FINAL

South Swink Water Company

Water Conservation and Water Use Efficiency Plan

February 2015

Prepared in conjunction with the

Southeastern Colorado Water Conservancy District

With funding from

The US Bureau of Reclamation and the Colorado Water Conservation Board

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Appendices

Section 1 - Water Conservation Plan Overview

South Swink Water Company (hereafter "SSWC"), a private water company, supplies potable water to residential and commercial customers in an area of about 12 square miles south of Route 50 west of La Junta, Colorado (see Figure 1). SSWC is one of the project participants in the Arkansas Valley Conduit (AVC) being developed by the Southeastern Colorado Water Conservancy District (hereafter the "District"), as the local sponsor for the US Bureau of Reclamation. To comply with the requirements of developing the AVC, the District prepared and implemented a Regional Water Conservation Plan, addressing regional and local water conservation and water use efficiency issues relevant to the project partners located throughout the lower Arkansas River valley east of Pueblo.

As part of the implementation of the District's Regional Water Conservation Plan, grant funding was obtained from Reclamation and the State of Colorado (through the Colorado Water Conservation Board Water Efficiency Grant Fund) to, among other things, support preparation of local water conservation plans in accordance with the guidelines set forth by the State of Colorado[1]. SSWC sought District financial and technical support to prepare a local water conservation plan as part of its overall water utility planning programs.

The key areas of interest for SSWC relative to local water conservation planning and implementation include:

- Maintaining appropriate and effective water loss management programs
- Developing and using appropriate customer water rates that reflect the cost of service, including, but not limited to the cost for maintaining and upgrading infrastructure (e.g., water distribution pipe replacement, customer service line replacement, customer meter instrumentation, filter media disposal); and
- Preparing for the transition from production wells to the AVC provided project water in the future.

Each of these key areas of interest are further explained and explored within the body of the water conservation plan.

[1] Although the State of Colorado regulations (CRS 37-60-126) are not directly applicable to most of the AVC project partners, since most project partners do not have annual retail municipal and industrial water sales equal to or greater than 2,000 acre-feet, the technical requirements contained within the statute have been used to guide the development of all local water conservation plans supported by the District.

Section 2 - Summary of the Water Supply System

The water company was created in 1959 when four production wells were constructed to a depth of between 565 and 720 feet below ground surface (bgs). In 1970 and 1971, the wells were redrilled to improve production rates and yields. One well is used for emergency water supply only, such that only three of the wells are typically used for water supply on a daily basis.

The wells are plumbed to two separate water treatment plants, which are used to remove iron and chlorinate the water prior to distribution. Iron removal occurs as a result of anthracite filters. On a daily basis, and sometimes more than once a day depending in demand, the filters are backwashed and the backwash water is pumped to waste and discharges to local evaporation ponds. For this reason, filter backwash water, which is currently unmetered, is considered a net water loss (this is discussed further in the section that follows). The water produced by the wells is typically high in iron, total dissolved solids and radionuclides (mainly radium 226/228)[2].

Water that has been treated is delivered to the water customers via about 33 miles of buried distribution system pipe that is typically 2, 3 or 4-inch diameter PVC[3]. The distribution system consists of four pressure zones (see Figure 1), which operate in the range of 35 to 75 pounds per square inch (psi) pressure head depending on time of day, and current demand.

Water is metered at each of the wells using new electromagnetic meters and at the effluent of each of the water treatment plants using mechanical meters.

Summary of Water Use

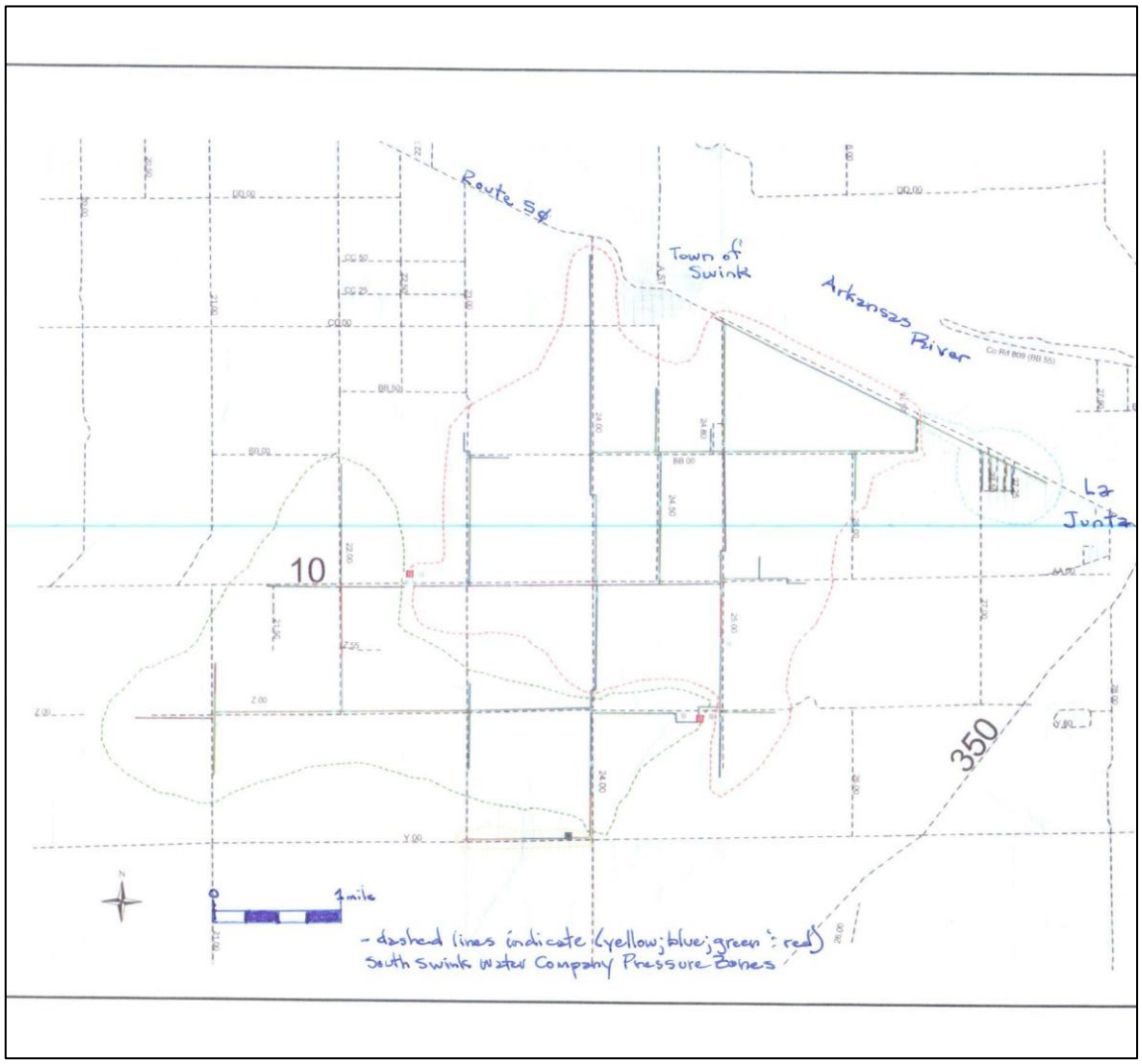
Trends in Population and Connections

SSWC maintains about 216 meters for its customers as summarized in Table 1. All meters are direct read, impeller mechanism measuring devices. The customers that rely on SSWC for potable water currently include 209 residential customers, six commercial customers, and one trailer park, which houses between 27 and 32 mobile homes.

[2] Wells with iron and elevated radionuclides create a sludge disposal issue since the radionuclides are precipitated and concentrated within the metal laden filter backwash. The elevated radionuclide concentrations in the backwash triggers requirements under the TENORM regulations that can include special handler's licensing as well as extreme costs for handling, transporting and ultimate disposal of waste sludge. For the participants on the South East Colorado Radionuclide List, which SSWC is included, a CDPHE consultant performed analyses and developed reports determining that the probable treatment option of choice would be metals oxidation and filtration and cation exchange with discharge to concrete lined basins containing sacrificial soils. This option was determined to be prohibitively costly. The CDPHE Radionuclides studies could not conclude what the costs and requirements would be for the final handling and disposal of the processed backwash waste sludge, as the regulations, which were developed in 2013, have not yet been fully enacted by the local water providers that have these kinds of waste impoundments. SSWC will benefit from the construction and operation of the Arkansas Valley Conduit (AVC) since it will be used to blend and/or eliminate the groundwater sources upon which the water company currently depends for all of its water supply.

[3] Approximately 4.6 miles of the distribution pipe is ABS which is the oldest pipe in the system. SSWC has been systematically replacing this pipe with comparable PVC pipe, as funds are available.

