

The City monitors water demands on a monthly basis. Conservation program impacts are evaluated annually. Ms. Bodean maintains an extensive data set of water use and summarizes and evaluates water demands on a regular basis. Since she will also be in charge of implementing the water conservation program and reviews all applications under the City's

conservation oriented tap fee rules, Ms. Bodean is in a perfect position to monitor Water Efficiency Plan implementation and to evaluate impacts on a regular basis.

The annual accounting summarizes total treated water production, the number of accounts in the system, metered deliveries, estimates of both production and customer meter adjustments and authorized un-metered uses. This allows an estimate of annual losses to be made. Efficiency parameters are derived by tracking the indoor household water use per residence for single and multi-family customers along with estimates of irrigation applications rates in the system compared to annual net ET. These annual reports will be available for tracking improvements to system efficiency and to compare to the goals of the Shallow Creek Integrated Supply, Operations, and Efficiency Model (SCISOEM).

A summary of the data to be collected for efficiency plan monitoring is presented in Table 14 which is based on Worksheet K from the Guidance Document. Additional information on the monitoring plan and the data that will be used to evaluate the water efficiency program can be found in Appendix A.

Table 14: Worksheet K – Selection of demand data for efficiency plan monitoring

Monitoring Data	HB 10-1051 Reporting Requirement			Selection		Entity/Staff Responsible for Data Collection and Evaluation	Schedule/Timing of Monitoring
	Annual	Monthly		Annual	Monthly		
Total Water Use							
Total treated water produced (metered at WTP discharge)				√		Betty Bodean	First quarter of the year.
Total treated water delivered (sum of customer meters)	√			√		Betty Bodean	First quarter of the year.
Raw non-potable deliveries				√		Betty Bodean	First quarter of the year.
Per capita water use							
Indoor and outdoor treated water deliveries				√		Betty Bodean	First quarter of the year.
Treated water peak day produced							
Raw water peak day produced/delivered							
Non-revenue water	√			√		Betty Bodean	First quarter of the year.
Water Use by Customer Type							
Treated water delivered		√			√	Betty Bodean	First quarter of the year.
Raw non-potable deliveries					√	Betty Bodean	First quarter of the year.
Residential per capita water use							
Per capita water use (other customer types besides residential)							
Indoor and outdoor treated water deliveries				√		Betty Bodean	First quarter of the year.
Large users							
Other Demand Related Data							
Irrigated landscape				√		Betty Bodean	First quarter of the year.
Precipitation							
Temperature							
Evapotranspiration				√		Betty Bodean	First quarter of the year.
Drought index information							
Economic conditions							
Population				√		Betty Bodean	First quarter of the year.
New taps				√		Betty Bodean	First quarter of the year.

Every year on a regular and on-going basis, Shallow Creek inputs new supply and demand data into the SCISOEM, to project water supplies under the most recent hydrologic, growth, and demand scenarios.

Objective and actual demand reductions achieved by each component of the plan will be quantitatively monitored and reported to management and the City's Water Resources Advisory Board at least once a year.

6.0 ADOPTION, PUBLIC REVIEW, AND APPROVAL OF WATER EFFICIENCY PLAN

6.1 Efficiency Plan Adoption

On February 20, 2012 the City of Shallow Creek Water Resources Advisory Board reviewed this Water Efficiency Plan and made comments, after which the public comment period began. Public comments ended on May 1, 2012.

6.2 Public Review Process

On March 1, 2012 the City of Shallow Creek Water Efficiency Plan was posted on the City website www.shallowcreekgov.com and hard copies were be made available to any interested members of the community at City Hall (1000 Creek Ave.) and the Water and Sewer Department at City Hall Annex (1100 Creek Ave.).

A total of four public comments were received during the 60 day comment period. To the extent possible, comments were addressed in the revised conservation plan.

Copies of public notice announcements, all public comments, and the official plan adoption resolution are provided in Appendix D.

6.3 Efficiency Plan Approval

6.3.1 Local Approval

Public comments and proposed changes were presented to the City of Shallow Creek Water Resources Advisory Board on May 7, 2012. The City of Shallow Creek Water Resources Advisory Board formally adopted the 2012 Water Efficiency Plan on May 7, 2012.

6.3.2 CWCB Approval

The City of Shallow Creek Water Efficiency Plan was submitted to the Colorado Water Conservation Board Office of Water Conservation and Drought Planning on May 9, 2012. On May 25, 2012 the City received official notification that the plan was approved by the CWCB.

6.4 Water Efficiency Plan Review and Update

The City plans to review and update this conservation plan every five years. The next update is scheduled to be completed in 2017.

