City of San Angelo
Water Utilities
Water Conservation Plan
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Chapter 1
Introduction

The City of San Angelo, located in Tom Green County, has a current population of approximately 95,877 people, with a predicted increase by 2060 to over 163,215 people. The City provides water to its citizens and to several industries and wholesale customers. In addition to water from local sources, including Lake Nasworthy, Twin Buttes Reservoir, O.C. Fisher Reservoir, and the Concho River, the City purchases water from the Colorado River Municipal Water District's (CRMWD's) Lake E.V. Spence and Lake O.H. Ivie. The City also has undeveloped groundwater rights in McCulloch, Concho, and Menard counties, collectively referred to as the McCulloch County well field.

Lake Nasworthy, the oldest major water supply reservoir in the City's system, was completed in 1930. The City owns and operates the reservoir. Most of the drainage area of Nasworthy is controlled by Twin Buttes Reservoir, which was built by the Bureau of Reclamation in 1962. The storage in Twin Buttes is divided into two pools connected by a 3.22-mile equalization channel. Below elevation 1926.5 msl the two pools function as separate reservoirs. The City holds water rights in both Nasworthy and Twin Buttes. The U.S. Army Corps of Engineers owns and operates the third major reservoir in the San Angelo system, O.C. Fisher, which was completed in 1951. The Upper Colorado River Authority (UCRA) holds all water rights in Fisher. UCRA retains 1,000 acre-feet of supply from Fisher, increasing to 1,500 acre-feet after 2008. The remainder of the Fisher water rights is contracted to the City.

In additional to the local supply, the City purchases water from two reservoirs owned and operated by CRMWD: O.H. Ivie Reservoir and Lake E.V. Spence. The current contract limits are 15,000 acre-feet per year from Ivie Reservoir and 3,000 acre-feet per year from Lake Spence. The City may accrue or "bank" up to 6,000 acre-feet of additional water in Spence if it does not take the full contracted amount for one or more years. Withdrawals for any single year are limited to a maximum of 9,000 acre-feet.

During the drought in the 1960s and early 1970s, the City began investigating sources of groundwater in the San Angelo area. As a result of this investigation, the City obtained groundwater rights associated with 37,633 acres of land in McCulloch, Concho, and Menard counties. The water is produced from the Hickory sandstone aquifer, which lies approximately 2,200 to 3,000 feet below the surface. The McCulloch County well field is located within the jurisdiction of the Hickory Underground Water Conservation District No. 1 (UGWCD) and is subject to the rules and regulations of the District. The City has received a permit from the District to drill and produce water. The District has placed a one-mile spacing limit and 500 gpm capacity on the City's wells, as well as limits on the amount to be produced from the well system on an annual basis.

1.1 Projects/Activities

Automated Meter Reading (AMR):

The City of San Angelo Water Utilities began their AMR installation program in September 2010. Approximately 35,000 meters will be converted with the majority of these meters being 5/8”(83%) and 1”(15%). The remaining 2% are comprised of one and one-half inch to eight inch meters.

We have completed 81% of the program with 77% of the 5/8”and 90% of the 1”meters converted. Included in this conversion is software which allows us to print reports on leaks. This allows us to be proactive by notifying the customer promptly of the possible leak and providing them time to have the leak fixed before their usage becomes too high.

In 2014, this software will be available for our customers. This will allow customers the capability to view their usage on a daily basis and have email notification of any detection of leaks or higher than normal consumption. With these tools, we’re anticipating a reduction of water loss from the customer side. In addition, customers can run their sprinklers and household appliances and track how much water is being consumed from each. Once customers can visually see how much consumption their sprinklers and appliances use, they will be better equipped to manage their consumption and cost.

Hickory Project:

The City of San Angelo is in the process of constructing facilities to begin to exercise its right to drill and produce water from the Hickory Aquifer in accordance with a permit issued by the Hickory Underground Water Conservation District No.1. The permit was issued November 14, 1997. Currently infrastructure is in place to produce 6 million gallons per day (approximately 6,720 acre feet per year) from the nine existing wells. New wells and related infrastructure necessary to increase production to 9 MGD (approximately 10,082 acre feet per year) are scheduled to be operational by late 2014.

The project was initially designed for an annual production rate of 6 MGD beginning in 2014, increasing to 9 MGD in 2026 and increasing to 10.7 MGD in 2036. These production rates are based on the annual allotment and the amount of water that has been banked since the permit was issued. Once the effects of the drought of 2011 were assessed and the lack of relief since then, the decision was made to expand the production capacity to 9 MGD. This will allow the city assess to an additional 3 MGD to be used in emergency conditions or if the drought conditions continue. Pumping water at the higher rate on a continuous basis will deplete the banked water and will require that production is reduced to meet the annual production rates imposed by the permit.

The city has informed Groundwater Management Area 7 (GMA 7) of the above information to ensure this information is included in the Desired Future Conditions (DFC) for the Hickory Aquifer. The city's intention is to NOT produce water from the aquifer until late 2014 unless drought conditions dictate otherwise. Beginning in late 2014, the city's maximum anticipated production will be up to 10,082 acre feet per year (ac-ft/yr) (9MGD) and the city recommends that 10,082 ac-ft/yr be used as the annual well field withdrawal rate from 2015-2019 when establishing a DFC for the aquifer. For years beyond 2019 the withdrawal rates should be 5,000 ac-ft/yr for 2020-2025, 10,000 ac-ft/yr for 2026-2035 and 12,000 ac-ft/yr for 2036 and beyond for establishing a DFC for the Hickory Aquifer.

Chapter 2
Demand Profile, Targets, and Goals

2.1 Demand Profile

Total water demand in the City of San Angelo in the year 2013 was 4.6 billion gallons, with 4.4 billion gallons sold to customers. Single-family residential customers at 69 percent represented more than half of all water sold (see Figure 1). Commercial customers were the next highest demand sector at 15 percent, with Government and Industrial at 7 percent and Wholesale customers at 3 percent.

Figure 1

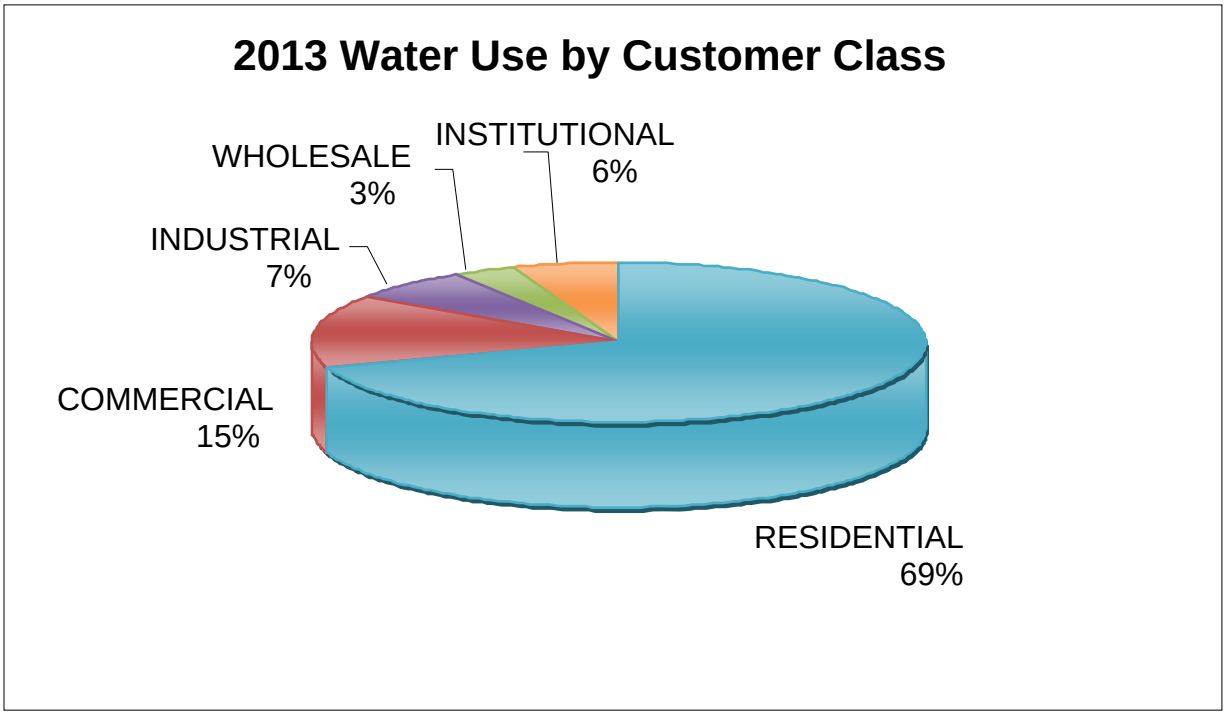


Figure 2

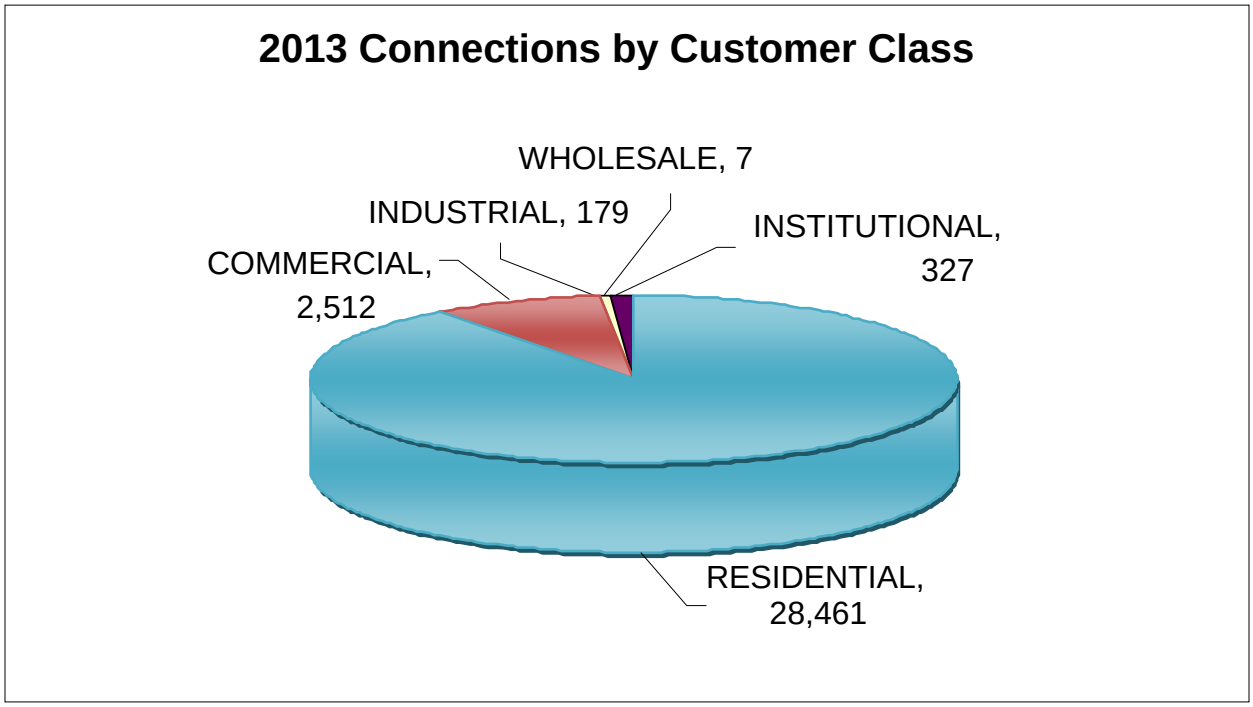
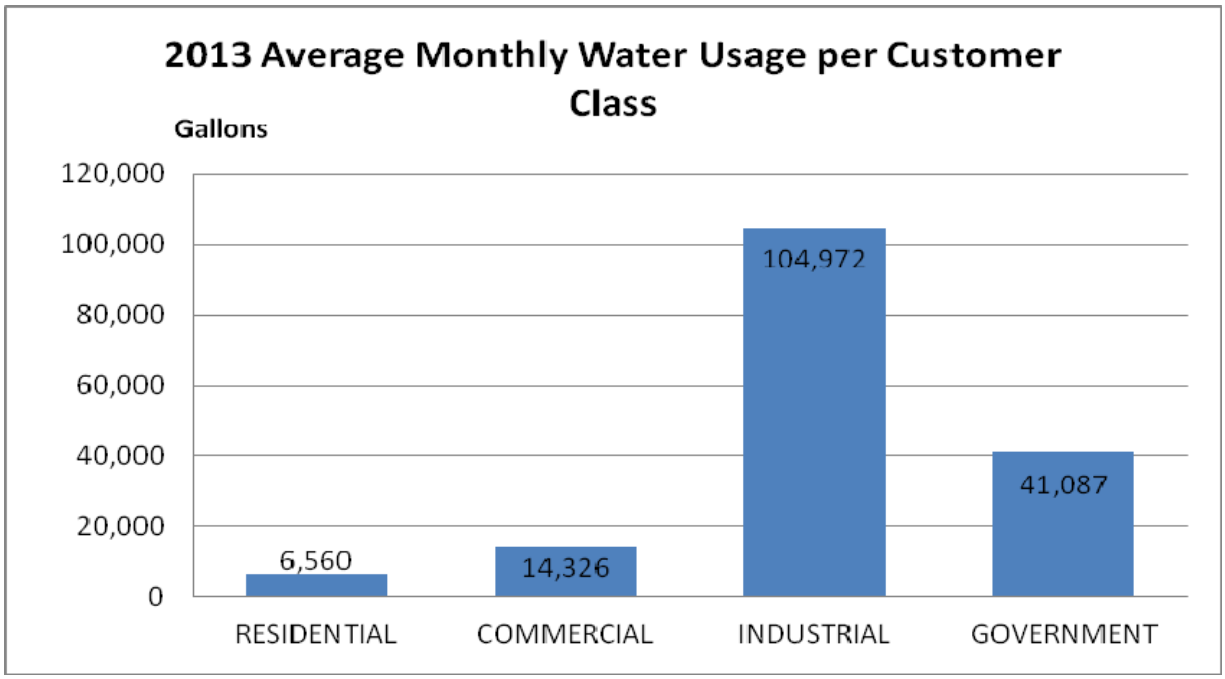


Figure 2 shows the breakdown of customers by meter connection. The chart indicates that residential accounts represent the largest type of account at 90 percent of all retail connections. Commercial customers account for the next largest number of customers at 8 percent of all accounts with Government at 1 percent. Wholesale and Industrial customers represent the remaining one percent.