Figure 1 – Map of South Swink Water Company Service Area



The number of meters and customers that are served by SSWC has been fairly constant since 2000 – varying slightly throughout the years – with a total net of 1 new customer[4] added since the start of the century. Tracking the population served by SSWC is not as straightforward as tracking the number of connections and customers since private organizations such as SSWC do not have the authority to collect population data. In addition, SSWC does not have taxing authority, which would allow for tracking population served. The State Demographer publishes data for Otero County, indicating that between 2000 and 2008 the average household size was 2.49 persons. Using the 2010 population figure and number of connections as indicated in the EIS (Reclamation, 2012), the average household size in the South Swink service area was closer to 2.60. Using this figure, SSWC is estimated to serve about 620 persons in 2013, including the trailer park (which relates to 4 additional residential connections since

[4] This does not include customers with inactive meters that pay a base fee but no fee for water use.

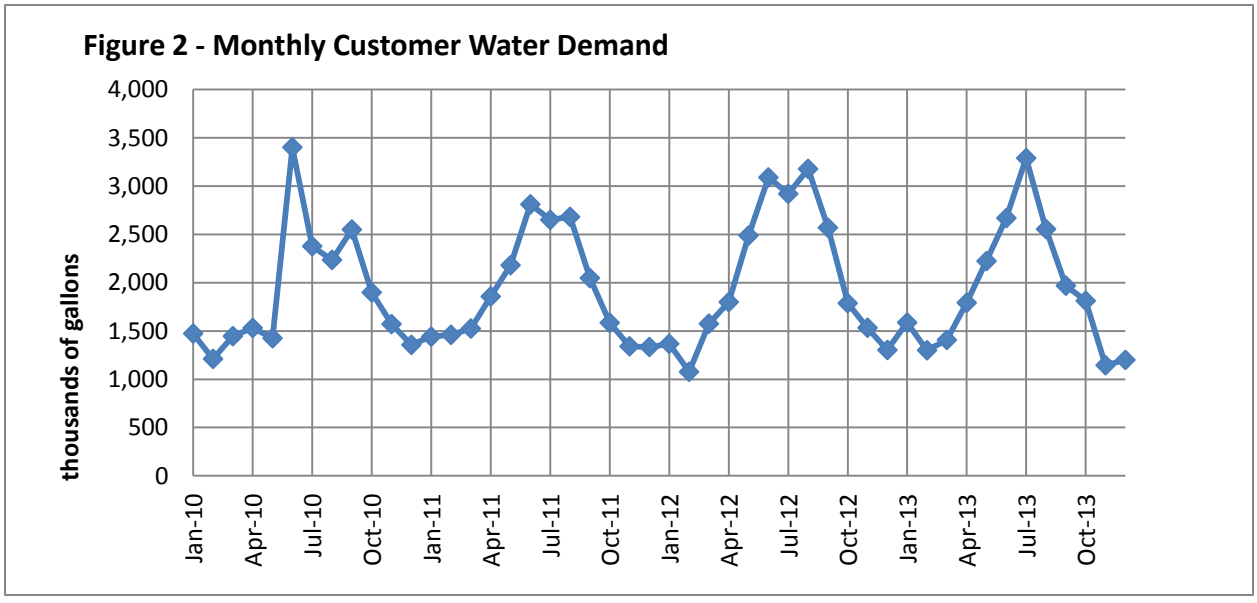
2010). This translates into an average per capita water use of about 117 gallons per person per day system wide[5].

Given that population served and number of connections have not changed substantially for the period of record, variations in annual well production and water sold (See Table 2) are not necessarily correlated to changing numbers of customers – but rather to other influences (e.g., weather, changes in real and apparent losses, leak events, passive savings, etc.).

Table 1
Summary of Meters

Customer Meters	Meter Size (inches)
215	5/8 x 3/4
1	1 1/4
Master Meters	
3 (wells)	2
2 (water treatment plants)	3

Monthly water demands over the past 4 years – from 2010 through 2013 – are presented in Figure 2. The data presented in this figure illustrates the seasonal nature of the customer water demand and the relative similarity of demand from year to year for South Swink. For example, wintertime use per connection from 2010 through 2013 averaged about 215 gallons per connection per day (for January through March), with a coefficient of variability (i.e., standard deviation over mean) of about 4%. The standard deviation could represent changes in indoor use due to passive savings, however for South Swink, per connection wintertime use was highest in 2011 and 2013, and lowest in 2012 over these four years. The indoor wintertime water use, as will be presented later in this report, was influenced by water use behaviors at the local trailer park, which had a master meter but no Submetering. Once submeters were installed on each mobile home, indoor water use fell substantially.



[5] Based on the average WTP effluent presented in Table 2 divided by the population served.

Trends in Water Production, Use and Water Loss

Table 2 summaries well production, water treatment plant (WTP) production and water sold since 2000, noting that well production was not

Table 2
Summary of Water Production and Water Use Including Non-Revenue Water

	Well Production[a] (1,000 gal)	WTP Effluent (1,000 gal)	Bulk Water Sales at WTP (1,000 gal)	WTP Losses[b] (1,000 gal)	% WTP Losses[c]	Water Sold (1,000 gal)	Non-Revenue Water After WTP[d]	Number of Connections	Per Connection Water use (gpd)
2000		26,405				21,536	18.4%	215	274.4
2001		26,270				21,287	19.0%	217	268.8
2002		29,651				25,254	14.8%	211	327.9
2003		27,398				22,354	18.4%	214	286.2
2004		28,499				23,266	18.4%	221	288.4
2005		27,152				23,619	13.0%	225	287.6
2006		26,026				22,116	15.0%	228	265.8
2007		24,866				21,326	14.2%	226	272.5
2008		27,606				22,971	16.8%	220	286.1
2009	27,940	25,954	400	1,586	5.7%	22,477	13.4%	217	269.3
2010	29,930	27,740	440	1,750	5.8%	22,478	19.0%	213	289.1
2011	28,990	26,660	540	1,790	6.2%	22,916	14.0%	213	294.8
2012	30,552	27,567	689	2,296	7.5%	24,687	10.4%	216	313.1
2013	29,019	26,531	503	1,985	6.8%	22,950	13.5%	216	291.1
average	29,286	27,023	514	1,881	6.4%	22,803	15.6%		286.8
standard deviation	893	1,150	100	243		1,117	3.0%		16.7

[a] well production was not fully metered until 2009.

[b] calculated as well production less WTP effluent. This value includes WTP backwash (~600,000 gallons per year), and other WTP losses (e.g., leaking cistern) (~1.2 million gallons per year).

[c] as a percent of well production

[d] as a percent of WTP effluent

fully metered until 2009. Today, all the wells are metered with electromagnetic (i.e., mag meters) meters which are accurate over a broad range of operating flows. The WTP effluent is also metered, however these meters are mechanical and are not as accurate at low flow as the mag meters on the wells.

Water loss in the SSWC water system is tracked in two distinct areas:

- From the production wells through the water treatment plant (WTP); and
- In the distribution system.

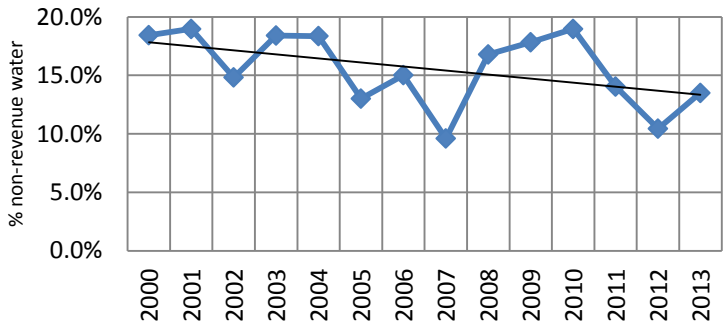
Losses in each of these areas are discussed below.

Based on the data since 2009, water losses through the two WTPs at SSWC averages about 6.4% per year (or about 1.88 million gallons). This loss includes the unmetered filter backwash flows, which are pumped to waste, and the other treatment plant related losses, which may be related to leaks in the cistern that holds the raw water before it is treated for distribution and/or meter inaccuracies, or some other loss.

Estimates of filter backwash flows (based on pump run cycles) are 600,000 gallons per year, on average. Therefore, about 1.2 million gallons (1.8 million less 0.6 million) of water is lost in the WTP process for an unknown reason. SSWC will look to include improved metering in its water conservation plan to characterize and ultimately manage this water loss, for some portion of this volume may be attributable to inaccurate effluent meters reading the amount of water leaving the two treatment facilities. If the water loss through the WTP is related to meter inaccuracy, current estimates of non-revenue water (discussed below) could be low by up to 3%.

Non-revenue water after water treatment is another characteristic of SSWC's water loss – water loss in the distribution system[6]. It is also presented in Table 2. Based on the data presented, non-revenue water appears to be on a steadily declining trend since 2000, averaging about 15.6% over the past 14 years of record. The downward trend (see Figure 3) may be in response to the meter replacement program that the water company has implemented over the past 14 years, reducing apparent losses in the system. It may also have been influenced by distribution pipe replacement efforts conducted by the water company. Non-revenue water over the past 3 years has averaged about 12.6%[7].