APPENDIX A: WATER EFFICIENCY PROGAM MEASURE SCREENING WORKSHEETS

WORKSHEET D - IDENTIFICATION AND SCREENING OF FOUNDATIONAL ACTIVITIES									
		Identification		Qualitative Screening					
Demand Management Activities	State Statute Requirement	Existing/ Potential Activity	Targeted Sector	Feasible to Implement in Shallow Creek	Cost < $20,000/AF	Significant water savings expected	Notes on Additional Pros/Cons to Consider	Carry to Evaluation	Reason for Elimination
Metering (BP1)	V, VII								
Automatic Meter Reading Installation and Operations		P	All	YES	NO	NO		NO	COST
Submetering for Large Users (Indoor and Outdoor)		P	CII	YES	NO	NO	Impractical for retrofits.	NO	IMPRACTICAL
Meter Testing and Replacement		E					EXISTING PROGRAM		
Meter Upgrades		P	All	YES	NO	NO		NO	NOT ENOUGH WATER SAVINGS
Identify Unmetered/Unbilled Treated Water Uses		E					EXISTING PROGRAM		
Data Collection - Monitoring and Verification (BP2)									
Monthly Meter Reading		E					EXISTING PROGRAM		
Tracking Water Use by Customer Type		E					EXISTING PROGRAM		
Upgrade Billing System to Track Use by Sufficient Customer Types		E					EXISTING PROGRAM		
Tracking Water Use for Large Customers		E					EXISTING PROGRAM		
Irrigated Lands in Service Area		E					EXISTING PROGRAM		
Water Use Efficiency Oriented Rates and Tap Fees (BP1)	VII, VIII								
Volume Billing		E					EXISTING PROGRAM		
Water Rate Adjustments		E					EXISTING		

WORKSHEET D - IDENTIFICATION AND SCREENING OF FOUNDATIONAL ACTIVITIES									
		Identification		Qualitative Screening					
Demand Management Activities	State Statute Requirement	Existing/ Potential Activity	Targeted Sector	Feasible to Implement in Shallow Creek	Cost < $20,000/AF	Significant water savings expected	Notes on Additional Pros/Cons to Consider	Carry to Evaluation	Reason for Elimination
							PROGRAM		
Monthly Meter Reading		E					EXISTING PROGRAM		
Inclining/Tiered Rates		E					EXISTING PROGRAM		
Water Budgets		E					EXISTING PROGRAM		
Tap Fees with Water Use Efficiency Incentives		P	CII	YES	YES	YES		YES	
System Water Loss Management and Control (BP3)	V								
System Wide Water Audits		P	MUNI	YES	YES	YES		YES	
Control of Apparent Losses (with Metering)		E					EXISTING PROGRAM		
Leak Detection and Repair		E					EXISTING PROGRAM		
Water Line Replacement Program		E					EXISTING PROGRAM		
Planning (BP2)									
IRP		E					EXISTING PROGRAM		
Master Plans/Water Supply Plans		E					EXISTING PROGRAM		
Goal Setting and Monitoring		E					EXISTING PROGRAM		
Staff (BP4)									
Water Conservation Coordinator		E					EXISTING PROGRAM		

WORKSHEET E - TARGETED TECHNICAL ASSISTANCE AND INCENTIVES									
		Identification		Qualitative Screening					
Demand Management Activities	State Statute Requirement	Existing/ Potential Activity	Targeted Sector	Feasible to Implement in Shallow Creek	Cost < $20,000/AF	Significant water savings expected	Notes on Additional Pros/Cons to Consider	Carry to Evaluation	Reason for Elimination
Installation of Water Efficient Fixtures and Appliances									
Indoor Audits		P	Res., muni, CII	Y	N	??		N	Cost
Toilet Retrofits		P	Low income MF Res.	Y	Y	Y		Y	
Urinal Retrofits		P	Muni, CII	Y	N	Y		N	Cost
Showerhead Retrofits		P	Low income MF Res.	Y	Y	N		Y	
Faucet Retrofits		P	Res., muni, CII	Y	Y	Y		Y	
Water Efficient Washing Machines		P	Low income MF Res.	Y	Y	Y		Y	
Water Efficient Dishwashers		P	Res., muni, CII	Y	N	N		N	Cost/savings
Low Water Use Landscapes									
Drought Resistant Vegetation		P	All	Y	Y	Y		Y	
Removal of Phreatophytes		P	All	N	N	N		N	Cost/savings
Efficient Irrigation		P	All	Y	Y	Y		Y	
Irrigation Efficiency Evaluations/Outdoor Water Audits		P	All	Y	Y	Y		Y	
Outdoor Irrigation Controllers		P	All	Y	Y	??		Y	
Irrigation Scheduling/Timing		P	All	Y	Y	??		N	Low savings
Rain Sensors		P	All	Y	Y	Y		Y	
Residential Outdoor Meter Installations		E	All				EXISTING PROGRAM		
Xeriscape		P	All	Y	Y	Y		Y	
Irrigation Equipment Retrofits		P	All	Y	Y	??		Y	