Figure 3



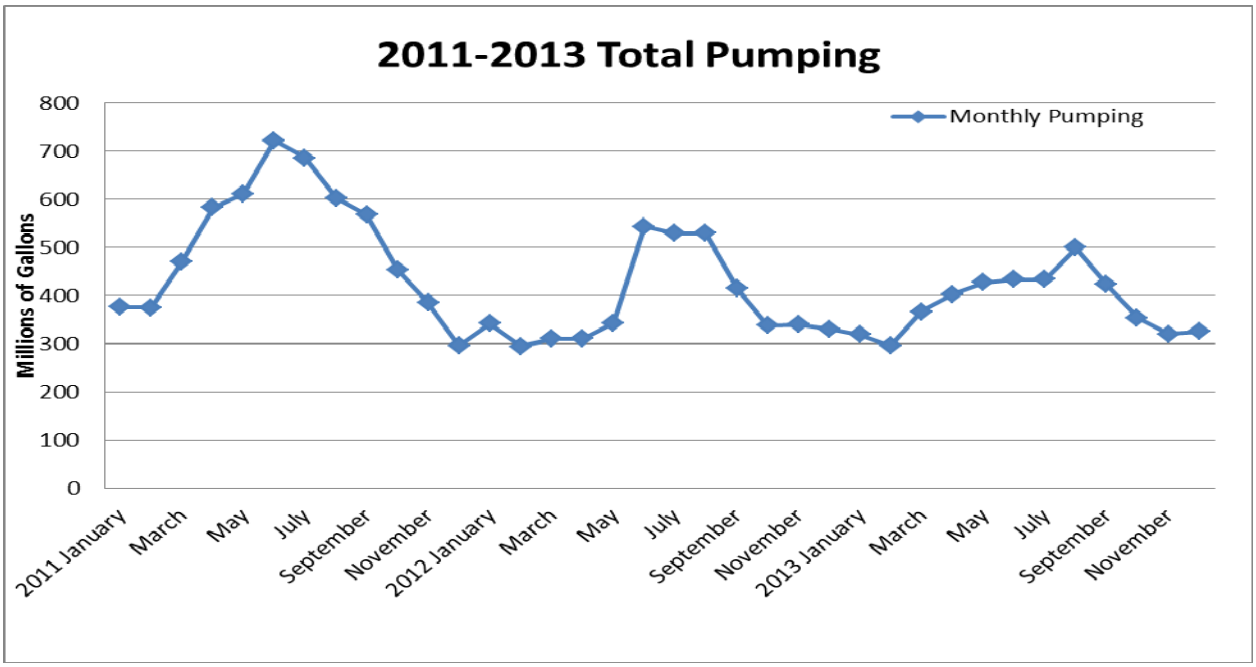
Examining average monthly demand by account gives a different picture. Figure 3 indicates that industrial accounts have the largest average monthly usage of all retail customer followed by government, commercial, and residential. Although residential meters account for over 69% of the total meters in the system, the average usage per residential meter is the lowest of all customer classes at just 6,560 gallons per month.

Seasonal Demand

The City's demand profile shows summertime peaks typical of Texas cities. The summertime months averaged 554 million gallons per month over the past five years. Over a similar time period the wintertime average was approximately 337 million gallons per month (see Figure 4).

Residential customers make up the largest share of summertime pumping followed by commercial and industrial customers. Reductions in the summertime average over the past several years can be attributed to the combined effects of rainfall events that reduced irrigation usages; and public education. Declines in winter consumption are probably related to indoor water conservation achieved through a combination of behavioral changes, due to water conservation education awareness, and the effects of the City's two-inch main replacement program.

Figure 4



2.2 Target and Goals

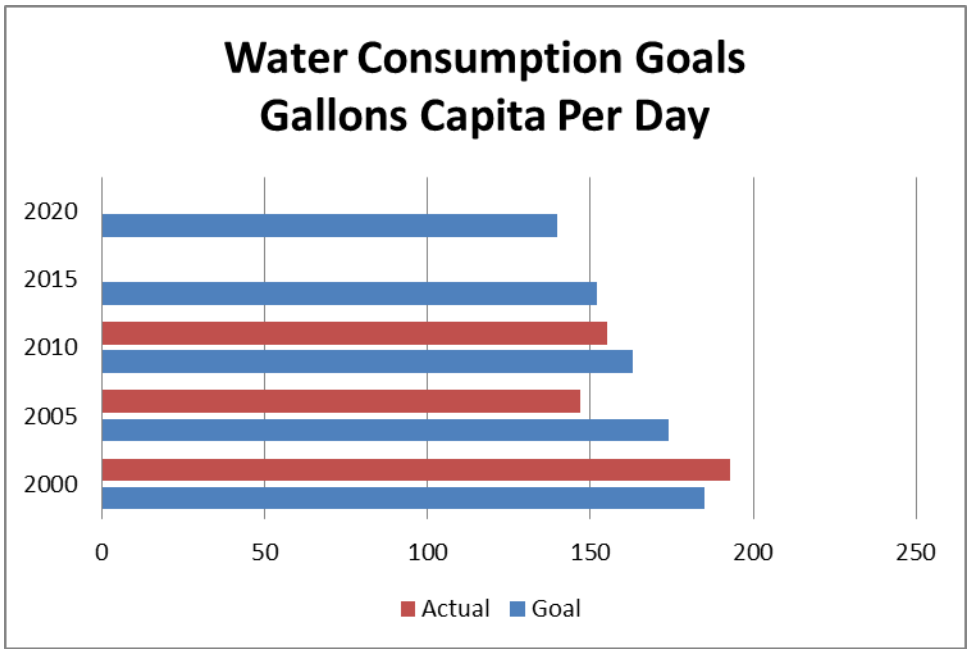
The City of San Angelo's water conservation plan is focused on two efficiency goals. The first and most immediate goal is to reduce summertime peak pumping. The second goal is to reduce overall per capita consumption by 1.2 percent per year from the City's goal in 2000 of 185 gallons per capita per day to 140 gpcd by 2020. The immediate near-term goal is designed to assist the City with challenges to water supply constraints due to weather and longer term changes in the hydrological balance on local river systems.

The City has a long history of progressive water resource planning. In keeping with that tradition, and ensuring that future generations will have adequate water supplies, the City promotes water conservation as an alternative water supply. Conserving existing supplies can help to reduce and delay the need for additional water supplies. In order to reduce per capita demand in the future, the City promotes various water conservation programs designed to educate citizens on the benefits of efficiency.

Table 1 shows recent per capita consumption and the goal of 1.2 percent per year reduction over the next 15 years. The targets and goals are shown at five year increments through 2020. These goals have been met and exceeded in 2005 and 2010 as a result of a combination of conservation efforts, including public education, and restrictions on outdoor water use, implemented as part of the City's conservation plan. Continuing to maintain this success is the principle goal of the City's conservation efforts. Total gpcd represents all water pumped, less wholesale customer usage, divided by total population, while residential gpcd is calculated by dividing total water sold to single-family and multi-family residential customers by total population.

Table 1
Water Consumption Goals (GPCD)

Year	2000	2005	2010	2015	2020
Goal	185	174	163	152	**140**
Actual	**193**	**147**	**155**		



2.3 Utility Survey Data

A detailed summary of the City's water and wastewater system is included in Appendix. A.

Chapter 3
Best Management Practices

3.1 Introduction

Water consumption in the City of San Angelo is driven by a wide variety of domestic, commercial, industrial, and institutional needs. Best Management Practices (BMPs) have been developed to both improve water use efficiency for the San Angelo Water Utilities and for programs to assist the City's water customers to efficiently use water. BMPs have been implemented as part of the City's ongoing water conservation effort. Additional BMPs are included in Chapter 4 to be considered for implementation in the future. Future BMPs will be evaluated and implemented as a condition of a positive evaluation. The BMPs are described briefly in the next two or three paragraphs, and in greater detail in the remaining sections of this chapter. Following the format recommended by the TWDB, each BMP has five sections: description, implementation, schedule, documentation, and water savings information.

The System Water Audits and Water Loss BMP allows the Water Utilities to reliably track water uses and provide the information to address unnecessary water and revenue losses. The Metering of All New Connections and Retrofit of Existing Connections BMP has been established to create equity among customers, reduce water waste, and reduce flows to wastewater facilities. The Water Conservation Pricing BMP has been implemented to discourage the inefficient use or waste of water. The Prohibition on Wasting Water BMP is aimed at customers who continue to waste water despite the Water Utilities efforts to educate customers to reduce waste of water. The Conservation Specialist BMP provides an effective method of ensuring that the City's water conservation programs are well administered and effective.

The Public Information BMP affects water consumption through changes in behavior as customers learn about water resources, the wise use of water, and the conservation program. The School Education BMP focuses on measures included to educate the youth of the community about the importance of water and water conservation to everyday life and their future. The Park Conservation BMP can save water through the implementation of efficient irrigation practices in City parks and possible use of reclaimed water in the City's golf course.

3.2 System Water Audit and Water Loss

A. Description

The City of San Angelo performs a regular estimate of system water efficiency by comparing water delivered to the treatment plant, potable water produced, and water sold. This audit includes estimates of water loss to leaks in the system and water used in fire fighting. The City's

water audit, using existing records and some estimation, will provide a picture of water losses in the system, and will be maintained annually.

B. Implementation

A working group will be formed with representatives from the following work areas: management, distribution, production, customer service, and conservation. Each of these work areas has an essential role to play in implementing this BMP. Initially the working group will focus on gathering relevant data and identifying current practices listed below in Step 1 that form the basis for the top-down audit.

> **Step 1.** The City's audit will be performed by using readily available information compiled annually in the response to the Texas Commission on Environmental Quality's Utility Profile; with the worksheets provided by the Texas Water Development Board's water planning division.
>
> **Step 2.** The second step of the audit will involve a more detailed review of utility policies and practices that affect water losses. This review will be performed at least once every five years. It will better incorporate information from utility practices including leak reporting, whether by customers or by City staff, and repairs, and explore methods for developing better estimates of water use by the fire department and for line flushing. The City will also evaluate using night flow to better estimate leakage; analysis of leakage repair records for length of time from reporting to repair of the leak; and analysis of pressure throughout the system.

C. Schedule

Elements to be done in the survey are:

1. The Water Utilities will gather the necessary information for conducting the audit.
2. The Water Utilities will review the Texas Water Development Board's new guidelines for water audits.
3. After such review, the Water Utilities will consider new water audit standards based upon keeping real water losses below a specific percent or to achieve an infrastructure leakage index (ILI) below three.
4. An audit will be performed no less than once every five years; and more often if the internal water audit standard is not achieved.

D. Documentation

To track this BMP, the Water Utilities will collect and maintain the following documentation:

1. A copy of each annual system audit, the ILI and percentage losses for each year, and a list of actions taken in response to audit recommendations;

2. Annual leak detection and repair report, including number and sizes of leaks repaired;
3. Number of customer service line leaks identified and actions taken to repair these leaks.

E. Determination of Water Savings

Potential water savings are an integral part of the system water audit process and will be contained in the audit report. Based on the results of the audit, goals will be set for reducing losses.

3.3 Metering of All New Connections and Retrofit of Existing Connections

A. Description

The purpose of this BMP is to ensure that all aspects of meter installation, replacement testing, and repair are managed optimally for water use efficiency. The Water Utilities installs the meters; Building Inspection confirms that the building code is met.

The meter program has several elements:

1. Required metering of all new connections and existing connections, excluding fire services.
2. A policy for installation of adequate, proper-sized meters as determined by a customer's current or projected water use patterns.
3. Direct utility metering of each new duplex, triplex, and fourplex unit, whether each is on its own separate lot or there are multiple buildings on a single lot.
4. Metering of all utility and publicly owned facilities, as well as customers.
5. Use of construction meters to account for water used in new construction.
6. Implementation of the State requirements in HB 2404, passed by the 77th Legislature Regular Session and implemented through Texas Water Code 13.502, which requires all new apartments be either directly metered by the utility or submetered by the owner.
7. Annual testing and maintenance of meters larger than two inches. Regular replacement of five-eighth and three-quarter inch meters that are 15 years or more in service.
8. An effective monthly meter-reading program where readings are not estimated except due to inoperable meters or extenuating circumstances.

B. Implementation

The Water Utilities ensures the high quality of metering is maintained through the regular review of metered data, and revision of metering polices to ensure that the maximum amount of water consumption is accounted for.

The City will continue to conduct a Meter Replacement Program following the methodology and frequency currently recommended in industry practices and recommended by the AWWA. This includes:

1. Maintaining a proactive meter-testing program, and repair identified meters, and
2. Notifying customers when it appears that leaks exist on the customer's side of the meter.

C. Schedule

The City has already implemented this BMP, and continues to maintain the practice on an ongoing basis.

D. Documentation

To track the effectiveness of Metering Programs, the Water Utilities gathers the following documentation:

1. Copy of meter installation guidelines based upon customer usage levels;
2. Copy of meter replacement policy;
3. Records of number and size of meters replaced annually;
4. Estimate of water accounted for through meter replacement program; and
5. Monthly records of water pumped versus billed water consumption.

E. Determination of Water Savings

Every year the Water Utilities will estimate its annual water saving from the BMP. Savings will be estimated based upon a statistical sample analyzed as part of the meter-testing program. The sample size and estimating methods from AWWA's manual, M6, may be followed.