Figure 3 - Non-Revenue Water Post Water Treatment with Trendline



Note that after the three year period from 2008 to 2010 when several main line leaks occurred and were since repaired, non-revenue water has decreased; however in 2013 it began to increase again, presumably as a result of increased service line leaks. The service line leaks have since been determined to be related to a low grade brass nipple/sleeve at the joint between the service line and the meter on the utility side, which has suffered from corrosion. SSWC repaired 10 to 15 of these service line leaks in 2013 and has budgeted for 10 additional repairs in 2014 (at a cost of about $450 per home). Further

[6] Non-revenue water is a term that has been developed by the American Water Works Association (AWWA) to describe the water that a water company or utility produces by does not sell. The components of non-revenue water include real losses and apparent losses; as well as authorized unbilled uses (e.g., hydrant flushing, street cleaning). This report will use the term non-revenue water in place of the less accurate term unaccounted for water. Real losses relate to distribution and service line leaks (before the customer meter) and storage tank overflows; apparent losses relate to unauthorized consumption, inaccurate customer meters and systematic data handling errors (which can include labeling unmetered uses as losses).

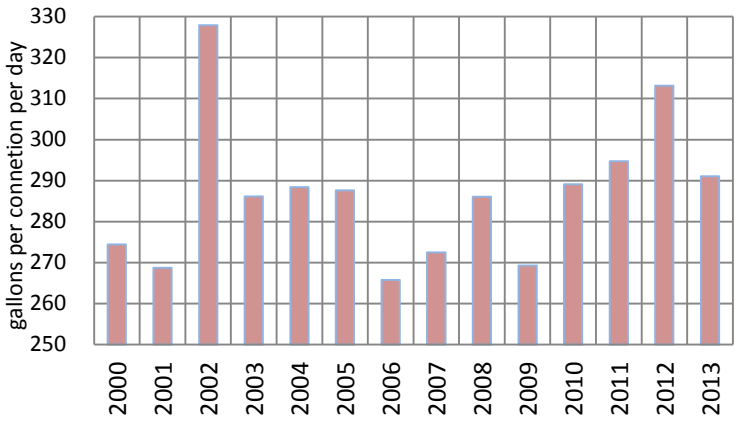
[7] Note that non-revenue water measured during the period 2008- 2010 included several main line leaks which presumably accounts for a substantial percentage of the estimated 16.8 to 19% non-revenue water in those years.

water conservation efforts will likely include additional repairs to these nipples/sleeves to reduce real losses in the distribution system.

Additional water loss management programs that SSWC may benefit from include improved metering of its four pressure zones to help isolate real leaks, improved use of technology (i.e., automated meter reading (AMR) devices), and continued[8] implementation of ABS distribution pipe replacement activities (since these pipe have been shown to be prone to leaks).

In spite of the reduced percentage of non-revenue water, per connection water use has not decreased in the past 3 to 5 years, and instead has increased (see Figure 4). Per connection water use was at its lowest during the four year period from 2006 through 2009, when it averaged about 274 gallons per day per connection annually (which translates to about 110 gallons per person per day for an average household of 2.49). Over the past four years per connection water use has increased on average by nearly 9% to 297 gallons per connection daily. This variation cannot be explained solely by outdoor water use, since evapotranspiration in the La Junta area varies annual, with both wet and dry years in the period from 2006 through 2013.

Figure 4 - Per Connection Water Use 2000 - 2013



Even with the severe drought conditions that have been present in the area over the last four years, wintertime water use per connection has been trending upward, which is counter to anticipated passive water savings[9]. Wintertime water use has varied from about 205 to 225 gallons per day per connection since 2010[10]. It is possible that wintertime water use has been influenced by water use at the trailer park, which accounts for between 10 and 15% of the water sold by SSWC. Apparently, the residents in this location have used running water 24/7 to eliminate the chance for frozen plumbing during periods of below freezing weather. In an effort to reduce water use at the trailer park, the owner in cooperation with SSWC installed individual meters on each mobile home in April 2013 and developed a billing system based on use. Water use in the trailer park has since been reduced by about 50%[11] including a reduction

[8] In 2012 and 2013, SSWC replaced 5,480 feet and 2,900 feet of ABS pipe, respectively, as part of its capital improvement program.

[9] Passive (or naturally-occurring) water conservation savings are defined as water savings that result from the impacts of plumbing codes, ordinances, and standards that improve the efficiency of water use. These conservation savings are called "passive" savings because water utilities do not actively fund or implement programs that produce these savings. In contrast, water conservation savings from utility-sponsored water conservation programs are referred to as "active" savings (SWSI I, Appendix E, (CDM, 2004)).

[10] SSWC's residential customers utilize potable water for various domestic purposes including watering of livestock, which vary from year to year, influencing summertime and wintertime use.

[11] Wintertime water use at the trailer park averaged over a quarter million gallons in January 2012 and 2013, (236,000 and 284,000, respectively); and was only 123,000 in January 2014.

of about 350,000 for the period January through March when comparing 2013 use (before sub-metering) to 2014 (after sub-metering). This represents a reduction of about 8% of the average water delivered by SSWC in the winter months of 2011 and 2012.

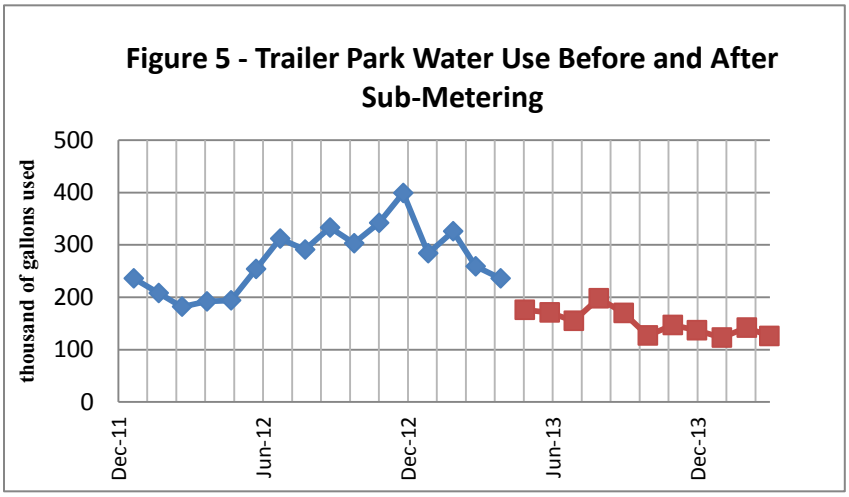
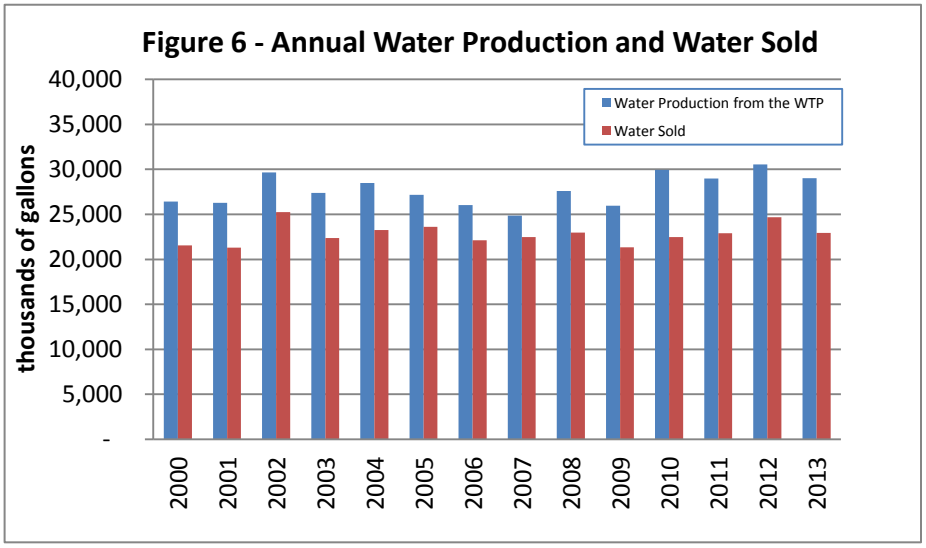


Figure 5 presents the change in water use at the trailer park before and after the sub-metering was implemented.

Figure 6 presents the water production from the water treatment plants (WTPs) and water sold since 2000. This figure illustrates the increase of water production and water sold from 2010 through 2013, related in part to the practices at the trailer park, as well as the impact of the drought in the area. An 8% decrease in water use at the trailer park would reduce average values for water production and water sold from 2010 through 2013 from 26.9 and 23.3 million gallons to 24.8 and 21.5 million gallons, respectively. These adjusted values, which take into account the effect of reduced water demand in the trailer park, would be among the lowest observed over the past 14 years. Future monitoring of water production and water sold will be used to characterize other features of customer water use.