WORKSHEET E - TARGETED TECHNICAL ASSISTANCE AND INCENTIVES									
		Identification		Qualitative Screening					
Demand Management Activities	State Statute Requirement	Existing/ Potential Activity	Targeted Sector	Feasible to Implement in Shallow Creek	Cost < $20,000/AF	Significant water savings expected	Notes on Additional Pros/Cons to Consider	Carry to Evaluation	Reason for Elimination
Efficient Swamp Cooler and Air Conditioning Use		P	All	N	??	??		N	Cost/savings
Xeriscape loan program		E	All	Y	Y	Y	EXISTING PROGRAM		
Water-Efficient Industrial and Commercial Water-Using Processes									
Specialized Nonresidential Surveys, Audits and Equipment Efficiency Improvements		E	CII				EXISTING PROGRAM		
Commercial Indoor Fixture and Appliance Rebates/Retrofits		P	CII	Y	??	Y		Y	
Cooling Equipment Efficiency		P	CII	Y	Y	Y		Y	
Restaurant equipment		P	CII	Y	Y	Y		Y	
Assistance with CII efficiency plans		E	CII				EXISTING PROGRAM		
Incentives									
Toilet Rebates		P	Low income MF Res.	Y	N	Y		Y	
Urinal Rebates		P	Res., muni, CII	Y	N	Y		N	Cost
Showerhead Rebates		P	Low income MF Res.	Y	Y	N		Y	
Faucet Rebates		P	Res., muni, CII	Y	Y	Y		Y	
Water Efficient Washing Machine Rebates		P	Low income MF Res.	Y	Y	Y		Y	
Water Efficient Dishwasher Rebates		P	Res., muni, CII	Y	N	N		N	Cost/savings
Irrigation Equipment Rebates		P	Res., muni, CII	Y	Y	Y		Y	
Landscape Water Budgets Information and Customer Feedback		P	Res., muni, CII	Y	Y	Y		Y	
Turf Replacement Programs/Xeriscape Incentives		P	Res., muni, CII	Y	Y	Y		Y	

WORKSHEET F - ORINANCES AND REGULATIONS									
		Identification		Qualitative Screening					
Demand Management Activities	State Statute Requirement	Existing/ Potential Activity	Targeted Sector	Feasible to Implement in Shallow Creek	Cost < $20,000/AF	Significant water savings expected	Notes on Additional Pros/Cons to Consider	Carry to Evaluation	Reason for Elimination
General Water Use Regulations									
Water Waste Ordinance (BP 5)		E					EXISTING PROGRAM		
Time of Day Watering Restriction		E					EXISTING PROGRAM		
Day of Week Watering Restriction		E					EXISTING PROGRAM		
Landscape Design/Installation Rules and Regulations									
Rules and Regulations for Landscape Design/Installation (BP 9)		P	All	Y	Y	Y		Y	
Landscaper Training and Certification (BP 8)		E	All	Y	Y	Y		Y	
Irrigation System Installer Training and Certification (BP 8)		E	All	Y	Y	Y		Y	
Soil Amendment Requirements (BP 9)		P	All	Y	Y	Y		Y	
Turf Restrictions (BP 9)		P	All	Y	Y	Y		Y	
Outdoor Water Audits/Irrigation Efficiency Regulations (BP 10)		P	All	Y	Y	Y		Y	
Outdoor Green Building Construction (BP 8,9)		P	All	Y	Y	Y		Y	
Indoor and Commercial Regulations									
High Efficiency Fixture and Appliance Replacement (BP 12)		P	All	Y	??	Y		Y	
Commercial Cooling and Process Water Requirements (BP 14)		P	CII	Y	Y	Y		Y	
Green Building Construction (BP 12)		P	All	Y	Y	Y		Y	
Indoor Plumbing Requirements (BP 12)		P	All	Y	Y	Y		Y	
City Facility Requirements (BP 12)		P	All	Y	Y	Y		Y	
Required Indoor Residential Audits (BP 13)		P	All	N	??	??		N	Cost/savings
Required Indoor Commercial Audits (BP 14)		P	CII	N	??	??		N	Cost/savings
Commercial Water Wise Use Regulations (Car Washes, Restaurants, etc.)		P	All	Y	??	Y		N	Cost

WORKSHEET G - EDUCATION ACTIVITIES									
		Identification		Qualitative Screening					
Demand Management Activities	State Statute Requirement	Existing/ Potential Activity	Targeted Sector	Feasible to Implement in Shallow Creek	Cost < $20,000/AF	Significant water savings expected	Notes on Additional Pros/Cons to Consider	Carry to Evaluation	Reason for Elimination
Customer Education (BP6)	VI								
Bill Stuffers		E					EXISTING PROGRAM		
Newsletter		P	ALL	N	N	N		N	Impractical
Newspaper Articles		E					EXISTING PROGRAM		
Mass Mailings		P	ALL	Y	N	N		N	Cost/savings
Web Pages		E					EXISTING PROGRAM		
Water Fairs		P	Res.	Y	N	N		N	Cost/savings
K-12 Teacher and Classroom Education Programs		E					EXISTING PROGRAM		
Message Development/Campaign		P	ALL	Y	N	N		N	Cost/savings
Interactive Websites		E					EXISTING PROGRAM		
Social Networking (i.e. Facebook)		P	ALL	N	N	N		N	Impractical
Customer Surveys		P	ALL	Y	N	N		N	Cost/savings
Focus Groups		P	ALL	Y	N	N		N	Cost/savings
Citizen Advisory Boards		E					EXISTING PROGRAM		
Informational Water Budgets		P	ALL	Y	Y	Y		Y	
Technical Assistance	VI								
Customer Water Use Workshops		P	ALL	Y	??	??		N	Uncertain savings potential
Landscape Design and Maintenance Workshops		P	ALL	Y	N	??		N	Uncertain savings potential
Xeriscape Demonstration Garden		E					EXISTING PROGRAM		
Water Conservation Expert Available		E					EXISTING PROGRAM		