3.4 Water Conservation Pricing

A. Description

San Angelo has an inverted block rate structure for residential customers. Commercial, apartment, mobile home parks, industrial, hotel, motel, hospital, school, and government customers have a flat rate with a seasonal increase in rate for summer usage of landscape water. An increasing meter fee is assessed with larger meter sizes. The basic rate structure is designed to recover the cost of providing service, and billing for water and sewer service based on actual metered water use. The rates include a consumption charge based upon actual gallons metered so that increasing water consumption results in a larger bill for the customer. Conservation pricing provides incentives to customers to reduce both average and peak use.

B. Implementation

Rate studies may be used to determine the appropriate rate structure for customer classes. The existing inverted block for residents will be retained and additional conservation pricing structures will be examined, such as the following:

1. Seasonal rates to reduce peak demands during summer months.
2. Increasing block rates for other customer classes. Rates for single family residential and other customer classes may be set differently to reflect the different demand patterns of the classes.

Successful adoption of a new rate structure may necessitate developing and implementing a public involvement process in order to educate the community about the new rate structure. The new rate structure will adhere to all applicable regulatory procedures and constraints. If the conservation pricing structure to be implemented is substantially different from current practices, then a phase-in approach may be appropriate.

Public involvement in the development and implementation of conservation rates can help assure that the goals of the conservation pricing initiatives will be met and accepted by local constituents. The water advisory group and public hearings at City Council will be used to obtain public input in rate proposals.

C. Schedule

Within a year of initiating a rate study, a decision will be made as to the need for a rate increase to accomplish revenue goals and conservation pricing.

1. At least annually, the Water Utilities staff will review the consumption patterns (including seasonal use) and the income and expense levels to determine if the conservation rates are effective, and make appropriate, rate structure recommendations.

D. Documentation

To track this BMP, the Water Utilities maintains the following documentation:

1. A copy of the legally adopted rate ordinance.
2. Billing and customer records that include annual revenues by customer class and revenue derived from commodity charges by customer class for the reporting period;
3. Monthly customer numbers and water consumption by customer class.

E. Determination of Water Savings

Elasticity studies have shown an average reduction in water use of one to three percent for every 10 percent increase in the average monthly water bill. In implementing a conservation pricing structure, consideration will be given to the factors that influence whether the new structure results in a reduction in water use. The *Water Price Elasticities for Single Family Homes* (TWDB, 1998) study found long-term price elasticities of -0.20 in three Texas cities, which translates into a reduction of two percent in water use for a 10 percent increase in price.

The City's priority is a rate design that encourages customers to reduce discretionary water use. To remain effective, the rates need to be reviewed and possibly adjusted periodically to take inflation into account, as well as future increases in operating costs.

3.5 Prohibition on Wasting Water

A. Description

Water Waste Prohibition measures are enforceable actions and measures that prohibit specific wasteful activities. Under this BMP, ordinances have been enacted and enforced to prohibit wasteful activities including:

1. Water waste during irrigation;
2. Failure to fix outside faucet leaks;
3. Service line leaks (on the customer side of the meter);
4. Sprinkler system leaks; and

Water waste during irrigation includes:

1. Water running along the curb of the street for a distance of 150 feet;
2. Irrigation heads or sprinklers spraying directly on paved surfaces such as streets, driveways, parking lots, and sidewalks;
3. Operation of an irrigation system with broken heads;
4. Spray irrigation during summer months between the hours of 12 noon and 6 p.m.

B. Implementation

This BMP is implemented by the regular operating personnel of the Water Utilities, and leaks on the water system distribution lines are repaired by crews that are available 24 hours a day. Through visual detection of leaks reported by the public or Water Utilities staff, leaks are detected and scheduled for repair.

C. Schedule

The first water waste provisions on San Angelo's City ordinances were introduced in the mid 1980's. Future water waste ordinances, such as freeze sensors will be considered.

D. Documentation

To track this BMP, the Water Utilities maintains the following documentation:

1. Copy of water waste prohibition ordinances enacted in the service area;
2. Copy of compliance or enforcement procedures implemented by the utility; and
3. Records of enforcement actions including public complaints of violations and utility responses.

E. Determination of Water Savings

Total water savings for this BMP can be estimated from each water-wasting measure eliminated through the actions taken under this BMP. The Water Utilities will develop tracking methods to determine overall water savings through the water waste prohibition efforts in future years.

3.6 Conservation Manager

A. Description

The City's Water Conservation Manager oversees and coordinates conservation efforts within the utility's service area for retail customers. The Conservation Manager list is responsible for effecting water conservation practices and measures within the Water Utilities service area by promotion of water conservation programs, development of marketing strategies for conservation programs, and coordination with other utility staff and program partners. The manager also promotes the value of conservation programs within the utility.

Water conservation programs are directed to primary grade school children through the schools; to the general public through media awareness campaigns, public events, and partnership with other entities. Other duties include preparation of the annual conservation budget; preparation and submittal of annual conservation status reports to utility management; implementation of the utility's conservation program; and management of the conservation staff, consultants, and contractors, when appropriate.

B. Implementation

Conservation Manager and support staff duties include the following:

1. Manage and oversee conservation programs and implementation;
2. Document water conservation program implementation status as it relates to state requirements and water conservation BMPs adopted by the Water Utilities;
3. Communicate and promote water conservation to utility management;
4. Communication and promote water conservation to customers;
5. Coordinate utility conservation programs with operating and planning staff;
6. Prepare annual conservation budget;
7. Manage consultants and contractors assisting in implementing the water conservation program;
8. Coordinate with partnering agencies;
9. Assist in preparing presentations to the Water Advisory Board Council and City Council;
10. Develop public outreach and marketing strategies for water conservation; and
11. Serve as media contact and public information spokesperson for the utility on conservation issues.

C. Schedule

The City of San Angelo Water Utilities first hired a Conservation Manager in 2004. The Water Utilities employs the Conservation Manager, assisted by support staff, on an ongoing basis.

D. Documentation

The City of San Angelo Water Utilities gathers the following documentation:

1. Description of the Conservation Manager position;
2. Reports on progress of water conservation program implementation, costs and water savings.

E. Determination of Water Savings

The Manager assists in the implementation of other BMPs. This effort can be considered as essential to the savings accrued by the implementation of the whole range of conservation programs that are offered by the utility.

3.7 Public Information

A. Description

San Angelo Water Utilities employs several methods of media resources to present a compelling and consistent message about the importance of water use efficiency and the managing and sustaining of existing water supplies and delaying the need to build new treatment plants. The overall goal of the public information program is to raise awareness among customers and citizens of the overall picture of regional water resources and the importance of conservation.

B. Implementation

San Angelo Water Utilities employs the following methods to bring about water resources awareness and to instill the importance of conservation in the community.

1. **Multi-tiered media campaign.** Budgeting of funds for television, radio, and print campaigns (i.e. billboards, internet, etc.) promoting water use efficiency. Conservation programming is aired on local television channels, Facebook, Twitter, Youtube, city web-site and City Channel 17.
2. **Leaflets.** Various leaflets and flyers are available to the public. These give advice on water conservation measures that customers can implement.
3. **School Education.** Programs targeted to grade school children to instill good conservation habits.
4. **Water Conservation Hotline.** The Water Conservation Hotline was established in 2004 to encourage public access to water conservation information. Customers utilize a dedicated telephone line to request information and report water waste.

C. Schedule

1. The multi-tiered media campaign was initiated in 2004, and continues as an ongoing effort.
2. The Water Hotline started in 2004.

D. Documentation

To track the progress of this BMP, San Angelo Water Utilities gathers the following documentation:

1. Number of activities and pieces of information and attendance at an activity;
2. Number and schedule of activities or information pieces related to promoting specific BMPs adopted by the Water Utilities;

3. Number of public school children divided by grade level who received instruction in water resources or water conservation;
4. Number of news programs or advertisements that featured the water conservation message;
5. Total population in the service area; and
6. Total budget for public information.

E. Determination of Water Savings

Water savings due to public information efforts are difficult to quantify. Water savings for other public information programs that result in specific actions by customers such as changes in irrigation scheduling or reduction in water waste occurrences may be quantified through surveys or analysis of water waste reporting in future years.

3.8 School Education

A. Description

School education programs, although difficult to relate to a quantifiable water saving, nevertheless enhance a utility's public image, contribute to the attainment of Texas state education goals by students, increase customer goodwill, and increase the viability of the utility's overall water conservation efforts. The message conveyed by students to their families based upon greater knowledge of water sources and conservation can result in behavioral changes resulting in both short- and long-term water savings.

B. Implementation

San Angelo Water Utilities has participated in the Major Rivers. Piloted in 2004, the self-contained *Major Rivers* curriculum, incorporated into the 4th grade curriculum, meets or exceeds the requirements of Texas Essential Knowledge and Skills (TEKS). The program educates students on water conservation, supply, treatment, distribution, and conservation. The self - contained program offers academic and hands-on activities in math, language arts, science, and social studies, with a teacher's guide geared to the interdisciplinary curriculum, as well as an introductory video and home information leaflets. The program includes pre- and post-test evaluations. In addition, teachers receive continuing education credits for participating in *Major Rivers* workshops.

C. Schedule

The San Angelo Water Utilities will continue to offer *the Major Rivers* program or other types of educational programs on an ongoing basis, subject to available funding.

D. Documentation

To track the progress of this BMP, the utility will have the following documentation:

1. Number of school presentations made during reporting period;
2. Number and type of curriculum materials developed and/or provided by the utility;
3. Number and percent of students reached by presentations and by curriculum;
4. Number of in-service presentations or teacher's workshops conducted during reporting period;
5. Results of evaluation tools used, such as pre- and post-tests, student surveys, teacher surveys;
6. Copies of program marketing and educational materials; and
7. Annual budget for school education programs related to conservation.

E. Determination of Water Savings

Water savings for school education programs are difficult to quantify. An attempt may be made to evaluate this program through surveys of participants.

3.9 Park Conservation

A. Description

Park irrigation conservation practices as well as the wise use of water in operation and maintenance of park facilities can effectively reduce water demands. Under this BMP, the City Parks Department coordinates irrigation and water use practices with Water Utilities to conserve water at San Angelo's parks. The San Angelo Parks Department will develop water conservation policies and procedures that cover all irrigated parks under its jurisdiction. All park facilities will be metered. Under this BMP the park manager implements a watering regimen that uses only the amounts of water necessary to maintain the viability of the turf and landscape material appropriate for the use of the park. Water is only applied to areas that are essential to the use of the park. The park manager may cease irrigation of areas that do not affect the use of the park by the public during times of shortage.

Water wasting during park irrigation will continue to be monitored, including water running in gutter, irrigation heads or sprinklers spraying directly on paved surfaces, operation of automatic irrigation systems without a functioning rain shut-off device, operation of an irrigation system with broken heads, and irrigation during summer months between the hours of at least 12 noon and 6 p.m. The parks department has implemented a new irrigation central control system. With this new central control system, city staff will be able to monitor irrigation systems from one central location in real time directly affecting the irrigation staffs ability to find and make repairs in a more efficient time frame.

Use of reclaimed or other non-potable water for park irrigation will be evaluated for the potential to conservation of potable water. However, specific uses must meet Texas Commission on Environmental Quality (TCEQ) water quality standards for reclaimed water and human contact and must be appropriate for the specific use of the park.

Playground equipment and facilities such as recreational facilities, tennis courts, basketball courts, and park and pool buildings will be cleaned with the amounts of water needed for human health and safety purposes. Faucets and toilets in park facilities will be retrofitted with efficient fixtures.

B. Implementation

Prior to development of a specific park conservation plan, the Water Utilities will consider a series of planning meetings with park management to discuss water conservation issues and to prepare a scope of action for the plan. The Water Utilities will provide staff and work with City Parks Department staff to develop the conservation plan, including a water survey of selected park irrigation systems and practices. The water-use survey, at a minimum, includes measurement of the irrigated turf areas; irrigation system checks and distribution uniformity analysis and review of irrigation schedules or development of schedules as appropriate.

If indicated by survey results and if cost-effective, the Water Utilities will encourage the Parks Department to upgrade irrigation systems and install or upgrade controllers. The Water Utilities will also assist in seeking funds for conservation upgrades.

C. Schedule

To accomplish this BMP, the utility will develop a plan in conjunction with the Parks Department.

D. Documentation

To track the progress of this BMP, the Water Utilities will gather the following documentation:

1. Copy of conservation ordinances or rules;
2. Metered water readings before and after any changes are implemented;

3. Changes to irrigation systems, retrofits, or upgrades, regular leak detection and maintenance policies, and estimated water savings from conservation practices.
4. Water savings attributable to changes implemented;
5. Costs of irrigation system upgrades if applicable.

E. Determination of Water Savings

Water savings will be estimated from each water-wasting measure eliminated through the actions taken under this BMP. For the replacement of inefficient equipment, the water savings are the difference in use between the new or upgraded equipment and the inefficient equipment. For landscape water waste, the savings can be calculated based on estimated savings from each water waste incident. For an irrigation survey, water savings can be expected in the range of 15 percent to 25 percent for park irrigation operations.

Switching to reuse or other non-potable water or other alternatives can save up to 100 percent of the potable water supply used in irrigation. The savings are determined by comparing water use before and after the conversion to the new water supply.

Chapter 4
Potential BMPs for the Future

4.1 Introduction

This Chapter contains a number of BMPs which the San Angelo Water Utilities intends to evaluate for implementation during the next five-year planning horizon. Following the format recommended by the TWDB, each BMP has five sections: description, implementation, schedule, documentation, and water savings information. The seven BMPs described below will be evaluated and implemented depending upon cost effectiveness and potential for water savings. The BMPs are described briefly in the next two or three paragraphs, and in greater detail in the remaining sections of this chapter.