Section 3 - Water Demand Forecast

The forecast for growth and a commensurate increase in water use demand for SSWC is not expected for the current planning period. In 2009, growth in Otero County was predicted to be about 0.72% per annum. Since 2000, SSWC has had an increase of 1 customer tap, or a growth of less than 0.5% in 14 years. For this reason, it is not expected that any additional growth, or demand, will occur within the SSWC service area over the planning period for this water conservation plan, which is 6 years (i.e., until 2020). This agrees with data presented in the AVC Environmental Impact Statement (EIS).

Even without growth, SSWC expects variability in future water demands to occur, due to changing water patterns, unforeseen leaks, variable customer demands, and other factors beyond the control of the water company. Assuming that the average water demand will maintain the positive impacts of past meter and distribution piping improvements (reducing non-revenue water), and that sub-metering will continue to be effective at the trailer park, water sold is estimated for an average year to be about 64.5 acre-feet (AF), and range up to about 69.3 AF for a dry year (which is expected during 1 out of every 10 years[12]). This translates to well production that will be 82.1 AF for an average year, ranging up to about 88.2 AF for a dry year.

Note that some passive savings are expected to occur as customers retrofit their homes and businesses with more efficient bathroom fixtures and kitchen and laundry appliances. Passive savings could account for 10.6 to 13 gallons per connection per day[13] of additional reduction in water sold by 2020 (GWI, 2010). This translates to a total reduction of well production of between 3.3 and 4.0 AF by 2020[14], adjusting the well production downward for an average year in the range of 78.5 AF and a dry year production in the range of 84.5 AF (versus the current average year of 90 AF). Table 3 summarizes these data.

Table 3
Estimates of Future Water Demand and Well Production in 2020

	Water Sold (AF)		Well Production (AF)	
	Average Year[a]	Dry Year[b]	Average Year[a]	Dry Year[b]
Without Passive Savings	64.5	69.3	82.1	88.2
With Passive Savings	61.4 to 62.0	66.2 to 66.8	78.1 to 78.9	84.2 to 84.9

[a] occurs about 5 out of every 10 years
[b] occurs about 1 out of every 10 years

Noteworthy is that, as previously mentioned, SSWC has a solid waste management issue related to the presence of radionuclides, and radium specifically, in its filter backwash water and related solids. Because of this, SSWC will be looking to blend or substantially replace its current groundwater supply with Fryingpan-Arkansas (Fry-Ark) Project Water.

[12] This calculation assumes that the past water sold and well production data is normally distributed and that the dry year occurrence for 1 out of 10 years (or greater than 90% chance of occurring) is 1.28 standard deviations greater than the normal, or average, year occurrence.
[13] Assuming 120 gallons per capita per day for SSWC based on population and demand presented in Appendix A of Reclamation's EIS for the AVC (2012) and current per connection water use rates reported in Table 2 of this Plan.
[14] Note that passive savings are not affected by seasonal variations in water use (or wet and dry years) since they relate solely to indoor water use efficiency.

Water conservation measures and programs that will be of the most benefit to SSWC during the planning period, aside from those listed above (which include those that will improve system wide water use efficiency in the treatment process and distribution system, until such time as the AVC is constructed and operated), appear to be those that may help to reduce peak day demands when the water treatment plant and well yields are most stressed. In addition, SSWC's customers will likely benefit from educational programs that help them to understand future water rate increases in response to increasing energy and material costs, infrastructure repairs and improvements, and for the development of the new (i.e., AVC related) water supplies. Alternative water rate structures may also benefit SSWC to help curtail summer time peak day usage.

Section 4 - Annual Operating Budget for SSWC

SSWC keeps an annual budget that includes tracking of both water sales revenue and expenses. During 2013, SSWC had revenues of about $140,000, related to water sales and other income. Expenses that are tracked by SSWC include accounts that are similar to all other water utilities and companies such as personnel expenses, treatment costs, capital improvements, repairs and maintenance, legal and professional fees, and other expenses. Based on 2013, SSWC expenses were partitioned approximately as shown in Table 4.

Table 4
Summary of SSWC Annual Expenses

Category	% of Expense
Salary and Personnel Expenses	37%
Energy and Treatment Costs	17%
Legal Fees and Professional Services	12%
Capital Improvement, Repairs and Maintenance	34%

SSWC is expected to operate in future years with similar revenue and expenses, assuming that the company is not going to make substantial changes to its current water rate structure, and current trends of its customer's water use and population served will continue.

However, revenue from water sales is going to be reduced by about 8% as a result of the sub-metering at the trailer park, which relates to a reduction of about $11,000 in revenue, as well as a reduction in operating costs of about $2,000 for chlorine and power. Given that personnel and salary costs, legal fees and professional services and most other expenses are fixed, the reduction in revenue associated with the trailer park will likely impact the funds available for capital projects and repairs by about $9,000 per year – making only about $33,000 available on average for water line repair and replacement, service line repair and replacement, and meter repair and replacement .

In future years, SSWC will focus its repair efforts on fuel and back hoe expenses, electronic and chlorinator parts, and service line leak repairs. In addition, SSWC will commit funds to capital improvements related to meter replacement and ABS pipeline replacement. Finally, SSWC will maintain its well and pump repair budgets. The budgets for these accounts will be made available based on revenue collected after fixed expenses are met.

One cost that is not explicitly contained within the annual budget is the cost for the proper disposal of spent filter media in accordance with the TENORM requirements of the State (see footnote 1). This expense[15], which occurs on a frequency of about one out of every 15 years, is expected to occur within the next few years – well within the planning period of this water conservation plan (i.e., 6 years). Future budgets will likely need to include costs related to planning for the disposal costs of the filter media.

[15] A recent bid indicated that the cost to sand blast and re-epoxy the filter housing, and dispose of the filter media in an appropriate manner is approximately $34,500.

Section 5 - Current Water Conservation Programs

SSWC has not had any formal water conservation programs in place related to customer education, appliance and fixture replacements, or landscaping controls or incentives. In general, water customers in the SSWC service area don't utilize water in wasteful practices due to their economic situation and their understanding of the value of water. The glaring exception to this has been the use of water by the trailer park residents that did not pay for misuse and waste. However, this condition has been remedied through the installation of submeters by the owner of the trailer park.

The focus of SSWC has therefore been to maintain a vigilant program of water loss control, focused on limiting apparent losses (related to customer meter reading inaccuracy) and water distribution system leaks (related to aging, and in some cases brittle, pipe). As a result of these efforts, average non-revenue water loss has decreased consistently over the past 14 years with the exception of losses due to leaks that occurred in 2010[16].

Based on these data (see Figure 2), average non-revenue water was about 17.8% from 2000 through 2004. Non-revenue water is averaging 12.6% since 2010, which is about a 30% improvement, representing on average an annual water use reduction of about 1.3 million gallons or about 4 acre-feet. This reduction, in addition to the customer water use reduction realized at the trailer park related to the installation of sub-meters, have reduced water use demand for SSWC by about 13% over the past 4 years.

Future water conservation programs that may be best for SSWC in the short to mid-term may involve continuing the current practices and improving in others, such that measurable conservation and water use efficiency is realized. Specific programs that SSWC may consider will include:

- Improved water treatment plant and bulk water sales efficiencies in part facilitated by metering those areas where water use is not currently metered (e.g., filter backwash, bulk water sales) or by replacing older mechanical meters (e.g., WTP effluent meters) that may be inaccurate. In addition, the water company may benefit from testing the cistern that holds and equalizes the raw water from the wells for leaks.
- Improved leak detection and repair through increased cash flow (developed through increasing water rates and fees), enhanced with submetering of the water company's four pressure zones and appropriately placed isolation valving.
- Improved monitoring and measuring of water production, delivery, and customer use, through improved metering and meter reading technologies.
- Evaluate alternative water rate pricing and pricing structures in response, in part, to falling water demand and therefore falling revenue, as well as the need to increase reserves to continue and

[16] Losses that occur as part of the water treatment plant are not included in these calculations. Filter backwash water which is pumped to waste is one treatment "loss" which has been reported to be consistent from year to year, and is a result of the water treatment process. It has been estimated that filter backwash is approximately 300,000 gallons of water per year for each of the two water treatment plants, for a total of 600,000 gallons per year. Another treatment system loss appears to relate to some unknown process. Improved metering and testing of the cistern for leaks are best management practices to consider to address characterizing the unknown water loss. Total treatment system losses including these two accounts are typically about 1.8 million gallons per year (which is about 6.4% of the total water pumped per year).

enhance current water conservation and water use efficiency programs and prepare for future costs related to the management and operation of the SSWC iron filtration system.

Another possible water conservation program may involve automating the filter backwash process such that this component of treatment could be performed off peak, improving efficiency during periods of high stress on the system since SSWC has no finished water storage[17]. A detailed assessment of candidate water conservation programs is provided later in this Plan.

Finally, SSWC may benefit from conducting an annual system wide water audit to review production and billing records and evaluate metering accuracy both at the treatment plant and at a representative group of customers. The audit could also be used to evaluate SSWC's billing and finance department practices that track and activate customer meters, integrate manual and radio read data sets, and track customer uses. It may also be of benefit to the SSWC to incorporate limited meter testing and calibration with an annual audit to help characterize apparent losses related to both master meters and customer meters.