WORKSHEET L - MONITORING PLAN

Water Efficiency Activities	Sector Impacted	Monitoring Data			Other Monitoring Data						
		Customer level demand data (monthly & annual)	Utility level demand data (monthly & annual)	# of Participants / Activities / Etc.	Description of Key Parameter(s) to Record	Annual costs	Lessons learned	Water saving estimates	Administration data	Relevant public feedback	Records of significant changes
Foundational Activities											
Tap Fees with Water Use Efficiency Incentives	CII	X	X	X	*# of taps sold under program, estimated water use without efficiency.*	X	X	X	X	X	X
System Wide Water Audits	MUNI		X		*Utility water loss (real & apparent)*	X	X	X	X	X	X
Informational Water Budgets	ALL	X	X	X	*Total water allotted through budgets, actual consumption.*	X	X	X	X	X	X
Meter Testing and Replacement	ALL	X	X	X	*# of meters tested, replaced, make, model, size*	X	X	X	X	X	X
Identify Unmetered/Unbilled Treated Water Uses	MUNI		X	X	*Estimated volume of unbilled water*	X	X		X	X	X
Volume Billing	ALL	X	X	X	*Total billed volume*	X	X		X	X	X
Water Rate Adjustments	ALL	X	X	X	*Total billed volume*	X	X	X	X	X	X
Monthly Meter Reading	ALL	X	X	X	*Total billed volume*	X	X		X	X	X
Inclining/Tiered Rates	ALL	X	X	X	*Total billed volume*	X	X	X	X	X	X
Control of Apparent Losses (with Metering)	MUNI	X	X	X	*Utility water loss (real & apparent)*	X	X	X	X	X	X
Leak Detection and Repair	MUNI		X	X	*# of repairs, estimated loss reduction*	X	X	X	X	X	X
Water Line Replacement Program	MUNI		X	X	*Length of pipe replaced*	X	X		X	X	X
IRP	MUNI		X		*Total produced & billed volume*	X	X		X	X	X
Master Plans/Water Supply Plans	MUNI		X		*Total produced & billed volume*	X	X		X	X	X
Goal Setting and Monitoring	MUNI		X		*Total billed volume*	X	X		X	X	X
Water Conservation Coordinator	ALL		X		*Staffing level*	X	X		X	X	X
Targeted Technical Assistance and Incentives											
Efficient Irrigation	ALL	X	X	X	*# of interventions, monthly & annual use*	X	X	X	X	X	X

WORKSHEET L - MONITORING PLAN

Water Efficiency Activities	Sector Impacted	Monitoring Data			Other Monitoring Data						
		Customer level demand data (monthly & annual)	Utility level demand data (monthly & annual)	# of Participants / Activities / Etc.	Description of Key Parameter(s) to Record	Annual costs	Lessons learned	Water saving estimates	Administration data	Relevant public feedback	Records of significant changes
Irrigation Efficiency Evaluations/Outdoor Water Audits	ALL	X	X	X	*# of interventions, monthly & annual use*	X	X	X	X	X	X
Commercial Indoor Fixture and Appliance Rebates/Retrofits	CII	X	X	X	*# of interventions, monthly & annual use*	X	X	X	X	X	X
Cooling Equipment Efficiency	CII	X	X	X	*# of interventions, monthly & annual use*	X	X	X	X	X	X
Restaurant equipment	ALL	X	X	X	*# of interventions, monthly & annual use*	X	X	X	X	X	X
Irrigation Equipment Rebates	ALL	X	X	X	*# of rebates, $ amount, monthly & annual use*	X	X	X	X	X	X
Landscape Water Budgets Information and Customer Feedback	ALL	X	X	X	*Total water allotted through budgets, actual consumption.*	X	X	X	X	X	X
Turf Replacement Programs/Xeriscape Incentives	ALL	X	X	X	*# of interventions, monthly & annual use*	X	X	X	X	X	X
Residential Outdoor Meter Installations	RES	X	X	X	*# of meters installed, monthly & annual use*	X	X	X	X	X	X
Specialized Nonresidential Surveys, Audits and Equipment Efficiency Improvements	CII	X	X	X	*# of interventions, monthly & annual use*	X	X	X	X	X	X
Assistance with CII efficiency plans	CII	X	X	X	*# of interventions, monthly & annual use*	X	X	X	X	X	X
Ordinances and Regulations											
Rules and Regulations for Landscape Design/Installation (BP 9)	ALL		X		*Take effect date*	X	X		X	X	X
Soil Amendment Requirements (BP 9)	ALL		X	X	*# of interventions, monthly & annual use*	X	X	X	X	X	X
Turf Restrictions (BP 9)	ALL		X	X	*# of interventions, monthly & annual use*	X	X	X	X	X	X