The Showerhead, Aerator, and Toilet Flapper Retrofit BMP is designed to conserve water through plumbing retrofits by either directly installing plumbing devices in single-family homes and multi-family residential facilities or providing incentives or kits for installation. The Residential Toilet Replacement Programs BMP is designed to conserve water through plumbing retrofits by offering free toilets or rebates to single-family homes and multi-family residential facilities. The Residential Clothes Washer Incentive Program BMP is designed to provide economic incentives to customers in single-family homes (including duplexes and triplexes) and in multi-family units that have in-unit washer connections to install washers that qualify as water efficient.

The Water Survey for Single-Family and Multi-Family Customers BMP is designed to reduce both indoor and outdoor water usage by offering to conduct a water use survey for single-family homes and multi-family residential facilities with high water use and reviewing water-saving measures that can be made either during the survey or afterwards. The Rainwater Harvesting BMP is designed to reduce potable water usage by providing customers with support, education, incentives, and assistance in proper installation and use of rainwater harvesting systems. The New Construction Graywater BMP is designed to reduce potable water use by encouraging builders and owners of new homes and/or multi-unit properties and/or commercial properties to install plumbing that separately collects graywater from all eligible sources and distributes the graywater through a subsurface irrigation system around the foundation of the residence or building or for other landscape use. The Water Utilities will also evaluate the Institutional, Commercial and Industrial BMP for the potential to save water through a number of specific measures which can be implemented with the Water Utilities non-residential customers.

4.2 Showerhead, Aerator, and Toilet Flapper Retrofit

A. Description

The City will evaluate a program to retrofit showerheads, kitchen and bathroom faucet aerators, and toilet flappers in the residential sector. Four types of low flow plumbing devices are included under this program: showerheads rated at 1.75 gallons per minute (gpm) or less; kitchen faucet aerators of 2.2 gpm or less; bathroom faucet aerators of 1.5 gpm or less; and toilet flappers that flush the toilet at the design flush volume for that toilet model.

San Angelo Water Utilities will explore the potential for ordinances and inspection programs requiring replacement of inefficient plumbing when ownership of the property transfers or by date certain, after passage of such an ordinance.

B. Implementation

Under this BMP, the San Angelo Water Utilities will evaluate the following possibilities:

1. Develop a program to directly install plumbing devices in single-family homes and multi-family residential facilities or, alternatively, provide incentives or kits for installation;
2. If feasible, include a program to restore the flush volume of 1.6 gpf toilets to the design flush volume; and
3. Identify single-family (SF) and multi-family (MF) residences constructed prior to 1995.

C. Schedule

Based on the approach selected, the following schedule will be followed:

1. In the first 12 months, staff will initiate the program including stakeholder meetings as needed; determine a plan for educating homeowners, apartment owners and managers, plumbers, and realtors about this program; include inspections by Water Utilities personnel, building inspectors, or non-profit organizations to verify plumbing device installation.
2. By the end of 2013, over 8,000 low flow showerheads and over 1,500 1.5 gpm aerators have been distributed to citizens for free. There are 1,000 low flow showerheads scheduled for free distribution in 2014 and as budgets allow, will continue each year.

D. Documentation

To track the progress of this BMP, the Water Utilities will gather the following documentation:

1. An inventory of the number of single-family and multi-family buildings completed prior to 1995, which are targeted by this BMP; and

2. For each year of implementation, the records of the number of showerheads, bathroom faucet aerators, kitchen faucet aerators, and toilet flappers (by category) installed in single-family and multi-family units.

E. Determination of Water Savings

Water savings will be calculated as follows:

Water Savings = Number of Devices Retrofitted x Device Savings
Where Device Savings may be found in the Retrofit Device Savings Table, and
Number of Devices Retrofitted = 1.0 x Number Devices installed (when using Ordinance Approach or Direct Installation Approach), or
Number of Devices Retrofitted = 0.3 x Number Devices installed (when using Kit Distribution Approach)

Retrofit Device Savings Table

Device	Initial Savings (gpd per device)	Device Life Span (Savings)
Showerheads and Faucet Aerators	5.5 gpd	Permanent*
Toilet Flapper	Up to 12.8 gpd **	5 years

Notes: (*) The actual device life span is five to 15 years; the savings are permanent because inefficient equipment can no longer be purchased. The Texas Performance Standards for Plumbing Fixtures forbids importation or sale of inefficient fixtures into Texas. Plumbing standard provisions of the Energy Policy Act took effect in 1994 thereby ensuring that inefficient fixtures would not be manufactured in neighboring states.

(**) Residential End Use Study average for toilet leakage was 9.5 gpcd, which can be translated to gpd per toilet by multiplying by average household size (2.7) and dividing by average number of bathrooms (2) per single-family house. The Water Utilities staff will try to estimate actual savings based on measured leakage rate. (9.5gpcd x 2.7) / 2=12.8 gpd per toilet

4.3 Residential Toilet Replacement Programs

A. Description

ULFT replacement programs are an effective method of achieving water efficiency in the residential sector. ULFTs are toilets that use 1.6 gpf or less including dual flush toilets that can flush at either 1.6 gpf or 0.8 to 1.0 gpf. State and federal requirements prohibit installation of new toilets using more than 1.6 gpf. Under this BMP, the Water Utilities will develop and implement a program to replace existing toilets using 3.5 gpf or more in single-family and multi-family residences. To accomplish this BMP, the Water Utilities staff will first identify single-family and multi-family residences constructed during or prior to 1995.

San Angelo Water Utilities will explore the potential for ordinances and inspection programs requiring replacement of inefficient plumbing when ownership of the property transfers or by date certain, after passage of such an ordinance.

B. Implementation

Implementation will consist of the following:

1. A program for replacing existing pre-1995 high-water use toilets with efficient (1.6 gpf or less) toilets in single-family and multi-family residences.
    a. ULFT models that are used in retrofit programs will maintain 2.0 gpf or less regardless of what replacement flapper is used.
    b. ULFT replacement programs will offer free toilets or rebates for toilet replacement.

C. Schedule

Based on the approach selected, the following schedule will be followed:
During the first 12 months, the City will plan a program including stakeholder meetings as needed. The City will locate plumbing contractors or retrofit companies who may be interested in participating in this program; develop a plan for educating homeowners, apartment owners and managers, plumbers, and realtors about this program; and initiate the program.

D. Documentation

To track this BMP, the Water Utilities will gather the following documentation:

1. The eligible number of single-family residences and multi-family units in the service area;
2. The average number of toilets per single-family residence; the average number of toilets per multi-family unit;

3. The average persons per household for single-family residences; the average persons per household for multi-family units;
4. The number of ULFT installations credited to the program participant's replacement program, by year, including brand and model of toilets installed;
5. Description of ULFT replacement program, if applicable;
6. Estimated cost per ULFT replacement, if applicable;
7. Estimated water savings per ULFT replacement; and

E. Determination of Water Savings

Water savings will be calculated as follows:

Average Daily Savings = SF x (10.5 x Hs) / Ts + MF x (10.5 x Hm) / Tm
Where SF = Number of SF Toilets Retrofitted
MF = Number of MF Toilets Retrofitted
Hs = Number of people in average single family household
Hm = Number of people in average multi-family household
Ts = Average number of toilets per SF house
Tm = Average number of toilet per MF unit
For Single Family Homes:
10.5 = gallons saved per capita per day if all toilets replaced in each household

Dual Flush ULFTs increase savings by 25 percent.
For Multi-Family Units:
10.5 = gallons saved per capita per day if all toilets replaced in each unit
Dual flush ULFTs increase savings by 25 percent

4.4 Landscape Irrigation Conservation and Incentives

A. Description

Landscape irrigation conservation practices are an effective method of accounting for and reducing outdoor water usage while maintaining healthy landscapes and avoiding run-off. Using this BMP, the Water Utilities may provide non-residential and residential customers with customer support, education, incentives, and assistance in improving their landscape water-use efficiency. Incentives may include rebates for purchase and installation of water-efficient equipment. Three approaches will be evaluated for implementation. Successful implementation of this BMP may be accomplished by performing one or a combination of the approaches listed.

1. ET-Based Water Budgets

If the Water Utilities chooses the water budget approach, the Water Utilities also develops reference evapotranspiration (ET)-based water-use budgets equal to no more than 80 percent of ET per square foot of irrigated landscape area for customers participating in its Landscape Irrigation Conservation Program. More aggressive landscape conservation programs can utilize stress coefficients lower than 80 percent.

Evapotranspiration is the combined amount of the water transpired by plants and the water evaporated from the soil. ET is defined as the estimate of evapotranspiration that occurs from a standardized reference crop of well-watered, clipped, cool-season grass. The amount of supplemental irrigation water needed is the shortfall between plant water need (which is a fraction of ET) and precipitation.

The statewide Texas Evapotranspiration Network (http://texaset.tamu.edu/) will be consulted for historical evapotranspiration data, historical precipitation, and methodology for calculating reference evapotranspiration and allowable stress.

2. Water-Use Surveys, Metering, and Budgeted Water Use

If the Water Utilities chooses the survey approach, the Water Utilities develops and implements a plan to promote landscape water-use surveys to industrial/commercial/institutional (ICI) and residential accounts with mixed-use meters. The water-use surveys, at a minimum, include: measurement of the landscape area; measurement of the total irrigable area; irrigation system checks and distribution uniformity analysis; review of irrigation schedules and providing the customer with a survey report and information packet. When cost-effective and budgeted, the Water Utilities will offer the following: landscape water-use analyses and surveys; voluntary water-use budgets; installation of dedicated landscape meters; acceptance of site conservation plans; and follow-up to water-use analyses and surveys.

For accounts with water-use budgets, the Water Utilities may provide notices with each billing cycle showing the relationship between budgeted water usage and actual consumption. When soil conditions allow, and landscape managers are familiar with the use and maintenance of soil moisture sensors, water budgets can be allocated based upon soil moisture status, thereby providing a closer estimate of actual evapotranspiration.

The City may consider the potential for an ordinance requiring dedicated irrigation meters for all commercial and/or industrial accounts with automatic irrigation systems or if the lot is above a minimum size.

3. Landscape Design

If the Water Utilities chooses the landscape design approach, the Water Utilities provides information on climate-appropriate landscape design and efficient irrigation equipment and management for new customers. To serve as a model, the Water Utilities and City Parks Department may install climate-appropriate, water-efficient landscaping at water utilities facilities and landscape meters where appropriate.

B. Implementation

The Water Utilities will consider offering the Landscape Irrigation Program to customers with large landscapes first as a means of increasing cost-effectiveness and water savings. The Water Utilities will consider approaching local weather announcers, radio gardening show hosts, and newspaper columnists for assistance in notifying the public about the program. Public/private partnerships with non-profits such as gardening clubs, Cooperative Extension offices and/or with green industry businesses such as landscape and irrigation maintenance companies are potential avenues to market the program and leverage resources.

Incentives may include rebates for irrigation audits and systems upgrades, recognition for water-efficient landscapes through signage and award programs, and certification of trained landscape company employees and volunteer representatives who can promote the Program. Water Utilities staff may also be trained to provide irrigation audits which can include resetting irrigation controllers with an efficient schedule.

Approximately one year after conducting an irrigation audit, the Water Utilities may conduct a customer-satisfaction survey. The objective of the customer-satisfaction survey is to determine the implementation rate of recommended modifications and to gauge customer satisfaction with the program.

The initial step in assisting customers with landscape irrigation systems is a thorough evaluation of the existing landscape area and irrigation systems. This includes:

1. A list of landscape areas, measurements, plant types, irrigation system hydrozones, and controller(s);
2. A list of existing irrigation policies or procedures including maintenance and irrigation schedules;
3. A distribution uniformity analysis on irrigated turf areas; A review of water bills with attention to the ratio of summer to winter use; and
4. An initial report summarizing the results of the evaluation.

The water customer who participates in this program needs to maintain and operate its irrigation systems in a water-efficient manner. Maintenance programs include pre-irrigation system checks, adjustment of irrigation timers when necessary, installation of rain sensors, and regular review of irrigation schedules and visual inspection of the irrigation system. When landscape management companies are utilized, contracts should include a required report showing regularly scheduled maintenance and seasonal adjustments to irrigation systems controllers. A more advanced form of contracting would be to build into the contract a dollar amount based on 80 percent of ET and require the contractor to pay for any water use above that amount.

When appropriate, the Water Utilities will consider offering the following services:

1. Training in efficiency-focused landscape maintenance and irrigation system design;
2. Financial incentives (such as rebates, and grants) to improve irrigation system efficiency and to purchase and/or install water efficient irrigation systems;
3. Financial incentives to replace high-water use plants with low water use ones;
4. Rebates and incentives to purchase rain sensors or soil-moisture sensors; and
5. Notices at the start and end of the irrigation season alerting customers to check irrigation systems and to make repairs and adjustments as necessary.

The Water Utilities will need to ensure that landscape irrigation system specifications are coordinated with local building codes.

Evaluations and/or rebate processing could be done by the Water Utilities staff or be outsourced. If a Water Utilities chooses to perform the evaluations using in-house staff, they may take advantage of irrigation evaluation training programs provided by the Texas A&M School of Irrigation or the Irrigation Association.

An outsourcing option for the non-residential sector is to use or recommend a water-based performance contractor. Performance contracting is a financing technique that uses cost savings from reduced water consumption to repay the cost of installing water conservation measures. This technique allows for the development of a water-savings program without significant up-front capital expenses on the part of the customer. Instead, the costs of water-efficiency improvements are borne by either the contractor or a third party lender who recoups cost and shares water savings profits with the user.

A fourth approach, focused on using more efficient equipment, including new installation and upgrades of irrigation systems, ET controllers, and possibly including rainwater harvesting systems, may be initiated in partnership with other entities as a pilot project.

C. Schedule

The actual schedule will be determined by the rate at which programs are evaluated, the overall goal will be to realize the scope of this BMP within ten years of the date implementation commences.

As for specific measure, prospective timelines could be:
Develop ET-based water-use budgets for selected accounts with dedicated irrigation meters by the end of the second year from the date implementation commences.