Arkansas Valley Conduit (AVC)

In the long-term, SSWC will implement water conservation programs that will include regional cooperation with the Southeastern Colorado Water Conservancy District and the operation of the AVC. This project will supply SSWC with filtered Fry-Ark Project Water, making obsolete the current iron removal and filter backwash operations conducted by SSWC, since the Project Water will replace, or substantially replace, the groundwater production that current constitutes SSWC's water supply. In doing so, SSWC will eliminate the need for its treatment plant operations, and do away with the solid waste management issues and costs related to the handling of filter backwash liquids and solids. Until the time that the AVC begins to deliver Project Water, SSWC will continue to have losses related to its treatment processes[18]. After the AVC is constructed and operated, SSWC will have an immediate improvement in efficiency estimated to be between 2.8 and 6.4% of water produced, or between 2.5 and 5.8 AF.

[17] Finished water storage is more expensive than automating filter backwash cycles.

[18] The actual amount of filter backwash water that is generated and pumped to waste by SSWC on an annual basis can only be estimated at this time, since the backwash is not measured directly. Errors in the WTP effluent meter, which does not register low flows, currently identify the backwash volume to be over 6% of water production; however, it may be a little as half that amount based on system knowledge and backwash flow rates and run times. Future improvements to the WTP effluent metering are proposed as part of the water conservation planning effort.

Section 6 - Water Conservation Goals

Specific goals that SSWC will attempt to achieve during the 6-year plan implementation period, and beyond, related to conducting the selected conservation and efficiency programs will include:

- A reduction of peak day summertime demand by 5% (which varies over the summer, peaking at about 150,000 gallons per day in July). The 5% reduction in peak day demand translates into an estimated 150,000 gallons per year or about 0.5 AF per year[19].
- A reduction in raw water loss through the two water treatment plants by about 25% (or about 450,000 gallons per year or about 1.4 AF)[20].
- A reduction of real and apparent water losses by about 10% (which is about 1.3% of the water placed into distribution, or about 340,000 gallons per year, or about 1.0 AF per year).

Given that SSWC pumps about 90 AF of groundwater per year to treatment, the total reduction of pumped groundwater is expected to be in the range of 1.5 to 2.9 AF or about 1.7 to 3.2% of current production levels by the end of 2020.

It is important to note that the overarching goals of the SSWC relative to improved water use efficiency and water conservation relate to improved and more accurate data collection. Improved data collection will support more focused and accurate water loss management programs, better water rates and rate structures, and improve overall cash management for the water company.

Noteworthy is that in the long-term, the AVC conduit will be constructed providing Fry-Ark Project Water to various lower Arkansas River valley water providing entities, including SSWC. Once the AVC is constructed and operational, it will alleviate, or greatly reduce, the local iron treatment needs currently conducted by SSWC. When the AVC becomes operational in 12 to 15 years, SSWC will reduce or eliminate its current backwash operations, and may reduce its treatment requirements completely (with the exception of chlorination). The AVC therefore may reduce SSWC's raw water supply needs, on average, by an estimated 2.5 to 5.7 AF. This reduction coupled with the distribution system efficiencies that were listed above, SSWC may realize an improvement in total water use efficiency of between 4.2 to 8.9 AF, or about 5 to 10%, by 2030.

[19] Peak day demand reductions may not result in a one to one reduction of well production, but may instead reduce demand during the peak hours of the day, which will allow for a more sustainable production rates and reduce negative impacts on overall system pressures and wear and tear on the distribution system and appurtenances.
[20] Note that the raw water loss observed by SSWC may be an apparent loss related to inaccurate metering of the WTP effluent. Improved metering of the WTP effluent may resolve this loss, without reducing demand.

Section 7 - Identification and Evaluation of Water Conservation and Efficiency Measures and Programs

SSWC has a number of pressing issues that will influence the way in which the company chooses to plan for and implement water conservation and water use efficiency programs. These issues include:

- Water loss at the water treatment plant which may be addressed through:
    - More accurate flow metering into and out of the water treatment plant including the backwash flows
    - Automation of the filter backwash process
    - Leak assessment of the raw water cistern/cistern replacement
- Water loss control within the distribution system which may be addressed though:
    - Distribution pipe replacement and repairs
    - Utility side service line repairs at the meter connection
    - Construction of above ground tanks on the distribution system with level sensors
    - Annual system wide water audit
    - Submetering pressure zones and install isolation valves
- Water rate assessments and adjustments
- Customer metering improvements
- Implementation of the AVC Project
- Customer education

Preparing for and implementing these measures and programs will produce a benefit for the water company, but each has a cost which may or may not fit within SSWC's operational and financial constraints. The following sections will explore the relationship between the cost and the benefits for the candidate water conservation and efficiency, and make recommendations based on the needs of SSWC and its customers.

Identifying candidate water conservation and efficiency measures and programs has its roots in two key resource areas. First is the State of Colorado Revised Statute 37-60-126 (4)(a) which addresses water conservation planning for municipal water providers. Although this statute is not directly applicable to SSWC[21], it requires that "at a minimum, [planning entities should] consider the following," which is a list of water-saving measures and program types that may be used by a water provider for water conservation and improved water use efficiency. The second is the Southeastern District's Best Management Practices (BMP) Tool Box, which is a web-based water conservation planning tool that contains a wide variety of relevant information regarding best practices that water utilities can use to improve water use efficiency and support smart water use. The Tool Box contains categories of measures and programs that address the five different operational areas that all utilities conduct - system wide management, water production and treatment, water distribution, delivery of water to customers and customer demand management.

[21] See footnote 1.

Table 5 presents a discussion of how each of the State's required types of water conservation measures and programs was considered and incorporated into SSWC's further evaluation of candidate water conservation and water use efficiency programs. In general, the SSWC has determined that customer

Table 5
Review of State Required Measures and Programs for Consideration Under CRS 30-67-126 (4)(a)

Measure and Program for Consideration	Included	Factors for Consideration
Water efficient fixtures and appliances	No	Being performed organically by customers
Low water use landscapes	No	Limited outdoor irrigation use currently exists; summer demand driven by livestock use managed by need
Water-efficient industrial and commercial-using processes	No	Not applicable to customer base
Water reuse	No	Not currently possible given water supply (tributary groundwater)
Distribution system leak identification and repair	Yes	
Dissemination of information regarding water use efficiency	Yes	
Water rate structures and billing systems	Yes	SSWC conducted a water rate study in 2012. However, the organization needs to identify methods to make up for lost revenue (related to the sub-metering at the trailer park) and to create reserves for future expenses
Regulatory measures to encourage water conservation	No	Not consistent with needs of the community
Incentives to implement water conservation	No	Not applicable to customer base

demand management techniques are not particularly relevant to the issues that South Swink's customer base currently faces. Water use efficiency in this geography of the State is generally integrated into the culture. Outdoor water use is limited in most locations. Automated sprinkler systems are the exception rather than the rule. Residential outdoor use tends to be focused on small food gardens and livestock. Indoor use is limited to the typical water uses; albeit in older housing stock. Leaks inside may be higher than the national average, however passive savings are expected to help reduce indoor water use over time as a result of naturally occurring fixture and appliance upgrades and replacements.

For these reasons, SSWC like many other area water providers, are choosing to focus their limited resources on maintaining and upgrading the water system infrastructure – managing data collection, water loss, and revenue generation – over providing incentives and financial support for customer demand management. Note that a broader range of customer demand management programs such as those listed by the State for consideration under CRS 37-60-126 (4)(a) (see Appendix A) may become more applicable to the needs of SSWC and its customer base in the future. However, for the current planning period, there is limited utility of some of those measures and programs contained in Table 5, as noted.

Water conservation and/or efficiency measures and programs that SSWC may choose to implement have been identified using the template presented in the District's Tool Box, as indicated in Table 6.

Water conservation and/or efficiency measures and programs that SSWC chooses to implement will be selected based on effectiveness and affordability. In the short term (i.e., the next 1 to 2 years), SSWC will continue those measures and programs that it has been performing over the past few years, making selected enhancements to improve data collection and better plan for the future, including installing above ground tanks on the distribution system to reduce peak demand on the filter system and allow for better monitoring of leaks during off hour demand. In the mid-term (i.e., the next 2 to 5 years), the water company will enhance its current water conservation and efficiency programs leveraging both better and more accurate data collection, and local and regional funding mechanisms that may be available from other sources such as the Southeastern District and/or the State. In the long-term (i.e., greater than 5 years), SSWC plans to utilize project water supplied through the AVC to improve treatment-related water use efficiency in conjunction with other programs that are in keeping with improved metering and water loss management, water line replacements, and other process improvements that fit into the needs of the local customer base.