WORKSHEET L - MONITORING PLAN

Water Efficiency Activities	Sector Impacted	Monitoring Data			Other Monitoring Data						
		Customer level demand data (monthly & annual)	Utility level demand data (monthly & annual)	# of Participants / Activities / Etc.	Description of Key Parameter(s) to Record	Annual costs	Lessons learned	Water saving estimates	Administration data	Relevant public feedback	Records of significant changes
Outdoor Water Audits/Irrigation Efficiency Regulations (BP 10)	ALL	X	X	X	*# of interventions, monthly & annual use*	X	X	X	X	X	X
Outdoor Green Building Construction (BP 8,9)	ALL	X	X	X	*# of interventions, monthly & annual use*	X	X	X	X	X	X
High Efficiency Fixture and Appliance Replacement (BP 12)	ALL	X	X	X	*# of interventions, monthly & annual use*	X	X	X	X	X	X
Commercial Cooling and Process Water Requirements (BP 14)	CII	X	X	X	*# of interventions, monthly & annual use*	X	X	X	X	X	X
Green Building Construction (BP 12)	ALL	X	X	X	*# of interventions, monthly & annual use*	X	X	X	X	X	X
Indoor Plumbing Requirements (BP 12)	ALL	X	X	X	*# of interventions, monthly & annual use*	X	X	X	X	X	X
City Facility Requirements (BP 12)	MUNI		X	X	*# of facilities impacted, monthly & annual use*	X	X	X	X	X	X
Water Waste Ordinance (BP 5)	ALL		X		*# and type of citations*	X	X		X	X	X
Time of Day Watering Restriction	ALL		X		*Restriction specifics, effective dates, total billed volume*	X	X	X	X	X	X
Day of Week Watering Restriction	ALL		X		*Restriction specifics, effective dates, total billed volume*	X	X	X	X	X	X
Education Activities											
Informational Water Budgets	ALL	X	X	X	*Total water allotted through budgets, actual consumption.*	X	X	X	X	X	X
Bill Stuffers	ALL			X	*# and dates of stuffers*	X	X		X	X	X
Newspaper Articles	ALL			X	*# and dates of articles*	X	X		X	X	X
Web Pages	ALL			X	*URL, site visit statistics*	X	X		X	X	X
K-12 Teacher and Classroom Education Programs	RES			X	*# of classrooms and kids impacted*	X	X		X	X	X

WORKSHEET L - MONITORING PLAN

Water Efficiency Activities	Sector Impacted	Monitoring Data			Other Monitoring Data						
		Customer level demand data (monthly & annual)	Utility level demand data (monthly & annual)	# of Participants / Activities / Etc.	Description of Key Parameter(s) to Record	Annual costs	Lessons learned	Water saving estimates	Administration data	Relevant public feedback	Records of significant changes
Citizen Advisory Boards	ALL			X	*Dates of meetings, summary of efficiency topics*	X	X		X	X	X
Xeriscape Demonstration Garden	ALL			X	*Estimated # of visitors*	X	X		X	X	X
Water Conservation Expert Available	ALL			X	*# of customer contacts*	X	X		X	X	X

APPENDIX B: SHALLOW CREEK TAP FEE ORDINANCE

City of Shallow Creek Non-Residential Tap Fee Calculation Instructions

- Rather than basing non-residential tap fees on the size of the tap Shallow Creek has determined that a more equitable method would be to base the fee on the type, size and historical usage of similar businesses.
- A non-irrigation tap fee contains three components;
    1. The Water Resources Charge
    2. The Treated Water Investment Charge
    3. The Connection Charge
- The first step is to determine the business type.
- The size of the facility is then calculated based on the type of business. For example if the business is a motel the usage is based on the number of units while a restaurants usage is based on square footage.
- The size is then multiplied by the unit use per year.
- The sum (total usage per year) is then divided by 140.000, which is the amount of a base service commitment (SC).
- The result is the number of service commitments required which is then multiplied by the Water Resources Charge per SC. The product is the Water Resource Charge portion of the Tap Fee for the facility. The Water Resources charge is directly related to the cost of the City to purchase raw water rights to supply the required annual amount of water to the customer's tap.
- The customer requests a specific tap size based on fixture unit calculations. The building Division reviews the tap size based on the plumbing code and develops a final tap size.
- The Treated Water Investment Charge is based on the tap size and listed on the Tap Fee chart. The water tap size, and resulting maximum flow needs, directly impact the sizing of the City facilities and the Treated Water Investment portion of the tap fee recovers the related portion of that investment.
- Finally the connection charge is applied based on the size of the tap. The connection charge covers the actual costs to the City to calibrate and install the commercial water meter.
- The three portions of the fee are added to produce the total Tap Fee.

Irrigation Water

- Any lot with irrigated area over 40,000 square feet (SF) would require a separate irrigation tap.
- The irrigation portion of the Tap Fee is to be calculated for separate irrigation taps, and where irrigation is included in the domestic tap. *The fee is calculated by multiplying the irrigated area by the per square foot cost for both low and high water areas.*
- The tap fee for irrigation is based on water need. High water use areas (turf) are based on a need of 18 gallon per square foot per year. Low and medium water areas are based on a need of 9 gallons per square foot per year.

- Based on the flow needed for irrigation, the tap is sized and the connection charge is added to the square foot charge for the total irrigation tap fee. Irrigation taps should be sized based on actual pressure needs since there is very little tap fee impact from irrigation tap sizes.
- For lots under 40,000 square feet, the square foot charge is added to the potable tap fee and the tap is sized to include irrigation needs.

Sewer Tap Fee

- The sewer tap fee is calculated based on the water tap size. Metro sewer tap fees apply for the portion of Shallow Creek generally south of 92nd Ave. Shallow Creek sewer tap fees apply for areas generally north of 92nd Ave. Metro performs regional studies that determine the amount of wastewater produced based on water tap size installed, which is why the sewer tap fee is based on the water tap size.