1. Develop and implement a plan to target and market landscape water use surveys to ICI accounts with mixed-use meters by the end of the first year from the date implementation commences.
2. Develop and implement a customer incentive program by the end of the first year from the date implementation commences.
3. Follow up with the participating customer approximately one year after a water use survey has been conducted and/or a rebate processed.

D. Documentation

To track this BMP, the Water Utilities will gather the following documentation:

1. Number of dedicated irrigation meter accounts;
2. Number of dedicated irrigation meter accounts for which water budgets have been developed;
3. Aggregate water use for dedicated landscape accounts with budgets;
4. Aggregate budgeted water use for dedicated landscape accounts with budgets;
5. Number of mixed-use accounts;
6. Number of surveys offered and number of surveys accepted and completed;
7. Number, type, and dollar value of incentives, rebates, and loans offered to and accepted by customers;
8. Estimated water savings achieved through customer surveys; and
9. Estimated landscape area converted and water savings achieved through low water landscape design and conversion program.

E. Determination of Water Savings

Landscape surveys as described in this document are assumed to result in a 15 percent reduction in water demand for landscape uses by surveyed accounts. The Water Utilities will provide estimates of water savings from landscape irrigation survey programs based upon actual metered data. The water budget calculation is as follows:

80 percent ET calculation: I = (ETo x Kc x AS) where I is the irrigation amount to be applied for a given period (daily, twice weekly, weekly, etc.), in inches or centimeters

ET is the measured reference evapotranspiration over the irrigation period
Kc is a turf coefficient for turf grasses, and can be found at http://texaset.tamu.edu/
AS is allowable stress of 0.8 (or less if the landscape manager wishes)
For those wishing to convert inches of irrigation to gallons, multiply landscape area by 0.62.

Irrigation Volume (gals.) = I (in.) x LA (sq ft) x 0.62

When applying irrigation, the equation will be modified to gain greater water savings by accounting for precipitation: I = (ET x Kc x AS) – Pe where P is precipitation in inches or cm. In calculating an irrigation amount, it is important to consider effective precipitation (Pe). Effective precipitation is less than natural precipitation since some rainfall runs off or percolates below the root zone. The amount of effective precipitation will vary with region and rainfall trends. Each rainfall event will have a unique characteristic, and a good source for estimating Pe is the county office of the Texas Cooperative Extension Service.

4.5 Residential Clothes Washer Incentive Program

A. Description

Under this BMP, the Water Utilities may develop and implement an incentive program to encourage customers to purchase efficient clothes washers. According to the tiers recommended by the Consortium for Energy Efficiency ("CEE") in 2004, a clothes washer would need to have a WF equal to or less than 9.5 to be considered an efficient washing machine.

Conventional top-loading clothes washers use 41 gallons per load on average while efficient clothes washers use 11 to 25 gallons per load. The typical household washes an average of just more than one load per day. Manufacturers started producing efficient clothes washer models in the late 1990s in anticipation of rules being adopted by the Department of Energy ("DOE") setting higher efficiency standards.

A pricing incentive will be evaluated. To be effective, the incentive offered should bridge at least one-half of the gap in the price difference between the efficient machines and conventional ones. The price difference is an important part of the buying decision for customers. In addition, customers may be more likely to purchase the efficient washer if they got the incentive in the form of a discount at the time of purchase rather than waiting four to six weeks for a rebate.

Other utilities in Texas have found that a clothes washer incentive program is most effective when offered in conjunction with local gas and/or electric utilities since the incentive can be increased and the marketing reach expands. The energy savings are a result of more efficient motors, less energy required for heating hot water as less hot water is used, and shorter drying time because the spin cycle on efficient washers is much faster. Partnership potential with local energy providers will be explored by Water Utilities staff.

Incentives will only be given to those customers who install washers that qualify as water efficient. A list of efficient washers is maintained and regularly updated by the Consortium for Energy Efficiency (CEE). CEE, a non-profit public benefits corporation, develops national initiatives to promote the manufacture and purchase of energy-efficient products and services.

The U.S. Department of Energy and Environmental Protection Agency both support CEE through active participation as well as funding. The CEE list has been used by many utilities as the source of qualifying washers to receive an incentive.

B. Implementation

Develop and implement a clothes washer incentive program designed to increase the market share of efficient clothes washers. The program will be offered to customers in single-family homes (including duplexes and triplexes) and in multi-family units that have in-unit washer connections. Approach the local energy providers to join in a partnership to implement the program. Organize stakeholder meetings. Develop a marketing plan for educating customers, appliance stores, and realtors about this program. Initiate the program.

C. Schedule

Based on the approach selected, the following schedule will be followed: Plan, implement, and market an efficient clothes washer incentive program within 12 months of adopting this BMP.

D. Documentation

To track this BMP, the Water Utilities will gather the following documentation:

1. The number of single-family homes and multi-family units with in-unit washer connections;
2. The average number of persons per household for single-family homes and for multi-family residences;
3. The number of efficient clothes washer incentives issued each year, by year, including brand, model, and water factor of each efficient washer;
4. Estimated water savings per efficient washer; and
5. Average total washer sales per year in the service area.

E. Determination of Water Savings

Savings = EWS x 5.6 x Hs + EWM x 5.6 x Hm
Where EWS = Number of single family efficient washer incentives
EWM = Number of in-unit multi-family washer incentives
Hs = Number of people in average single family household
Hm = Number of people in average multi-family household
Single Family: 5.6 = gallons saved per capita per day
Multi-Family In-Unit: 5.6 = gallons saved per capita per day

4.6 Water Survey for Single-Family and Multi-Family Customers

A. Description

A Water Survey Program can be an effective method of reducing both indoor and outdoor water usage. Under this BMP, the Water Utilities conducts a survey of single-family and multi-family customers to provide information to them about methods to reduce indoor water use through replacement of inefficient showerheads, toilets, aerators, clothes washers, and dishwashers. If the customer has an automatic irrigation system, the survey includes an evaluation of the schedule currently used and recommends any equipment repairs or changes to increase the efficiency of the irrigation system.

In order to gain the fastest savings, surveys will be offered based on water use starting with the highest single-family and multi-family accounts, respectively. Multi-family accounts will be analyzed based on gallons per unit, although nearly all multi-family customers would benefit by this survey if they have not already retrofitted plumbing fixtures. The irrigation component of the single-family survey will target single-family customers using more than a certain amount of water per billing period that could be considered excessive for the particular geographic area and other characteristics of the service area. Typically, this is around 20,000 gallons per month in summer since that could represent an outdoor use of more than 12,000 gallons per month. Surveying outdoor water use in homes with water use below 20,000 gallons per month may not provide as significant an opportunity for water reductions. Customer water use records can give the Water Utilities a snapshot of which neighborhoods have higher than average water use.

Once the scope of services is determined, there are three options for conducting the survey: train Water Utilities staff to conduct an onsite survey; hire an outside contractor to conduct the onsite surveys; or provide a printed or online survey for customers to complete on their own. When conducting an onsite survey for a customer with an automatic irrigation system that is managed by an irrigation or maintenance contractor, it is beneficial to have the contractor present for the irrigation system survey.

For the indoor water use survey, a form can be used to provide the information on water reductions that would be achieved with each type of equipment change and the length of the payback period, taking into account any Water Utilities incentives that may be available. If it is an onsite survey, showerhead and faucet aerators may be changed during the survey.

A leak check may be conducted to determine if there are any toilet leaks occurring and any dripping faucets. If 1.6 gallons per flush toilets have already been installed, the flush volume will be checked. Information on water use habit changes such as shorter showers, and turning off the water while brushing teeth, for example, will also be provided at the time of the survey. The customer will be provided information on climate-appropriate landscaping from the Tom Green

County Extension office and about any programs the City has to replace inefficient landscaping or irrigation systems.

The survey of automatic irrigation systems will include a check of the system for broken or misdirected heads. The system will be run to determine precipitation rates for typical zones. Each zone will be checked to be sure that rotors and spray heads are not on the same zone since they have greatly different precipitation rates. Head spacing will be checked to determine if proper heads are installed. The schedule on the irrigation controller will be checked and the customer queried about how the schedule is adjusted during the year. The customer will be provided a written report on the system repairs and equipment changes needed. If the system does not have a rain sensor, information will be provided to the customer. Information will be provided on the installation of dedicated landscape meters.

B. Implementation

The Water Utilities will develop and implement a plan to market these surveys to both single-family and multi-family customers. Marketing will be done by ranking single-family customers according to water use on a monthly average and offer the program starting with those with the highest water use as a means of increasing cost effectiveness and water savings. Multi-family customers will be ranked by water use per unit. The survey may be offered by mail, telephone calls, e-mail, or through other appropriate methods of communication.

The customer incentive to participate can be reduced water costs and also recognition as a water efficient customer. If the utility offers any incentives for 1.6 gpf toilets, efficient clothes washers, irrigation systems upgrades, or water efficient landscape, the survey will include this information in the report to the customer.

Once a customer agrees to participate, the utility staff will collect the following information in the survey:

1. Calculation of the ratio of summer to winter use based on a review of the customer water bills;
2. Number and flush volume for each toilet;
3. If any 1.6 gpf toilets are flushing at greater than 1.6 gpf due to replacement of early closure flapper with standard flapper;
4. If any toilets are leaking around the flapper or over the overflow tube;
5. Showerhead and aerator flow rates in gallons per minute (“gpm”) when valve is fully open;
6. Estimated capacity of current clothes washer;
7. If customer has a swimming pool, the frequency and duration of backwash. Check fill valve and float to determine if working properly. Ask customer if they have noticed any leakage from pool; and

8. Ask customer who is responsible for changing the schedule and how often that occurs, if the system is turned off in winter months and if turfgrass areas are over seeded in winter.

Based on the information from the survey, the utility will develop a list of recommended changes or improvements.

To assure that the water savings measures recommended during and after the survey are achieved, the Water Utilities will follow up with the customer to determine which were actually implemented.

C. Schedule

Based on the approach selected, the following schedule will be followed: Develop and implement a plan to target and market water-use surveys to residential customers using more than 20,000 gallons per month in summer months and multi-family customers in the first year after implementing this BMP.

D. Documentation

To track this BMP, the Water Utilities will gather the following documentation:

1. Number of residential customers;
2. Number of single family customers using more than 20,000 gallons per month in summer months;
3. Number of multi-family customers;
4. Number of surveys offered and number of surveys completed by customer type; and

E. Determination of Water Savings

Saving should be based on measures implemented by each customer. Savings are calculated by multiplying the number of each type of measure implemented by the savings for that measure as listed below.

Single-Family Home

- Irrigation Audit: Actual Water Utilities survey results or 26 gallons per day (gp”) per house.
- Showerhead and aerator replacements: 5.5 gpd per person

Multi-Family Community

- Irrigation Audit: Actual Water Utilities survey results or 15 percent of outdoor water use or 208 gpd
- Showerhead and aerators: 5.5 gpd per person

Savings for resetting toilet tank levels, toilet leak repair and flapper replacement will be estimated during the water survey.

4.7 Rainwater Harvesting

A. Description

Rainwater harvesting (RWH) conservation programs are an effective method of reducing potable water usage while maintaining healthy landscapes and reducing problems due to excessive run-off. Using this BMP, the Water Utilities may provide customers with support, education, incentives, and assistance in proper installation and use of RWH systems. RWH systems will be most effective if implemented in conjunction with other water efficiency measures including water-saving equipment and practices. Rainwater harvesting is based on ancient practices of collecting — usually from rooftops — and storing rainwater close to its source, in cisterns or surface impoundments, and using it for nearby needs. The variability in rate and occurrence of precipitation events requires that rainwater be used with maximum efficiency. Incentives may include rebates for purchase and installation of water-efficient equipment.

Several factors will be considered in the design of rainwater harvesting systems. To be included in the San Angelo Rainwater Harvesting BMP, systems will need to incorporate all the components listed by the TWDB manual: collection area, a first flush device, a roof washer, an opaque storage structure with the capacity to meet anticipated demand, and a distribution system. Design consideration will be given to maintaining the highest elevations feasible for collection and storage systems for the benefit of gravity flow to storage or distribution. When using drip irrigation systems, filters are necessary to prevent particulates from clogging drip nozzles. Regular maintenance of RWH systems includes changing filter media on a regular basis and cleaning the first flush filter. Maximum expected daily demand, and knowledge of historical precipitation patterns, including amount, frequency and longest time between rainfall events, is important in designing the system. The Texas Water Development Board's Texas Manual on Rainwater Harvesting, 2005, may be used as a resource, as well as technical assistance from professional installers and manufacturers of RWH equipment for proper design and implementation of RWH program guidelines.

Large ICI installations can implement rainwater harvesting (from roofs) as well as capture of stormwater for irrigation or other non-potable uses. New commercial developments may have either stormwater detention ponds or water quality treatment structures. In either case, permanent storage can be added beyond that required and this storage can be used to retain runoff for later irrigation use. Large buildings that have or need French drain systems for foundation drain water will evaluate the potential for recovery of this resource as well.

The Water Utilities will consider sponsoring one or more demonstration sites. The ongoing efforts with the Tom Green County Extension office will be pursued an expanded if possible. Potential additional partners include customers with educational missions such as schools, universities, botanical gardens, and museums with large public landscapes.

Although rainwater is recommended for all irrigation uses, it is most appropriate for use with drip or micro irrigation systems. Customers considering RWH systems will be offered a landscape water-use survey to help customers ensure that RWH systems are properly designed and sized.