Table 6
Summary of Water Conservation and Efficiency Measures and Programs Under Consideration

System Wide Management	Process and Treatment	Distribution System	Customer Water Delivery	Customer Demand Management
Short-Term (1-2 years)				
Continue data management for water loss assessment; water utility management	Install mag meters on WTP effluent lines (4), one well (1), and on the Northeast pressure zone (2)	Continue water line repair and replacement	Continue meter repair and replacement	Initiate customer education
Initiate regular water audits (as part of District program)	Enter into Regional Working Group discussions with District and CDPHE on solid waste and residuals management	Consider above ground tanks with level sensors (as part of new tank design and construction project)	Continue service line repair and replacement	
Evaluate changes to water rates and customer billing structure				
Mid-Term (3 to 5 years)				
Continue data management for water loss assessment; water utility management	Complete installation of mag meters as needed	Continue water line repair and replacement	Continue meter repair and replacement	Continue customer education
Perform regular water audits in coordination with District Program	Automate backwash instrumentation		Continue service line repair and replacement	
Evaluate changes to water rates and customer billing structure	Implement relevant/applicable Working Group recommendations			
Long-Term (> 5 years)				
Continue data management for water loss assessment; water utility management	AVC construction and operation	Continue water line repair and replacement	Continue meter repair and replacement	Continue customer education
Perform regular water audits in coordination with District Program	Implement relevant/applicable Working Group recommendations		Continue service line repair and replacement	
Evaluate changes to water rates and structure			Install AMR on all customer meters	

Section 8 - Implementation Plan

Implementation Tasks

Based on the needs of the SSWC, its customers and its current level of funding, South Swink will implement the selected water conservation and water use efficiency programs, with the intention of achieving those water conservation goals listed in Section 6. Implementation will occur over a number of years as ongoing programs are continued and new programs are phased in. Funding levels are always a consideration, as operating expenses and water sales income change seasonally and from year to year. However, the programs that have been selected for implementation by SSWC are those that the Water Company believes are best for the organization in the short-term, mid-term and long-term; helping to improve processes, enhance business practices, and support customer needs.

The focus of the implementation plan is on the 1 to 2 year planning horizon, for during the short-term, it is possible to identify expenditures that can be used to implement those selected measures and programs without the substantial uncertainty that occurs over a 3 to 5 year horizon. To this point, the implementation plan provides a detailed accounting of planned expenditures for those programs selected for implementation in the short-term; and less detailed accounting of those that have been selected for implementation 3-years and further out.

Table 7 provides the details related to those programs that have been selected for short-term implementation.

Implementation of new programs will begin as soon as funding can be secured for the installation of the new mag meters to more accurately measure flow into and out of the water treatment facilities. Once the mag meters are in place, improved BMPs related to tracking and characterizing water loss will be initiated using the new, improved data. During the interim period, SSWC will continue its programs related to capital improvements associated with water line repair and replacement, service line repair and replacement, and meter repair and replacement.

It is anticipated that all water conservation and water efficiency programs selected for short-term implementation will occur by the end of 2016; with the possible exception of the water rate assessment, which may be postponed depending on funding availability[22]. Programs related to the implementation of improved processes such as tracking water use and water loss, enhanced customer education, conducting tank level monitoring assessments, etc. will be conducted as appropriate during the normal course of business once the proper infrastructure is in place. Once initiated, these practices will be conducted on a regular and consistent basis into the future.

Note that a group of selected programs incorporate collaboration with the District. The District role in the implementation of water conservation and water use efficiency at SSWC is important insomuch as the District can provide technical and financial resources that are vital to the efforts being conducted

[22] Funding availability will be influenced by water sales revenue, capital expenses related to changing (i.e., increasing) power and chemical costs, unexpected expenses that may occur related to leak repair, and outcomes of the work group related to regulatory compliance requirements.

Table 7
Summary of Selected Water Conservation and Water Use Efficiency Measures and Programs for Short-Term Implementation

Selected Measure/Program	BMP Category(ies)	Key Attributes	Description	Estimated Cost
Install Magnetic Meters on one (1) well discharge line; on four (4) water treatment plant discharge lines	Process and Treatment	Supports better water loss accounting and management; supports better assessment of water loss in treatment system	Installation of these meters will allow for more accurate reading of water production and water placed into distribution since existing mechanical meters lack accuracy at low flows. Includes two 2-inch and three 3-inch meters.	$ 12,000 (match for SSWC is $3,000)
Install Magnetic Meters on the northeast distribution line (two (2))	Distribution System	Supports better water loss accounting and management	Installation of these meters will allow for tracking distribution flows to this dead-end section of pipe with the SSWC largest users. Use of the existing valve vault eliminates the need for a new meter vault; however current valving has two valves in the valve box, ultimately supporting the need for two meters. One meter may work in the short-term. Includes two 2-inch meters.	$ 4,000 (match for SSWC is $1,000)
Continue Best Management Practice (BMP) related to data collection and management in support of water loss management	System Wide Management	Supports more accurate characterization of water loss through both water treatment and distribution to customers	Coupling BMPs developed as part of past system wide water audits (see Appendix B) will be used to develop more rigorous accounting of non-revenue water, authorized unbilled water, and estimates of real and apparent water loss in accordance with AWWA standards (i.e., M-36)	n/c
Conduct regular system wide water audits	System Wide Management	Supports more accurate characterization of water loss through both water treatment and distribution to customers	Utilize resources provided by the District on a regular basis to check and evaluate ongoing BMP implemented by South Swink	n/c
Continue water line repair and placement projects	Distribution System/Customer Water Delivery	Supports reduced water loss through installation of improved distribution piping and new valves and appurtenances	Utilizes resources which are budgeted and expensed annually to replace existing under-performing ABS distribution pipe that has historically leaked at junctions and/or split under varying pressure conditions	$ 24,000/yr
Continue meter repair and replacement	Customer Water Delivery	Supports improved accuracy of tracking customer water use which improves organization water sales revenues and reduces water loss	Utilizes resources which are budgeted and expensed annually to replace existing under-performing customer meters which can under-read actual water use, thereby creating paper losses (i.e., apparent losses)	$ 1,000/yr
Continue service line repair and replacement	Distribution System/Customer Water Delivery	Supports reduced water loss through installation of improved service line/metering couplings	Utilizes resources which are budgeted and expensed annually to replace low grade brass nipple/sleeve at the joint between the service line and the meter that has lost integrity due to corrosion	$ 3,500/yr
Enter into discussions with Regional Working Group on Solid and Waste Residuals Management	System Wide Management/Process and Treatment	Supports improved business operations by clarifying regulatory unknowns and connecting future AVC water supplies with improved water use efficiency	Working group to be facilitated by the District to help establish means for consistent application of solid waste and residuals management regulations; while accounting for the future benefits of the AVC, the local economic conditions, and the number of locally impacted water providers (both private and municipal)	n/c

Table 7 (continued)
Summary of Selected Water Conservation and Water Use Efficiency Measures and Programs for Short-Term Implementation

Selected Measure/Program	BMP Category(ies)	Key Attributes	Description	Estimated Cost
Evaluate changes to water rates and structure	System Wide Management	Supports improving revenue generation to support more aggressive leak detection and water loss management through capital projects, improved metering; and enhanced BMPs	Supports evaluations required to develop working capital and reserved needed to support future infrastructure investments related to the AVC and activities requisite to future compliance with solid waste and residuals management regulations	$ 15,000 (one time cost that can be supported with reserves and/or grant)
Consider installation of level sensors tied to SCADA in new above ground storage tanks	System Wide Management/Process and Treatment	Supports improved leak detection BMP and water loss management	Involves developing specification for tank level sensors, including SCADA, and creating a BMP that tracks tank levels during off peak hours to characterize water use and water loss	$ 4,000
Initiate Customer Education and Awareness Efforts	Customer Demand Management	Supports reducing customer demand through focused educational efforts	Utilize District materials and printing of materials to be included in once every 3 month mailings to customers (monthly billings performed using postcards; whereas every 3rd month is envelop with public notice on water quality	n/c

locally by SSWC. One clear example is the Working Group proposed by the District to help support conversations between the regulated community (e.g., SSWC) and the regulators (i.e., CDPHE). Without the efforts of the District, it is not clear how the State would implement consistent regulation of water treatment generated solid waste and residuals in the lower Arkansas River Valley. It is incumbent on all the stakeholders to support the dialogue and work toward credible and fiscally responsible solutions; however, the District plays a vital role in supporting the dialogue and working to facilitate solutions.

The District will also fulfill an important role in providing SSWC with printed educational materials that address some of SSWC customer's needs regarding landscape planting and irrigation management, as well as indoor leak detection and repair. Similarly, the District will provide resources to support regular system wide water audits to SSWC as a means to help review, and if applicable, improve the water loss tracking efforts that SSWC will be conducting in the future. Having the District support the audits helps to bring a level of consistency to SSWC (and all other project partners) as well as an unbiased independent check of the data collection and review processes that SSWC has developed.

In the years that follow the short-term implementation activities, SSWC will continue to conduct the BMPs to the extent that they make business sense, and will consider funding other mid-term and long-term BMPs listed in Table 6 – especially the one associated with automation of the treatment system backwash (which would be programmed to occur during off peak hours/off peak days in the summer)[23].