City of Shallow Creek Tap Fee Ordinance

WATER TAP FEES AND CREDITS:

(A) FEE CALCULATION:

1. An applicant for a water tap shall pay the fees set forth hereinafter, the total of which shall be known as the Water Tap Fee, or those portions that are applicable to the type of tap required by this Chapter. The Water Tap Fee or portions thereof are due and payable upon issuance of the water tap utility permit unless earlier paid as provided in Section 8-7-2(C). The Water Tap Fee may consist of the following individual fees.

    a. Water resources fee, being the share of the cost to provide adequate raw water supply to be utilized by the tap;
    b. Treated water investment fee, being the share of the utility system related to treating and distributing water to be utilized by the tap;
    c. Meter connection fee, being the actual City cost for installation of a meter with electronic remote readout device, when applicable; inspection of the tap, service line and meter pit installation; meter testing, when applicable; account and billing activation and other administrative procedures;
    d. and, when applicable, a fire connection fee, being that charge associated with a tap providing fire protection.

2. Water taps, water tap lines, and meters for the same service shall normally be the same size. If otherwise approved and/or required by the City, the tap and meter may be of different sizes in which case the fee for the meter size shall be paid. Water taps cannot be issued prior to building and/or tap entitlement approval. Any exceptions must be approved by the City Manager, i.e., conversion from well to the City water system, pursuant to Section 8-7-15.

3. The base water tap fees are as follows*:

Water Resources Fee	$6,435.00
Treated Water Investment Fee	$7,880.00
Meter Connection Fee	This connection fee is based on installed meter size and assessed on a per meter basis. See connection fee chart below.
Fire Connection Fee	$161.00

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*On April 1st of each year, the Water Tap Fee and its individual components shall be automatically increased in accordance with the Consumer Price Index (CPI) for the previous calendar year as established for the Denver metropolitan area. The meter connection fee may also be adjusted separately at any time, when necessary, to reflect the full cost of said connection to the City

4. The connection fees based on meter size are as follows:

METER SIZE (INCHES)	CONNECTION CHARGE*
5/8"	$283
3/4"	$283
1"	$226
1-1/2"	$226
2"	$283
3"	$340
4"	$396
6"	$453
8"	$511

5. The water resources and treated water investment portions of the tap fee for City owned facilities may be implemented at rates below 100% at the direction of the City Manager or his designee.

(B) RESIDENTIAL WATER TAPS: The following regulations apply to residential water taps:

1. The Water Tap Fee is based on a standard 5/8"meter size (commonly called a 5/8" by 3/4" meter) and is assessed on a per-dwelling-unit basis. One single-family detached dwelling unit served by a standard 5/8" meter has an assumed average annual water usage of 140,000 gallons per year.

2. The ratio of the average annual water usage of each dwelling unit type to the water usage of a single-family detached unit establishes the service commitment factor (SC factor). The service commitment factors are listed in the following chart:

Residence Type	Single Family Detached	Mobile Home Space	Single Family Attached Unit	Multi-Family Unit	Attached Senior Housing Unit
SC factor	1.0	1.0	0.7	0.5	0.35

3. The residential tap fees shall be calculated by applying the respective SC factor to both the water resources fee and the treated water investment fee on a per unit basis plus the applicable meter connection fee, on a per meter basis, plus any applicable fire connection charge. If a tap and meter larger than the standard 5/8" meter is requested for any residential unit, the tap fees shall be calculated using the non-residential treated water investment calculation and SC factor in subsection (C)2 below.
4. No additional tap fees are required for landscaped areas on residential properties that are irrigated by the water tap for the individual unit or units. Tap fees for landscaped areas on or adjacent to residential properties, such as common areas, private parks and play areas, medians, and right-of-way strips, not irrigated by individual units shall be assessed as provided hereinafter under subsections (C) or (D).
5. Tap fees for clubhouses, swimming pools, and other common buildings or structures shall be assessed as provided hereinafter under subsections (C) or (D).

(C) NON-RESIDENTIAL WATER TAPS: The following regulations apply to non-residential water taps:

1. The City shall review and evaluate each applicant's requested water tap and meter size, and may adjust the requested tap and/or meter size if it determines the projected water usage will be greater than that requested.
2. Every meter size has a corresponding service commitment factor (SC factor) that is based upon multiples of a single-family detached dwelling unit's usage characteristics. The treated water investment fee portion of the tap fee shall be calculated by multiplying the treated water investment fee, in subsection (A)3 above, by the respective SC factor in the following table:

METER SIZE (INCHES)	Treated Water Investment SC Factor
5/8"	1.0
3/4"	1.5
1"	2.5
1-1/2"	5.0
2"	8.0
3"	17.5
4"	30.0
6"	62.5
8"	90

3. The water resource fee portion of the tap fee shall be calculated based upon the estimated annual consumption, business type, and tap size required using methods and estimates developed by the Public Works and Utilities Department to determine the appropriate water resources service commitment factor, which shall be multiplied by the water resources fee in subsection (A)3 above.
4. All non-residential developments that contain an irrigated area less than 40,000 square feet, which area is served by the water tap and meter for the building, shall pay the irrigation tap fees calculated pursuant to subsection (D)4 below, in addition to the Water Tap Fee for the building.