B. Implementation

The RWH Programs design effort will consider the following elements:

1. Marketing the program to customers with the largest summer peak. The Water Utilities will consider also approaching local weather announcers, radio gardening show hosts, and newspaper columnists for assistance in notifying the public about the program. Public/private partnerships with non-profits such as gardening clubs, neighborhood associations, Tom Green Cooperative Extension office and/or with green industry businesses such as rainwater harvesting companies and local sustainable building groups are potential avenues to market the program and leverage resources.
2. Incentives may include rebates for RWH systems, recognition for RWH systems through signage, award programs, and certification of trained landscape company employees and volunteer representatives to promote the program.
3. The initial step in assisting customers with landscape irrigation systems is a thorough evaluation of the potential water capture of a RWH system.
4. The water customers who participate in this program will need to maintain and operate their irrigation systems in a water-efficient manner.
5. The Water Utilities will ensure that RWH system specifications are coordinated with local building and plumbing codes. Water Utilities staff will also be trained to provide irrigation audits. The American Rainwater Catchment Systems Association lists evaluation training for RWH programs.

In addition to retrofitting existing homes and buildings with RWH systems San Angelo Water Utilities may choose to support implementation focused on new construction. Under this approach, the Water Utilities will:

1. Implement an incentive program to encourage builders and owners of new ICI properties to install a RWH system that collects and stores rainwater and condensate from eligible sources and distributes it to irrigation and/or a cooling tower make-up system. In large ICI buildings requiring cooling towers, design consideration may be given to returning condensate flows from air conditioning coils to cooling tower make-up. It may be effective for this BMP to be part of a Green Builder type rating system that also includes WaterWise landscaping and adequate soil depth;
2. Implement an incentive program to encourage homebuilders and homeowners to install a RWH system for landscape use to reduce potable water consumption.

C. Schedule

Based on the approach selected, the following schedule will be followed:

Incentive Approach
In the first year, plan the program including stakeholder meetings as needed. Develop a plan for educating potential homebuyers, developers, plumbers, green industry trade groups, landscape architects and realtors about this program. After the first year, implement the program.

D. Documentation

To track this BMP, the Water Utilities will gather the following documentation for each year of operation:

1. The number of new RWH developments for which design planning started after adoption of this BMP;
2. The number and type of RWH installations completed each year;
3. The estimated rainwater and condensate use in each RWH installation;
4. Aggregate water capacity of RWH sites;
5. Number, type, and dollar value of incentives, rebates, or loans offered to and accepted by customers; and
6. Estimated water savings achieved through customer surveys.

E. Determination of Water Savings

Water savings from a RWH program is determined by water volume harvested and used to replace other water sources. In programs which target new construction, the water savings will be estimated based upon known water consumptions for the proposed end use. A number of sources, including other BMPs, can be helpful in estimating potential water savings. A method for estimating potential water catchment and a monthly water balance equation for estimating water storage capacity are:

Catchment Potential (gals) = Area x 0.62 x 0.8 x Rainfall

Where Area = total area of catchment surface in square feet
0.62 = coefficient for converting inches per ft2 to gallons (unit conversion from 7.48 gallons per ft3)
0.8 = collection efficiency factor
Rainfall = average rainfall in inches.

Note: Median and lowest recorded rainfall can also be calculated in order to develop a range of expected values.

Storage Capacity

A simple assumption is that up to three months may elapse without significant rainfall. So a storage capacity to provide for a three-month period of water demand may be desired.

More precise methods of estimating needed storage capacity or additional information for estimating water balance of RWH systems and of accounting for the variability in seasonal rainfall pattern is available in the Texas Manual on Rainwater Harvesting.

4.8 New Construction Greywater

A. Description

Greywater has commonly been used in Texas. The most common example is using washing machine water for lawn or garden irrigation. Until 2003, Texas statutes contained very restrictive provisions for using greywater, primarily due to concerns about public health. In 2003, the Texas Legislature adopted House Bill (HB) 2661 which provides a more comprehensive definition of graywater and provisions for facilitating the use of greywater in a safe manner.

Greywater is defined in Texas as wastewater from clothes washers, showers, bathtubs, hand-washing sinks, and lavatories not used for the disposal of hazardous or toxic ingredients. Greywater cannot include water from clothes washers used for washing diapers, sinks used for food preparation, toilets, or urinals.

HB 2661, passed by the 78th Legislature Regular Session, added a provision that allows greywater use without treatment of up to 400 gallons per day at a private house for landscape irrigation, gardening or composting as long as the greywater:

1. Is used by the occupants of the residence for gardening, composting, or landscaping;
2. Is collected using a system that overflows into a sewage collection system or on-site wastewater treatment and disposal system;
3. Is stored in tanks that are clearly labeled and that have restricted access;
4. Uses purple pipe or purple tape around the pipe;
5. Is not allowed to pond or run off across property lines; and
6. Is distributed by a surface or subsurface system that does not spray into the air unless the graywater receives additional treatment.

HB 2661 also encourages builders of new homes to install dual piping that provides the capacity to collect greywater from allowable sources and to install subsurface greywater systems around the foundation of new houses to minimize foundation movement and cracking. This approach may also provide irrigation for landscaping planted up to four feet from the foundation.

New duplexes, triplexes, fourplexes, town homes, condo units and apartments may all be designed for utilization of graywater. Greywater generated from office buildings and other commercial buildings, primarily through faucet use, may be used for landscape irrigation. HB 2661 requires the Texas Commission on Environmental Quality to adopt rules for greywater use for commercial purposes as well as for industrial purposes.

In many cases the quantity of water available as greywater is declining due to water efficiency gains from water conserving showerheads, faucet aerators and clothes washers. In a new home, which would have efficient plumbing fixtures, the amount of greywater produced will range from 22 to 30 gallons per person per day. For an average size household of 2.7 persons that might be sufficient in most cases for both foundation stabilization and landscape irrigation in a four-foot strip around a 2,500 square foot house.

The suitability of greywater for irrigation will vary, and if greywater is the primary source for irrigation, a low water use landscape should be used. Irrigation systems should consider soil depth, soil permeability and flooding characteristics. Application options include drip, flood and subsurface irrigation. It is not appropriate to use spray irrigation unless the greywater is highly treated.

B. Implementation

Implementation of this BMP includes following rules pertaining to graywater adopted by TCEQ as well as any local City or County Health Department rules. To promote this BMP, stakeholder meetings will be held with builders, developers, realtors and other impacted groups.

Under this BMP, the Water Utilities will consider:

1. Implementing an incentive plan to encourage builders and owners of new homes and/or multi-unit properties to install plumbing that separately collects graywater from eligible sources and distributes the graywater through a subsurface irrigation system around the foundation of the residence or building or for other landscape use. It may be effective for
2. This BMP to be part of a Green Builder type rating system that also includes WaterWise landscaping, adequate soil depth and rainwater harvesting; or

C. Schedule

In the first year, plan the program including stakeholder meetings as needed. Develop a plan for educating and training potential homebuyers, developers, plumbers, landscape professionals and realtors about this program. After the first year, implement the program.

D. Documentation

To track the progress of this BMP, the Water Utilities will gather the following documentation for each year of implementation:

1. Depending on which sectors the Water Utilities has decided to focus on, the number of new homes and/or multi-unit properties and/or certain new commercial developments such as office parks, started and completed after adoption of this BMP;
2. The number and type of graywater installations completed each year; and
3. The estimated graywater use in each graywater installation.

E. Determination of Water Savings

Water savings will vary depending on the type of installation and will likely be unique to each customer installing a graywater system. There may also be some cases where graywater use will provide more water for a purpose than is currently being met with potable water. Only the reduction in potable water use will be calculated as the actual savings. In general, calculate water savings as follows:

1. For single-family units, calculate gallons of potable water use replaced by graywater and multiply this estimated potable water savings per house times the number of houses installing a graywater system.
2. For commercial and other properties, calculate gallons of potable water use replaced by graywater. In some cases, water savings for commercial developments can be calculated based on the number of employees and graywater discharge per employee.

4.9 Conservation Programs for Industrial, Commercial, and Institutional Accounts

A. Description

Under this BMP, the Water Utilities will identify ICI customers and sort them according to water usage. The Water Utilities will focus its ICI Conservation Program toward the higher use customers and those sectors with the highest conservation potential. In addition to domestic water use by employees and customers, many industry-specific processes are captured in this BMP. Differences in this industry-specific category of water use result in unique opportunities for water savings within each Water Utilities service area.

The Water Utilities will evaluate programs that may offer incentives for specific activities such as: retrofits of inefficient water cooled equipment with air cooled equipment, cooling tower

upgrades, installation and operation of internal recycling equipment, or conversion to reclaimed water from the local water treatment plant in processes where nonpotable water can be used. In addition to process changes and cooling tower upgrades, incentives may be offered for water reuse, using water quality ponds for permanent storage for irrigation or use of process water for irrigation. Efficient landscape water use will be evaluated. For clothes washers in common area laundry rooms in apartment communities and for self-service laundromats, a clothes washer incentive program may be offered.

The incentive programs will start with direct communications through newsletters or direct mail to introduce the program and give examples of successful efficiency efforts. While a significant portion of conservation savings for industrial customers comes from modifications to water using equipment and processes, additional savings for the commercial and institutional customers comes from water used for domestic purposes. Programs and incentives for plumbing fixture retrofits and reduction in water wasting practices may also be considered.

A water use survey program is another program that can educate ICI customers about potential water savings. To accurately track water usage by ICI accounts, the Water Utilities will develop and market an ICI water-use survey. Water-use surveys will include a site visit; an evaluation of all water-using equipment and processes; a report identifying possible conservation measures and available agency incentives.

In lieu of customer incentives programs and water-use surveys, the Water Utilities may choose to implement other efforts to reduce water usage in the ICI sector. ICI customers will be encouraged to become familiar with BMPs that may be appropriate to their facilities including those related to fixture retrofits, landscape management, submetering, employee education, and reuse. The Water Utilities may also set goals for the ICI sector in relation to the Water Utilities' own gallons per capita per day ("GPCD") targets and goals from its overall conservation plan.

B. Implementation

Implementation will consist of at least the following actions:

1. Identify ICI Accounts

Identify and rank commercial, industrial, and institutional accounts (or customers if the agency chooses to aggregate accounts) according to water use and highest conservation potential. For purposes of this BMP, ICI accounts are defined as follows:

a. Commercial Accounts: any water user that provides or distributes a product or service, such as hotels, restaurants, office buildings, commercial businesses or other places of commerce. These do not include multi-family residences, agricultural users, or customers that fall within the industrial or institutional classifications.

b. Industrial Accounts: any water users that are primarily manufacturers or processors of materials as defined by the Standard Industrial Classifications (SIC) Code numbers 2000 through 3999 or the North American Industry Classification System.

c. Institutional Accounts: any water-using establishment dedicated to public service. This includes schools, courts, churches, hospitals, and government facilities. All facilities serving these functions are to be considered institutions regardless of ownership.

After ranking ICI accounts by water use, priority customers will be identified for incentives based upon cost-effectiveness or ease of program implementation.

2. ICI Ultra Low Flush Toilet (ULFT) Program

Implementation will consist of at least the following actions: A retrofit program to replace existing high-water-using toilets with ultra-low-flush (1.6 gallons or less) toilets in commercial, industrial, and institutional facilities.

3. ICI Customer Incentives Program and Water-Use Surveys:

Implement an ICI and Customer Incentives Program. Develop a customer targeting and marketing strategy to provide customer incentives to ICI accounts such that each ICI sector's average annual water demand, after considering

growth in demand that may occur from new ICI customers, is reduced 10 percent within 10 years of the date implementation is to commence. Contact and offer water use surveys and customer incentives to each ICI sector on a recurring basis.

Financial incentives may be offered on a dollar amount per piece of equipment retrofitted such as toilets, clothes washers or cooling tower conductivity meters. Another option for determining the amount of potential incentives is offering an open-ended incentive per gallon per day saved so that facility managers propose the projects.

Within one year of a completed survey, there will be follow-up via phone or site visits with customers regarding facility water use and water-saving improvements. The Water Utilities will track customer contacts, accounts (or customers) receiving surveys, follow-ups, and measures implemented.

4. ICI Conservation Performance Targets

The Water Utilities may choose an alternative approach based upon local customer base and specific circumstances. To be effective as a BMP, The Water Utilities will implement

programs designed to achieve annual water-use savings by ICI accounts of an amount equal to or exceeding 10 percent of the baseline use of ICI accounts in the Water Utilities 's service area over a 10-year period, accounting for growth. The target amount of annual water-use reduction in ICI accounts is a static value calculated from the baseline amount of annual use.

Baseline use is defined as the average annual use by ICI accounts in the five years prior to implementing the BMP.

C. Schedule

Based on the approach selected, the following schedule will be followed:

1. Within the first 12 months of implementing this BMP, identify industrial, commercial, and institutional accounts and sort them by water use; and
2. Offer water-use surveys to ICI accounts.

D. Documentation

To track this BMP, the Water Utilities will provide the following documentation:

1. The number of customers and amount of water used within the commercial, industrial, and institutional customer classes;
2. A description of the plan to market water-use surveys to ICI accounts;
3. The number of ICI customers offered water-use surveys during the reporting period and the number of water-use surveys completed during the reporting period;
4. The number of follow-ups completed during the reporting period;
5. The type and number of water-saving recommendations implemented; and
6. If utilizing other programs in lieu of the water-use survey and customer incentives program, a description of the programs and estimated water-use reductions achieved through these programs. The Water Utilities will document how savings were realized and the method and calculations for estimating savings.

E. Determination of Water Savings

Calculate water savings as follows: Using historical records and manufacturer data as appropriate, calculate water savings due to implemented operating procedures, equipment changes or alternative water sources. Specific water savings calculations for cooling tower efficiency improvements will be developed using the TWDB's Cooling Tower BMP for industrial users.

For Water Surveys
Water Savings = Number of Surveys x Estimated Savings x Water Used
Where: Estimated Savings = 20 percent or percentage determined through survey results
Water Used = Average (five year) annual water use by ICI customers receiving the survey

Chapter 5
Wholesale Customer Conservation

5.1 Summary

Communication will be maintained with wholesale customers to ensure that the City's retail and wholesale customers are being treated in an equitable fashion, and for optimum implementation of the Plan. The City offers wholesale customers the opportunity to cosponsor conservation education and information activities.