Other long-term water conservation and water use efficiency measures and programs that have been identified for consideration in Table 6 will be evaluated and characterized further for implementation based on the outcome of the short-term and mid-term implementation efforts.

Plan Monitoring and Assessment

Many of the measures and programs that have been selected for implementation have imbedded within them data collection and evaluation BMPs that constitute plan monitoring and assessment practices. For example, the goal related to reductions in raw water loss through the water treatment plant will be characterized and monitored through the analysis of flow/volume readings obtained concurrently from the proposed mag meters placed before and after the water treatment plants. The goal associated with reductions in system wide water loss will be assessed through the deliberate use of the AWWA M-36 water accounting methodology described in Appendix B. A summary of the data collection and assessment that will occur to monitor and assess the benefits of the various selected measures and programs is presented in Table 8.

It is once again worth noting that the District supported regular system wide audits will help to focus and refine the data collection activities presented in Table 8 for SSWC. The audit will be crafted to not only review those data that have been collected since the development of this plan and/or since the last audit was conducted, to assist SSWC in interpreting and reacting to the information collected. In addition, the audit will be used by SSWC to make modifications to its BMPs such that the data it collects can be better utilized for its intended purposes.

[23] This water use efficiency program/activity would directly address one of the Water Company's goals (reducing peak day use); it is estimated to be a about $10,000 which includes installing controllers on each of 10 valves at both treatment plants, as a cost of about $400 per valve plus installation costs.

Table 8
Summary of Monitoring and Assessment Data Collection

Type of Data	Timing			Uses		
	Hourly	Daily	Monthly	Production Water Loss	Distribution System Water Loss Metrics[1]	System Wide Water Use Metrics[2]
Production Data from Wells		X	X	X		
Water to Distribution		X	X	X	X	X
Distribution Submetering (i.e., Northeast Distribution Line)			X		X	
Metered Customer Water Use			X		X	X
Unmetered Customer Water Use (bulk water sales, construction water, etc.)			X		X	
Estimates of Other Authorized or Known Uses (e.g., losses due to leaks, line flushing, etc.)			X		X	
Tank Level Data (off peak hours, 3 to 4 hours once per month)	X				X	
Number of Leaks Found/Repaired			X		X	

[1] Includes: (all are monthly) water to distribution, water sold, non-revenue water, authorized unbilled consumption, estimated apparent losses, estimated current monthly water loss and unavoidable monthly water loss (see Appendix B)

[2] Includes: (all are monthly) water sold per connection, water sold per residential connection, water sold per commercial connection, number of connections, highest water use connections (top 5)

Updating the Plan

The SSWC Water Conservation Plan will be reviewed and updated informally throughout the planning period (i.e., until the end of 2020). SSWC may choose to formally update the plan whenever it is valuable to the organization dependant on financial needs, and/or substantial changes to its current operating conditions. At the very least, SSWC will update the plan in 7 years, or by the end of 2021.

Plan Public Review and Comment

The SSWC Water Conservation Plan has undergone public review in accordance with the requirements of the State regulations for a period of 60 days – from November 14, 2014 to January 12, 2015. A notice of the public review was printed in the Rocky Ford Daily Gazette and the La Junta Tribune (see Appendix C). A copy of the draft SSWC was made available to the public at South Swink's offices. No public comments were received during the period indicated.

Appendix A

Colorado Revised Statute 37-60-126

C.R.S. 37-60-126

COLORADO REVISED STATUTES

*** This document reflects changes current through all laws passed at the First Regular Session
of the Sixty-Ninth General Assembly of the State of Colorado (2013) ***

TITLE 37. WATER AND IRRIGATION
WATER CONSERVATION BOARD AND COMPACTS
ARTICLE 60.COLORADO WATER CONSERVATION BOARD
PART 1. GENERAL PROVISIONS

C.R.S. 37-60-126 (2013)

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

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

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

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

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

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

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

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

(g) "Water conservation" means water use efficiency, wise water use, water transmission and distribution system efficiency, and supply substitution. The objective of water

conservation is a long-term increase in the productive use of water supply in order to satisfy water supply needs without compromising desired water services.

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

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

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

(b) The office shall review previously submitted conservation plans to evaluate their consistency with the provisions of this section and the guidelines established pursuant to paragraph (a) of subsection (7) of this section.

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

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

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

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

(I) Water-efficient fixtures and appliances, including toilets, urinals, clothes washers, showerheads, and faucet aerators;

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

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

(IV) Water reuse systems;

(V) Distribution system leak identification and repair;

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

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

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

(VIII) Regulatory measures designed to encourage water conservation;

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

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

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

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

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

(4.5) (a) On an annual basis starting no later than June 30, 2014, covered entities shall report water use and conservation data, to be used for statewide water supply planning, following board guidelines pursuant to paragraph (b) of this subsection (4.5), to the board by the end of the second quarter of each year for the previous calendar year.

(b) No later than February 1, 2012, the board shall adopt guidelines regarding the reporting of water use and conservation data by covered entities and shall provide a report to the senate agriculture and natural resources committee and the house of representatives agriculture, livestock, and natural resources committee, or their successor committees, regarding the guidelines. These guidelines shall:

(I) Be adopted pursuant to the board's public participation process and shall include outreach to stakeholders from water providers with geographic and demographic diversity, nongovernmental organizations, and water conservation professionals; and

(II) Include clear descriptions of: Categories of customers, uses, and measurements; how guidelines will be implemented; and how data will be reported to the board.

(c) (I) No later than February 1, 2019, the board shall report to the senate agriculture and natural resources committee and the house of representatives agriculture, livestock, and natural resources committee, or their successor committees, on the guidelines and data collected by the board under the guidelines.

(II) This paragraph (c) is repealed, effective July 1, 2020.

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

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

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

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

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

(9) (a) Neither the board nor the Colorado water resources and power development authority shall release grant or loan proceeds to a covered entity unless the covered entity provides a

copy of the water conservation plan adopted pursuant to this section; except that the board or the authority may release the grant or loan proceeds notwithstanding a covered entity's failure to comply with the reporting requirements of subsection (4.5) of this section or if the board or the authority, as applicable, determines that an unforseen emergency exists in relation to the covered entity's loan application, in which case the board or the authority, as applicable, may impose a grant or loan surcharge upon the covered entity that may be rebated or reduced if the covered entity submits and adopts a plan in compliance with this section in a timely manner as determined by the board or the authority, as applicable.

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

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

(10) Repealed.

(11) (a) Any section of a restrictive covenant or of the declaration, bylaws, or rules and regulations of a common interest community, all as defined in section 38-33.3-103, C.R.S., that prohibits or limits xeriscape, prohibits or limits the installation or use of drought-tolerant vegetative landscapes, or requires cultivated vegetation to consist wholly or partially of turf grass is hereby declared contrary to public policy and, on that basis, is unenforceable. This paragraph (a) does not prohibit common interest communities from adopting and enforcing design or aesthetic guidelines or rules that require drought-tolerant vegetative landscapes or regulate the type, number, and placement of drought-tolerant plantings and hardscapes that may be installed on the unit owner's property or property for which the unit owner is responsible.

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

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

(A) An architect's stamp;

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

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

(D) The adoption of a landscaping change fee.

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

(II.5) "Turf" means a covering of mowed vegetation, usually turf grass, growing intimately with an upper soil stratum of intermingled roots and stems.

(III) "Turf grass" means continuous plant coverage consisting of nonnative grasses or grasses that have not been hybridized for arid conditions which, when regularly mowed, form a dense growth of leaf blades and roots.

(IV) "Xeriscape" means the application of the principles of landscape planning and design, soil analysis and improvement, appropriate plant selection, limitation of turf area, use of mulches, irrigation efficiency, and appropriate maintenance that results in water use efficiency and water-saving practices.

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

(I) No enforcement action shall require that a unit owner water in violation of water use restrictions declared by the jurisdiction in which the common interest community is located, in which case the unit owner shall water his or her landscaping appropriately but not in excess of any watering restrictions imposed by the water provider for the common interest community;

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

(III) In any enforcement action in which the existing turf grass is dead or dormant due to insufficient watering, the unit owner shall be allowed a reasonable and practical opportunity, as defined by the association's executive board, with consideration of applicable local growing seasons or practical limitations, to reseed and revive turf grass before being required to replace it with new sod.

(d) This subsection (11) does not supersede any subdivision regulation of a county, city and county, or other municipality.

(12) (a) (I) There is hereby created the water efficiency grant program for purposes of providing state funding to aid in the planning and implementation of water conservation plans developed in accordance with the requirements of this section and to promote the benefits of water efficiency. The board is authorized to distribute grants to covered entities,

other state or local governmental entities, and agencies in accordance with its guidelines from the moneys transferred to and appropriated from the water efficiency grant program cash fund, which is hereby created in the state treasury.

(II) Moneys in the water efficiency grant program cash fund are hereby continuously appropriated to the board for the purposes of this subsection (12) and shall be available for use until the programs and projects financed using the grants have been completed.