(D) IRRIGATION WATER TAPS: The following regulations apply to taps for irrigation:

1. Separate irrigation taps and meters shall be required for all residential developments other than a development whose land area consists entirely of single-family detached lots. A separate irrigation tap and meter is not required for non-residential developments having less than 40,000 square feet of irrigated area.
2. Irrigation tap fees are required based on the area and type of landscaping. Landscape types are defined as either standard or low-water as determined by the Community Development Department.
3. An irrigation water tap shall be used only for irrigation purposes. Each irrigation water tap shall be assigned a service address and billing account in the name of the property owner or manager.
4. The irrigation tap fee consists of the meter connection fee plus the following square footage fees based upon landscape type:
   A. $1.43 per square foot for standard landscaping requiring an annual application of more than ten (10) gallons of water per square foot;
   B. $0.72 per square foot for low water landscaping requiring an annual application of up to and including ten (10) gallons of water per square foot.

(E) FIRE PROTECTION:

1. For any water tap which is intended to also provide fire protection, the fire connection fee shall be included in the total water tap fee in the amount provided for in subsection (A) 4 of this Section.
2. For any size tap that is determined by the City Manager, or his designee, to provide solely fire protection, only the fire connection charge shall be collected. The applicant for a fire protection tap shall furnish all materials and labor as specified by the City, including any device required to detect any use of water for purposes other than fire protection.

(F) CONSTRUCTION WATER METERING: If any water is required for construction purposes, construction water meters must be installed, deposits collected as per Section 8-7-10, and water usage billed at commercial rates as per Section 8-7-7(D). It is prohibited to install any by-pass or jumper to provide water service without the installation of a water meter as per Section 8-7-12.

(G) PROVISION OF MATERIALS AND LABOR: For all water taps, the applicant shall furnish all labor and all materials as specified by the City except as provided by this paragraph. The City shall provide the applicant with a list of required materials and approved suppliers at the time of application. The City shall provide all 5/8" by 3/4" meters. All other meter sizes shall be provided by the applicant as specified by the City at applicant's sole cost and must be tested for accuracy by the City before installation. After payment of all required fees and charges, the City shall install all meters.

(H) TAP CREDITS:

1. Upon issuance of a tap permit for the first new service tap, a tap fee credit shall be given in an amount to be calculated by subtracting the cost of the current water resources fee and treated water investment fee of the original tap from the current value of the water resources fee and treated water investment fee of the first new service tap.
2. Treated water service commitment credits shall be calculated based on the tap size of the former tap. Water resource service commitment credits shall be calculated based on the most recent ten (10) year average annual water consumption through the former water tap.
3. The amount of credit shall be fixed at the issuance of the first new service tap and may be used for payment for additional service taps that are used on the same property.
4. When a credit is used for full or partial payment for a new water tap, all other applicable charges shall be assessed using the then current fee schedule in effect.
5. In no instance shall cash refunds be granted.
6. No credit shall be given for the meter connection fee or fire connection fee portions of the Water Tap Fee.
7. If any tap is installed and completed without receiving a utility permit and the proper inspection and approval by the city, no tap fee credit shall be given.

8. If a demolition or vacation of a unit results in an abandonment of an associated water tap as defined in Section 8-7-5, no tap fee credit shall be granted at the time a new tap permit is issued.

Any service commitments associated with water taps to serve buildings demolished in established urban renewal areas may be transferred as tap credits to an urban renewal authority or the City for use in approved redevelopment projects within that same urban renewal area.

APPENDIX C: SHALLOW CREEK WATER EFFICIENT LANDSCAPE ORDINANCE

City of Shallow Creek Landscape Regulations

The Shallow City Council adopted landscape regulations with provisions for design, installation and maintenance criteria which took effect in September 2004. The landscape regulations are intended to enhance property values and the living environment while improving air and water quality and reducing heat, dust, and noise. The efficient use of water resources is an important component of the landscape regulations as well and addresses water conservation through water wise landscaping, xeriscape and irrigation design. The regulations pertain to all landscaped areas and include:

- New development
- Redevelopment (with exceptions)
- Existing development requesting modification from previously approved plans
- Non-single family detached dwellings with no Official Development Plan or waiver
- Existing single family detached dwellings with no Official Development Plan or waiver

New landscape designs or modification of existing landscapes are subject to approval and must incorporate certain irrigation and landscape design elements. They include:

- The seven principles of xeriscape
- Identification of low, moderate, and high hydrozones on landscape and irrigation plans[3]
- Water budget not to exceed 24 inches (15 gallons) per square foot/year
- Transitioning of hydrozones
- Soil preparation to include rototilling and incorporation of soil amendment (4 cubic yards amendment per 1,000 square feet of landscape area). Soil analysis recommended.
- Mulching in all non-turf areas; organic mulch required in moderate and high hydrozones
- Plant selection and location must be appropriate for the hydrozone

Section XII of the Shallow Creek Landscape Regulations 2004 provides considerable detail of the design and construction of the irrigation plan and installation requirements. Although not part of the Official Development Plan, the irrigation plan must be submitted for review and approval at the same time. This section reiterates many of the basic irrigation design, installation, and operating recommendations and requirements necessary for efficient operation of an irrigation system as set forth by the Irrigation Association (IA 2002).

[3]Low hydrozones require no more than 3 gallons/SF/yr; moderate hydrozones require 10 gallons/SF/yr; high hydrozones require 18 gallons/SF/yr.