5.2 Wholesale Customer Targets and Goals

The City of San Angelo serves three wholesale customers with treated water. The Water demands for these customers are summarized in Chapter 2, Water Demand Profile, Targets and Goals, and are further detailed in the Water Utility Profile in the Appendix. Due to the fact that the City's wholesale customers have other sources of water in addition to the water provided by the City, the Total gpcd provided in Table 2, Wholesale Customer Targets and Goals below is based upon the Water Resource Planning information from the TWDB.

5.3 Metering, Monitoring and Records Management

The City meters all treated water delivered to its wholesale customers. The meters are read on a monthly basis for billing purposes.

A summary report is prepared, which aggregates all meter readings from wholesale treated water meters.

5.4 Leak Detection and Repair

The treated water wholesale customers are supplied from portions of the City's distribution system. The meter location is the point of sale after which the water enters the customer's system, which is the customer's responsibility to operate and maintain. The portions of the City's distribution system that serve these wholesale customers is subject to the same leak detection and repair program described in Chapter 3, Section 3.2 System Water Audit and Water Loss.

5.5 Contractual Requirements

The City has in place contracts with the various wholesale customers. All of these contracts contain language relating to water conservation in drought situations. Each contract has a section requiring the customer to accept shortages in supply, should natural or unforeseen circumstances

prevent the City from delivering the water. One of these contracts is in force, as is for 30 years from the mid-seventies, prior to when the State had conservation planning requirements. As the need to modify each contract arises, the City will include contract language requiring conformance with applicable regulations concerning water conservation.

5.6 Targets and Goals

The City has no enforcement mechanism to impose conservation targets and goals upon its wholesale customers at this time. Achieving these goals must be through cooperative efforts to maintain and improve system efficiencies, to educate customers to the importance of conservation, and to enforce existing plumbing regulations within the municipal boundaries of each entity. To assist in meeting these goals, the City plays an active role in Region F water resource planning, working with wholesale customers on a voluntary basis on water conservation programs like those described in Sections 3.7 Public Information, 3.8 School Education, and 3.9 Water-wise Landscape Design and Conversion Program.

The Region F Water Resource Planning Group has projected water conservation from plumbing fixture replacements which are listed in Table 2, Wholesale Customer Municipal GPCD. The City will assist its wholesale customers in voluntarily meeting these goals through cooperative efforts like those mentioned above.

Table 2
Wholesale Customer Municipal GPCD

Customer Name	GPCD 2000	GPCD 2010	GPCD 2020
Goodfellow Airforce Base	247	198	125
Upper Colorado River Authority	N/A	N/A	155
Millersview-Doole Water Supply Corp.	119	115	112
GPCD- Weighted Average	183	157	130

Of the wholesale customers served by the City, both had per capita use rates lower than the statewide goal of 140 gpcd recommended by the Water Conservation Implementation Task Force. The aggregate per capita use rates, weighted by population show that the overall per capita for the City's wholesale customers was below 140 gpcd in 2000 and stays below 140 gpcd, although the City of Miles is projected to rise to 152 gpcd by 2010. The 5- and 10-year targets are 118 gpcd by 2009 and 117 gpcd by 2014. All wholesale customers will be encouraged to operate efficiently and to keep water loss rates below 10 percent.

Chapter 6
Drought Contingency Plan; Variances and Enforcement

6.1 Triggering a Drought Stage

Section 11.203 of City of San Angelo code contains provisions defining drought trigger stages and enforceable water management measures. This Section as currently adopted is included in Appendix B of the Water Conservation Plan. When local reservoirs are below full but above drought condition levels, the local and non-local sources will be listed.

During drought conditions, the primary source of supply will be non-local sources, subject to the maximum amount available from each source, with the remaining amount of water coming from the local system or underground sources that the City may develop.

Whenever the total amount of water available to the City falls below the minimum criteria established for each Water Supply Stage Level, the City shall be deemed to have entered a Drought Stage for management of its water supplies.

The Water Utilities Director shall notify the City Manager and City Council upon entering the threshold of a drought stage. The Council shall implement each stage by resolution. Such resolution shall be published one time in the local newspaper. The criteria for each stage and the water management measures which shall be enforced are listed in Appendix B.

6.2 Variance Procedures and Exceptions

Section 11.204 of the City code lays out the procedures for requesting and receiving a variance to the enforceable provision of Water Conservation and Drought Contingency Ordinance.

A person desiring an exemption from any provision of the restrictions must file a petition for variance with the City Manager. All petitions for variances must be reviewed and acted upon by the City Council. The petition is required to contain certain specific information detailed by ordinance including alternative conservation measures implemented by the petitioner as condition of receiving the variance. The City Council may also impose other requirements as a condition of granting the variance.

6.3 Enforcement and Wholesale Provisions

Section 11.202 of the ordinance provides for the Director of Water Utilities of the City as the manager of the Water Conservation Plan.

Wholesale customers of the City are required to adopt applicable provisions of the City's Water Conservation and Drought Contingency Plan. Contracts for the sale of water already in effect will be revised to reflect the applicable provisions of the City's most current Water Conservation and Drought Contingency Plan when the contracts are renewed. Violations of the ordinance are misdemeanors under City code, and specific penalties are described in Section 11.106 of the code.

6.4 Targets and Goals

The San Angelo Drought Contingency Ordinance is designed to reduce water demand through the imposition of specific water use restrictions and the use of bill surcharges for customers depending upon the level of the reservoir system storage. At each successive condition the water use reduction goals increase. More restrictive measures are mandated as reservoir storage decreases, the demand reduction measures are summarized in Table 3 Drought Water Reduction Targets below.

Table 3

Drought Water Reduction Targets

Stage	Reservoir Storage Level	Target Demand Reduction Level
Stage I	24 months supply	10%
Stage II	18 months supply	15%
Stage III	12 months supply	25%

Appendix A
Utility Profile — Texas Water Development Board

Texas Water Development Board

UTILITY PROFILE FOR RETAIL WATER SUPPLIER

Fill out this form as completely as possible.
If a field does not apply to your entity, leave it blank.

CONTACT INFORMATION

Name of Utility: City of San Angelo Water Utilities

Public Water Supply Identification Number (PWS ID): 2260001

Certificate of Convenience and Necessity (CCN) Number: 10242

Surface Water Right ID Number: 14-1319,14-1318,14-1325,14-1401,14-1298B,14-1190

Wastewater ID Number: 10641

Completed By: Ricky Dickson Title: Director of Water Utilities

Address: 72 W.College Ave. City: San Angelo Zip Code: 76903

Email: ricky.dickson@cosatx.us Telephone Number: 325-657-4209

Date: March 4, 2014

Regional Water Planning Group: F Map

Groundwater Conservation District: 45 Map

Check all that apply:

- [x] Received financial assistance of $500,000 or more from TWDB
- [x] Have 3,300 or more retail connections
- [x] Have a surface water right with TCEQ

Texas Water Development Board

Section I: Utility Data

A. Population and Service Area Data

1. Current service area size in square miles: 60
(Attach or email a copy of the service area map.)

2. Provide historical service area population for the previous five years, starting with the most current year.

Year	Historical Population Served By Retail Water Service	Historical Population Served By Wholesale Water Service	Historical Population Served By Wastewater Service
2013	95,877	6,198	95,877
2012	94,544	5,936	94,544
2011	93,200	5,843	93,200
2010	93,000	5,762	93,000
2009	92,194	5,601	92,194

3. Provide the projected service area population for the following decades.

Year	Projected Population Served By Retail Water Service	Projected Population Served By Wholesale Water Service	Projected Population Served By Wastewater Service
2020	105,083	7,852	105,083
2030	118,480	8,131	118,480
2040	125,807	8,731	125,807
2050	133,586	8,916	133,586
2060	150,618	9,518	150,618

4. Describe the source(s)/method(s) for estimating current and projected populations.

2016 Regional Water Plan

Texas Water Development Board

B. System Input

Provide system input data for the previous five years.

Total System Input = Self-supplied + Imported – Exported

Year	Self-supplied Water in Gallons	Purchased/Imported Water in Gallons	Exported Water in Gallons	Total System Input	Total GPCD
2013	4,608,722,000	0	169,865,000	4,438,857,000	127
2012	5,176,985,000	0	169,936,000	5,007,049,000	145
2011	6,038,000,000	0	202,857,000	5,835,143,000	172
2010	5,460,000,000	0	186,312,000	5,273,688,000	155
2009	5,349,000,000	0	206,508,000	5,142,492,000	153
Historic 5-year Average	5,326,541,400	0	187,095,600	5,139,445,800	150

C. Water Supply System (Attach description of water system)

1. Designed daily capacity of system 42,000,000 **gallons** per day.
2. Storage Capacity:
   Elevated 4,250,000 **gallons**
   Ground 17,500,000 **gallons**

3. List all current water supply sources in gallons.

Water Supply Source	Source Type*	Total Gallons
Twin Buttes	Surface	1,303,000,000
O.C.Fisher	Surface	26,198,340,000
Lake Nasworthy/Twin Buttes	Surface	8,146,000,000
E.V. Spence	Surface	97,755,000
O.H.Ivie	Surface	4,887,750,000
	Choose One	

*Select one of the following source types: *Surface water, Groundwater, or Contract*

4. If surface water is a source type, do you recycle backwash to the head of the plant?
   - ○ Yes _____ estimated **gallons** per day
   - ◉ No

D. Projected Demands

1. Estimate the water supply requirements for the next ten years using population trends, historical water use, economic growth, etc.

Year	Population	Water Demands (gallons)
2015	112,778	6,342,366,000
2016	113,294	6,400,758,000
2017	113,843	6,459,150,000
2018	114,366	6,517,542,000
2019	114,922	6,575,934,000
2020	115,489	6,634,326,000
2021	116,088	6,692,718,000
2022	116,697	6,751,110,000
2023	117,298	6,809,502,000
2024	117,870	6,867,894,000

2. Describe sources of data and how projected water demands were determined. Attach additional sheets if necessary.

Population Projection, Texas State Data Center

County Water Demand Projections for 2020-2070, 2016 Regional Water Plan

E. High Volume Customers

1. List the annual water use, in gallons, for the five highest volume **RETAIL customers**. Select one of the following water use categories to describe the customer; choose Residential, Industrial, Commercial, Institutional, or Agricultural.

Retail Customer	Water Use Category*	Annual Water Use	Treated or Raw
Angelo State Univ.	Institutional	63,890,000	Treated
Shannon Medical Center	Institutional	61,302,000	Treated
San Angelo Public SC	Institutional	37,870,000	Treated
Ethicon	Industrial	18,644,000	Treated
S.A.Community Medical Center	Institutional	17,440,000	Treated

*For definitions on recommended customer categories for classifying customer water use, refer to the online Guidance and Methodology for Reporting on Water Conservation and Water Use.

2. If applicable, list the annual water use for the five highest volume **WHOLESALE customers**. Select one of the following water use categories to describe the customer; choose Municipal, Industrial, Commercial, Institutional, or Agricultural.

Wholesale Customer	Water Use Category*	Annual Water Use	Treated or Raw
Goodfellow Air Force Base	Institutional	100,800,000	Treated
Upper Colorado River Authority	Institutional	37,662,000	Treated
Milers View-Doole	Institutional	1,046,000	Treated
	Choose One		Treated
	Choose One		Choose One

*For definitions on recommended customer categories for classifying customer water use, refer to the online Guidance and Methodology for Reporting on Water Conservation and Water Use.

F. Utility Data Comment Section

Provide additional comments about utility data below.

Texas Water Development Board

Section II: System Data

A. Retail Connections

1. List the active retail connections by major water use category.

Water Use Category*	Active Retail Connections			
	Metered	Unmetered	Total Connections	Percent of Total Connections
Residential – Single Family	28,839	0	28,839	82%
Residential – Multi-family (units)	1,246	0	1,246	4%
Industrial	98	0	98	0%
Commercial	4,693	0	4,693	13%
Institutional	481	0	481	1%
Agricultural	0	0	0	0%
TOTAL	35,357	0	35,357	

*For definitions on recommended customer categories for classifying customer water use, refer to the online Guidance and Methodology for Reporting on Water Conservation and Water Use.

2. List the net number of new retail connections by water use category for the previous five years.

Water Use Category*	Net Number of New Retail Connections				
	2013	2012	2011	2010	2009
Residential – Single Family	281	218	225	233	341
Residential – Multi-family (units)	14	4	0	6	0
Industrial	0	0	2	0	0
Commercial	45	46	27	34	28
Institutional	4	1	6	4	1
Agricultural	0	0	0	0	0
TOTAL	344	269	260	277	370

*For definitions on recommended customer categories for classifying customer water use, refer to the online Guidance and Methodology for Reporting on Water Conservation and Water Use.

Texas Water Development Board

B. Accounting Data

For the previous five years, enter the number of gallons of RETAIL water provided in each major water use category.

Water Use Category*	Total Gallons of Retail Water				
	2013	2012	2011	2010	2009
Residential - Single Family	1,919,936,000	2,371,278,000	3,011,120,000	2,646,980,000	2,700,355,000
Residential – Multi-family	404,529,000	438,989,000	509,092,000	588,847,000	478,022,000
Industrial	114,416,000	291,523,000	331,592,000	309,424,000	290,017,000
Commercial	445,825,000	581,396,000	621,739,000	629,628,000	579,572,000
Institutional	493,506,000	355,249,000	458,044,000	489,376,000	559,980,000
Agricultural	0	0	0	0	0
TOTAL	3,378,212,000	4,038,435,000	4,931,587,000	4,664,255,000	4,607,946,000

*For definitions on recommended customer categories for classifying customer water use, refer to the online Guidance and Methodology for Reporting on Water Conservation and Water Use.

C. Residential Water Use

For the previous five years, enter the residential GPCD for single family and multi-family units.