(III) For each fiscal year beginning on or after July 1, 2010, the general assembly shall appropriate from the fund to the board up to five hundred thousand dollars annually for the purpose of providing grants to covered entities, other state and local governmental entities, and agencies in accordance with this subsection (12). Commencing July 1, 2008, the general assembly shall also appropriate from the fund to the board fifty thousand dollars each fiscal year to cover the costs associated with the administration of the grant program and the requirements of section 37-60-124. Moneys appropriated pursuant to this subparagraph (III) shall remain available until expended or until June 30, 2020, whichever occurs first.

(IV) Any moneys remaining in the fund on June 30, 2020, shall be transferred to the severance tax operational fund described in section 39-29-109 (2) (b), C.R.S.

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

(c) This subsection (12) is repealed, effective July 1, 2020.

HISTORY: Source: L. 91: Entire section added, p. 2023, § 4, effective June 4.L. 99: (10) repealed, p. 25, § 3, effective March 5.L. 2003: (4)(g) amended and (11) added, p. 1368, § 4, effective April 25.L. 2004: Entire section amended, p. 1779, § 3, effective August 4.L. 2005: (11) amended, p. 1372, § 1, effective June 6; (1), (2)(b), and (7) amended and (12) added, p. 1481, § 1, effective June 7.L. 2007: (1)(a), (2)(a), (5), (7), and (12) amended, p. 1890, § 1, effective June 1.L. 2008: IP(4) amended, p. 1575, § 30, effective May 29; (12)(a) amended, p. 1873, § 14, effective June 2.L. 2009: (12)(a) amended, (HB 09-1017), ch. 297, p. 1593, § 1, effective May 21; (9)(a) amended, (SB 09-106), ch. 386, p. 2091, § 3, effective July 1.L. 2010: (4)(a)(I) and (9)(a) amended and (4.5) added, (HB 10-1051), ch. 378, p. 1772, § 1, effective June 7; (12)(a)(III), (12)(a)(IV), and (12)(c) amended, (SB 10-025), ch. 379, p. 1774, § 1, effective June 7.L. 2013: (11)(a), (11)(b)(III), IP(11)(c), (11)(c)(I), and (11)(c)(III) amended and (11)(b)(II.5) and (11)(d) added, (SB 13-183), ch. 187, p. 756, § 1, effective May 10; (6) and (12)(a)(IV) amended, (SB 13-181), ch. 209, p. 873, § 24, effective May 13.

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

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

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

Appendix B

Best Management Practice Water Loss Calculation Example

Appendix B
Best Management Practice for Estimating and Tracking Water Losses
South Swink Water Company

		in thousands of gallons													
		2014												Annual	
		Jan	Feb	Mar	April	May	June	July	August	September	October	November	December	Total	Comment
Production															
At Wells		1,853	1,781	1,784	2,256	2,525	3,376	2,672	2,077	2,048	1,794	1,362	1,707	25,235	Input well readings
Treated Water Produced		1,784	1,681	1,676	2,117	2,358	3,157	2,510	1,938	1,910	1,708	1,309	1,660	23,808	Calculate sum of four meters measuring water to distribution
	2-inch meter FM	174	168	212	185	202	238	203	173	167	144	119	127		Input meter readings
	3-inch meter FM	726	658	600	854	1,005	1,362	1,060	791	790	699	518	691		Input meter readings
	3-inch meter FV	884	855	864	1,078	1,151	1,557	1,247	974	953	865	672	842		Input meter readings
		1,784	1,681	1,676	2,117	2,358	3,157	2,510	1,938	1,910	1,708	1,309	1,660		Check on Row 7
Customer Delivery															
Water Sold		1,368	1,222	1,291	1,818	2,084	2,600	2,408	1,929	1,904	1,654	1,173	1,277	20,728	Input total water sold
Non Revenue Water		485	559	493	438	441	776	264	148	144	140	189	430	4,507	Calculate Non-Revenue Water (Treated Water Produced less Water Sold)
														18.9%	Percent Non-Revenue Water
Authorized Unbilled Consumption		58	53	59	96	98	106	96	96	89	52	53	66	922	Sum Authorized Unbilled Consumption
treatment filter backwash		36	36	36	72	72	72	72	72	72	36	36	36		Estimate backwash flows
stand pipe		22	17	23	24	26	34	24	24	17	16	17	30		Estimate stand pipe/bulk water sales
Water Loss															
Apparent Water Loss	% of Water Sold	54	49	51	71	80	102	91	73	72	63	45	51	802	Sum Apparent Water Losses
Unauthorized Consumption	0.70%	12	12	12	15	17	22	18	14	13	12	9	12		Unauthorized Consumption (as a percentage of production = production*percentage)
Customer Meter Inaccuracies	2.50%	35	31	33	47	53	67	62	49	49	42	30	33		Customer Meter Inaccuracies (as a percent of demand adjusted upward = demand/(1-percentage) - demand)
Systematic Data handling Errors	0.50%	7	6	6	9	10	13	12	10	10	8	6	6		Systematic Data handling Errors (as a percentage of demand = demand*percentage)
Real Water Loss															
Current Monthly Real Water Loss (CMRL)		373	457	383	271	263	568	77	(21)	(17)	25	91	313	2,783	Calculate Real Water Loss (Non-Revenue Water less Authorized Unbilled Consumption and Appaent Water Loss)
Unavoidable Background Leakage (UBL)		89	89	89	89	89	89	89	89	89	89	89	89	1,062	Unavoidable Background Leakage (UBL) which is a component of UARL - UBL (1000 gallons per day) = ICF*((0.2*TL)+(0.008*NC)+(0.34*TPL))*(P/70)^1.5; for the purposes of this exercise, ICF (the Infrastructure Condition Factor is set to 1.0 - it can vary in practice from 1.0 to 1.5)
Characteristic Parameters of Water Supply System															
Total Length of mains, TL (miles)	33.57														
Number service connections, NC	220.00														
Total Length of private pipes, TPL (miles)	4.17														
Average system pressure, P (psi)	65.00														

Appendix C

Evidence of Public Notice

PROOF OF PUBLICATION IN THE
ROCKY FORD DAILY GAZETTE

STATE OF COLORADO)
) ss.
COUNTY OF OTERO)

J. R. Thompson **being first duly sworn, deposes and says: That he is an officer of "The Rocky Ford Publishing Company," to-wit, the secretary-treasurer thereof. That the said Rocky Ford Publishing Company is publisher of "the Rocky Ford Daily Gazette," a daily newspaper, published in Otero County, Colorado. That the annexed, or attached Public** Notice of South Swink Water Company. Draft Water Conservation Plan Notice was published November 14, 2014 in the Rocky Ford Daily Gazette.

And further that said newspaper is duly qualified for the purpose of publishing said notice within the meaning of an act to amend an act entitled an act concerning legal notices, etc., enacted March 20th, 1923. That said notice was published in the newspaper proper and not in a supplement thereof. That said newspaper has been published continuously and uninterruptedly as a daily newspaper during a period of not less than fifty-two consecutive weeks in accordance with chapter 113 session laws 1931, and that said Rocky Ford Daily Gazette, has a general circulation in Otero County, Colorado.

J. R. Thompson

Subscribed and sworn to before me this 14th day of November, 2014.
My Commission expires December 5, 2016.

Toby D. Jaramillo
Notary Public

TOBY D. JARAMILLO
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20124079037
MY COMMISSION EXPIRES DEC. 5, 2016

SOUTH SWINK WATER COMPANY DRAFT WATER CONSERVATION PLAN AVAILABLE FOR COMMENT

The South Swink Water Company (SSWC) has completed a draft Water Conservation Plan. The goal of the plan is to develop programs for efficient and sustainable water use. Before finalizing the Water Conservation Plan, SSWC welcomes comments from its constituents and the public. The 60-day public review period begins the day of this notice, November 12, 2014 through January 12, 2015. A complete draft copy will be available at the SSWC Offices at, 24980 County Road Z, La Junta, CO 81050 for public review. Please call 719-384-5458 to obtain a copy. The draft Water Conservation Plan will also be posted at the La Junta Woodruff Memorial Library, and the Town of Swink Town Hall.

All written comments are due prior to 4:30 pm, January 12, 2015. Comments can be dropped off or mailed to South Swink Water Company, 24980 County Road Z. La Junta, CO 81050.

Published November 14, 2014 in the Rocky Ford Daily Gazette

LA JUNTA TRIBUNE DEMOCRAT
422 Colorado Ave.
P.O. Box 500
La Junta, CO 81050
719-384-4475

ADVERTISING INVOICE/STATEMENT

SOUTH SWINK WATER COMPANY
PO BOX 442
SWINK, CO 81077

Acct #: 1100751
Date: 11/30/14
Phone: (719)384-5458

TERMS: DUE ON RECEIPT

Trans #	Type	Start	Stop	Ins	Memo	Amount	Balance
221069	INV				LEGAL 9367 LEGAL NOTICE South		
	PUB	11/12/2014	11/12/2014	1	01 Tribune-Democrat - LEGAL 9367	15.00	15.00