APPENDIX D: PUBLIC NOTICE ANNOUNCEMENT, PUBLIC COMMENTS, AND OFFICIAL PLAN ADOPTION RESOLUTION

Public Notice Announcement

The following Public Notice was published on February 28, 2012 in the Shallow Creek News and on the City of Shallow Creek website (www.shallowcreekgov.com)

WATER EFFICIENCY PLAN
Subject: City Council, Planning and Zoning

PUBLIC NOTICE OF WATER EFFICIENCY PLAN
CITY OF SHALLOW CREEK
PUBLIC COMMENT PERIOD: MARCH 1 – MAY 1, 2012
PUBLIC HEARING: SHALLOW CREEK WATER RESOURCES ADVISORY BOARD, MAY 7, 2012

Notice is hereby given that the City of Shallow Creek is updating its Water Efficiency Plan, pursuant to State Law. The City is seeking public comment over the next 60-days, and will conduct a Public Hearing on the Plan during the Water Resources Advisory Board Meeting on May 7, 2012. The Water Resources Advisory Board will be called to order at 7:30 p.m. in the Council Chambers at City Hall, 21 River Rock Road, Shallow Creek. Comments on the Water Efficiency Plan will be received during the time designated in the meeting's agenda.

The City's Water Efficiency Plan is designed to promote the efficient consumption of all water usage by residents, businesses, and local governments to more beneficially use our water resources, and insure a future adequate water supply. The Water Efficiency Plan is available for review by the public at City Hall and at the City Service Center, 21 River Rock Road, Shallow Creek, during regular business hours or a copy of the plan can be downloaded from the City's web site: www.shallowcreekgov.com.

All people wishing to comment on the Plan may submit their comments in writing or can present their comments in person at the May 7, 2012, Council meeting, or have written comments submitted to the City Clerk's Office at City Hall no later than 5:00 p.m. on Tuesday, May 7, 2012.

The point of contact for the Water Efficiency Plan is Betty Bodean Water Conservation Specialist, who can be reached at 720-555-5252.

Public Comments

A total of four (4) public comments on the Water Efficiency Plan were received. These comments are reprinted below along with responses prepared by City staff.

Comment #1: My neighbor received a $50 rebate from the City for the purchase of a new clothes washer two years ago. I see from the conservation plan that the City isn't going to be offering these rebates much in the future. Why not? I'm planning to buy a new washer next year and I was looking forward to a rebate.

Shallow Creek Staff Response: The City elected to discontinue the clothes washer rebate program based on a careful analysis of the costs and benefits of the program. It was determined that these rebates were not cost-effective for the City and do not make sense to continue in the future.

Comment #2: How much will my water bill go up as a result of this water efficiency plan?

Shallow Creek Staff Response: The City plans to increase water rates by 1% per year for the next 25 years to ensure enough revenue to keep the City's water system up and running. If your water use remains constant, you will see a 1% per year increase in your water bill. If you reduce water use, your bill will likely go down.

The City conducted an economic analysis as part of this plan which indicates that if the City did not implement this water efficiency plan it would need to spend more than $50 million to obtain new surface water supplies. The rate increases that would be required to pay for this new supply would be more than 10% per year and your water bill would certainly be much higher as a result.

Comment #3: I'm concerned about the water quality in Shallow Creek. If we use less water through the efficiency plan, will the quality of our water be degraded?

Shallow Creek Staff Response: The City of Shallow Creek is committed to providing water of the highest quality that meets or exceeds all State and Federal standards and requirements. The implementation of the Water Efficiency Plan is not expected to impact water quality at all. We will be using the same water treatment processes as always. You should be able to enjoy the same great quality water once this plan is in place.

Comment #4: This seems to be a very well-conceived plan that will save the City a lot of money (and water) over the next 25 years. I support this effort.

Shallow Creek Staff Response: Thank you. We agree completely.

Official Plan Adoption Resolution

WATER RESOURCES ADVISORY BOARD COMMUNICATION

Meeting Date: May 7, 2012

Subject: A RESOLUTION ADOPTING A WATER EFFICIENCY PLAN FOR THE CITY OF SHALLOW CREEK.

Prepared by: Betty Bodean
Reviewed by: Max Bend, Deputy City Manager
Approved by: Sally Stout
Presented by: Bethany Bathgate, Water Resources Manager

Disposition: Resolution was adopted by unanimous vote (7-0)

KEY CONSIDERATIONS:

- The City of Shallow Creek is responsible for providing water for the use of its current and future water customers.
- Water conservation is an integral component of the City's water supply. In addition, water use efficiency is important for the sustainable use of the State's water resources.
- Colorado Revised Statutes require that any public water utility requesting financial assistance from the Colorado Water Conservation Board or Colorado Water Resources and Power Development Authority adopt and implement a water conservation plan.
- This Resolution would update the City's Water Efficiency Plan from the Plan first adopted in 2007. The City intends to update the Water Conservation Plan, at least every seven years, as required by the Water Conservation Act of 2004.

The proposed Water Efficiency Plan:

- Guides the City's efforts to promote efficient water use by the City's water customers.
- Outlines current and planned Water Efficiency programs, and sets specific Water Efficiency goals that will be obtained by implementing these programs for Shallow Creek's water customers.
- Exceeds the State's requirements for Water Efficiency planning.

RECOMMENDATION:

Staff recommends approval of the resolution.