Water Use Category*	Residential GPCD				
	2013	2012	2011	2010	2009
Residential - Single Family	71	81	106	95	94
Residential – Multi-family					
TOTAL	71	81	106	95	94

D. Annual and Seasonal Water Use

1. For the previous five years, enter the gallons of treated water provided to RETAIL customers.

Month	Total Gallons of Treated Retail Water				
	2013	2012	2011	2010	2009
January	250,635,000	275,416,000	307,952,000	290,447,000	345,397,000
February	242,009,000	246,735,000	288,190,000	244,552,000	267,825,000
March	235,450,000	236,358,000	346,401,000	324,844,000	302,678,000
April	287,475,000	295,447,000	376,028,000	215,042,000	333,223,000
May	326,336,000	317,819,000	508,436,000	345,318,000	394,168,000
June	315,309,000	322,703,000	501,027,000	500,251,000	445,700,000
July	223,142,000	451,904,000	656,889,000	545,425,000	525,497,000
August	354,355,000	410,826,000	473,905,000	784,947,000	508,092,000
September	388,121,000	510,509,000	510,509,000	272,196,000	510,646,000
October	275,234,000	417,456,000	417,456,000	503,571,000	364,172,000
November	268,533,000	284,179,000	305,836,000	322,543,000	306,354,000
December	211,613,000	269,083,000	297,982,000	315,119,000	304,194,000
TOTAL	3,378,212,000	4,038,435,000	4,990,611,000	4,664,255,000	4,607,946,000

2. For the previous five years, enter the gallons of raw water provided to RETAIL customers.

Month	Total Gallons of Raw Retail Water				
	2013	2012	2011	2010	2009
January	320,069,000	342,529,000	377,120,000	326,240,000	339,349,000
February	295,718,000	294,625,000	376,013,000	279,697,000	357,409,000
March	367,327,000	310,808,000	472,153,000	340,307,000	396,920,000
April	404,414,000	414,607,000	583,226,000	398,981,000	410,207,000
May	427,383,000	419,814,000	610,671,000	481,366,000	488,764,000
June	434,528,000	544,170,000	722,643,000	616,128,000	570,124,000
July	433,630,000	529,653,000	687,041,000	526,646,000	602,492,000
August	499,654,000	530,099,000	603,673,000	685,791,000	615,876,000
September	424,413,000	416,143,000	569,194,000	515,307,000	467,956,000
October	355,325,000	338,768,000	455,177,000	482,341,000	385,208,000
November	320,335,000	341,033,000	385,865,000	416,250,000	378,221,000
December	326,220,000	331,196,000	335,382,000	391,055,000	336,489,000
TOTAL	4,609,016,000	4,813,445,000	6,178,158,000	5,460,109,000	5,349,015,000

3. Summary of seasonal and annual water use.

Water Use	Seasonal and Annual Water Use					Average in Gallons
	2013	2012	2011	2010	2009	
Summer Retail (Treated + Raw)	2,260,618,000	2,789,355,0	3,645,178,00	3,659,188,00	3,267,781,00	3,124,424,000 / 5yr Average
TOTAL Retail (Treated + Raw)	7,987,228,000	8,851,880,0	11,168,769,0	10,124,364,0	9,956,961,00	9,617,840,400 / 5yr Average

E. Water Loss

Provide Water Loss data for the previous five years.

Water Loss GPCD = [Total Water Loss in Gallons ÷ Permanent Population Served] ÷ 365

Water Loss Percentage = [Total Water Loss ÷ Total System Input] x 100

Year	Total Water Loss in Gallons	Water Loss in GPCD	Water Loss as a Percentage
2013	1,124,844,000	32	25%
2012	1,313,633,910	38	26%
2011	527,578,000	16	9%
2010	403,072,000	12	8%
2009	378,087,000	11	7%
5-year average	749,442,982	22	15%

F. Peak Water Use

Provide the Average Daily Water Use and Peak Day Water Use for the previous five years.

Year	Average Daily Use (gal)	Peak Day Use (gal)	Ratio (peak/avg)
2013	120,000	190,000	1.58
2012	140,000	210,000	1.50
2011	160,000	270,000	1.69
2010	140,000	240,000	1.71
2009	140,000	240,000	1.71

G. Summary of Historic Water Use

Water Use Category	Historic 5-year Average	Percent of Connections	Percent of Water Use
Residential SF	2,529,933,800	82%	26%
Residential MF	483,895,800	4%	5%
Industrial	267,394,400	0%	3%
Commercial	571,632,000	13%	6%
Institutional	471,231,000	1%	5%
Agricultural	0	0%	0%

H. System Data Comment Section

Provide additional comments about system data below.

Texas Water Development Board

Section III: Wastewater System Data

If you do not provide wastewater system services then you have completed the Utility Profile. Save and Print this form to submit with your Plan. Continue with the Water Conservation Plan Checklist to complete your Water Conservation Plan.

A. Wastewater System Data (Attach a description of your wastewater system.)

1. Design capacity of wastewater treatment plant(s): 13,200,000 **gallons** per day.

2. List the active wastewater connections by major water use category.

Water Use Category*	Active Wastewater Connections			
	Metered	Unmetered	Total Connections	Percent of Total Connections
Municipal	27,219	0	27,219	91%
Industrial	66	0	66	0%
Commercial	2,269	0	2,269	8%
Institutional	244	0	244	1%
Agricultural	0	0	0	0%
TOTAL	29,798	0	29,798	

2. What percent of water is serviced by the wastewater system? 60 %

3. For the previous five years, enter the number of gallons of wastewater that was treated by the utility.

Month	Total Gallons of Treated Wastewater				
	2013	2012	2011	2010	2009
January	220,000,000	247,000,000	260,000,000	255,000,000	250,000,000
February	203,000,000	230,000,000	241,000,000	262,000,000	235,000,000
March	218,000,000	241,000,000	252,000,000	314,000,000	255,000,000
April	216,000,000	238,000,000	248,000,000	334,000,000	254,000,000
May	243,000,000	261,000,000	260,000,000	321,000,000	263,000,000
June	246,000,000	247,000,000	256,000,000	301,000,000	262,000,000
July	249,000,000	255,000,000	272,000,000	281,000,000	275,000,000
August	236,000,000	258,000,000	288,000,000	281,000,000	275,000,000
September	243,000,000	259,000,000	261,000,000	264,000,000	285,000,000
October	246,000,000	245,000,000	260,000,000	268,000,000	269,000,000
November	220,000,000	222,000,000	233,000,000	255,000,000	241,000,000
December	226,000,000	216,000,000	237,000,000	260,000,000	258,000,000
TOTAL	2,766,000,000	2,919,000,000	3,068,000,000	3,396,000,000	3,122,000,000

4. Can treated wastewater be substituted for potable water?

○ Yes ◉ No

B. Reuse Data

1. Provide data on the types of recycling and reuse activities implemented during the current reporting period.

Type of Reuse	Total Annual Volume (in gallons)
On-site irrigation	
Plant wash down	
Chlorination/de-chlorination	
Industrial	
Landscape irrigation (parks, golf courses)	
Agricultural	2,304,930,000
Discharge to surface water	
Evaporation pond	
Other	
TOTAL	2,304,930,000

C. Wastewater System Data Comment

Provide additional comments about wastewater system data below.

You have completed the Utility Profile. Save and Print this form to submit with your Plan. Continue with the Water Conservation Plan Checklist to complete your Water Conservation Plan.

Appendix B
Ordinance Language: City of San Angelo Water Conservation and Drought Contingency Plan

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AN ORDINANCE OF THE CITY OF SAN ANGELO, TEXAS, AMENDING CHAPTER 11, ARTICLE 11.200 "WATER CONSERVATION AND DROUGHT CONTINGENCY PLAN", BY AMENDING SUBPART (d) ENTITLED "WATER SUPPLY STAGE-DROUGHT LEVEL I", OF SECTION 11.203 "DROUGHT STAGES AND WATER MANAGEMENT MEASURES" TO LIMIT WATERING OF LAWNS, GARDENS, LANDSCAPE AREAS, TREES, SHRUBS, GOLF COURSES (EXCEPT GREENS) OR OTHER PLANTS BEING GROWN OUTDOORS TO ONCE EVERY SEVEN DAYS; PROVIDING FOR SEVERABILITY; AND, PROVIDING FOR AN EFFECTIVE DATE.

BE IT ORDAINED BY THE CITY OF SAN ANGELO, TEXAS, THAT:

Section 1. THAT, Chapter 11, "Utilities & Solid Waste", Article 11.200 "Water Conservation and Drought Contingency Plan" of the Code of Ordinances of the City of San Angelo, Section 11.203 "Drought Stages and Water management Measures", subpart (d) "Water Supply Stage-Drought Level I", is hereby repealed in its entirety and a new subpart (d) entitled "Water Supply Stage-Drought Level I" of said Section 11.203 is hereby adopted to read as follows:

Section 11.203. **Drought Stages and Water Management Measures**, subpart (d):

"(d) Water Supply Stage - Drought Level I.

(1) The minimum criteria for this drought stage shall be the following.

The total amount of water available, as determined by the water utilities director, to the city from its developed water sources is less than a 24-month supply.

(2) In addition to the conservation measures stated in Section 11.202 of this article, the following additional water conservation measures shall be in force during Water Supply Stage - Drought Level I.

(A) The use of treated or raw city water for watering lawns, gardens, landscape areas, trees, shrubs, golf courses (except greens) or other plants being grown outdoors (not in a nursery) shall be prohibited at all times provided however a person may do such watering which shall be once ~~twice~~ every seven days during the period of April 1 through October 31 and once every 14 days during the period of November 1 through March

31 except during the "prohibited watering hours" as stated in Section 11.202.

(B) Golf courses greens may be watered daily except during the "prohibited watering hours" as stated in Section 11.202.

(C) Watering of "new landscape" shall be allowed in accordance with the provisions as stated in Section 11.202 for "new landscape."

(3) A fee shall be charged for water usage in the amounts as set forth below. This fee shall be in addition to the standard fee charged for water usage and shall be in lieu of the "excessive usage fee" as defined in Section 11.202.

(A) For single-family residential accounts, an additional fee of $2.00 per 1,000 gallons shall be charged for all usage from 25,000 thru 34,000 gallons during a billing period, an additional fee of $3.50 per 1,000 gallons shall be charged for all usage from 35,000 thru 44,000 gallons during a billing period, and an additional fee of $6.00 per 1,000 gallons shall be charged for all usage over 44,000 gallons during a billing period. Usage on a single-family residential account shall be the total usage at the address which is determined by adding together the usage on the meter supplying the residence and the usage on the meter(s) supplying water to the landscape watering system.

(B) For all landscape meters, except those at single family residences, schools, colleges, parks, cemeteries, golf courses or athletic facilities; an additional fee of $2.00 per 1,000 gallons shall be charged for all usage from 75,000 thru 94,000 gallons during a billing period, an additional fee of $3.50 per 1,000 gallons shall be charged for all usage from 95,000 thru 114,000 gallons during a billing period, and an additional fee of $6.00 per 1,000 gallons shall be charged for all usage over 114,000 gallons during a billing period."

Section 2. THAT, the terms and provisions of this Ordinance shall be deemed to be severable in that if any portion of this Ordinance shall be declared to be invalid, the same shall not affect the validity of the other provisions of this Ordinance

Section 3. THAT, this Ordinance shall be effective on the date of its adoption.

INTRODUCED on the 16th day of July, 2013, and finally PASSED, APPROVED and ADOPTED on this the 6th day of August, 2013.

ARTICLE 11.200 WATER CONSERVATION AND DROUGHT CONTINGENCY PLAN

Sec. 11.201 Purpose

The purpose of the water conservation and drought contingency plan is to encourage water conservation at all times and to establish a procedure for identifying, classifying and handling a water supply and/or a water demand emergency effectively and efficiently.

Sec. 11.202 Water Conservation Measures

The city will utilize the following strategies to encourage, promote and require citizens to conserve water at all times.

(1) Conservation Plan. The "City of San Angelo Water Conservation Plan," dated March 2, 2009, which is on file in the office of the city clerk, and available for public inspection, is adopted and incorporated herein.

(A) Implementation. The director of water utilities will act as the administrator of the water conservation plan. The administrator will oversee the execution and implementation of all elements of the program and will be responsible for supervising the promulgation and retention of records for program verification.

(2) Plumbing Code. The city plumbing code has provision for water conserving plumbing devices. The city will enforce the requirements of the code to ensure the use of water saving devices.

(3) Universal Metering. All users of municipal treated water, except for fire sprinkler lines, will be metered.

(4) Water Supply Meters. The city metering devices will record water use with an accuracy of plus or minus 5.0% in order to measure and account for the amount of raw water diverted from the source of supply.

(5) Restaurants. Restaurants shall not serve water to their customers except when specifically requested by the customer.

(6) Waste of Water. As defined below shall be prohibited.

(A) Allowing treated or raw city water, greywater, reclaimed water or well water to run off property to a gutter, street, alley, ditch or drainage facility and drain for more than 150 feet downgrade of the point of entry into such gutter, street, alley, ditch or drainage facility.

(B) Failure to repair a controllable leak.

(7) Prohibited Watering Hours. The use of treated or raw city water, greywater or reclaimed water for watering lawns, gardens, landscape areas, trees, golf courses, shrubs or other plants being grown outdoors (not in a nursery) shall be prohibited between the hours of 12:00 noon and 6:00 p.m. daily from April 1 through October 31.

(8) Watering Frequency. The use of treated or raw city water, greywater or reclaimed water for watering lawns, landscape areas, trees, gardens, golf courses (except greens), shrubs or other plants being grown outdoors (not in a nursery) shall be allowed at a frequency of twice every seven days during the period of April 1 through October 31 and once every seven days during the period of November 1 through March 31. Golf course greens may be watered once per day year round.

(9) New Landscape. Watering of newly seeded or sodded lawns or newly planted trees, shrubs or landscape plants will be allowed at the following frequency provided written notification is given to the city code compliance division or water conservation division of the watering schedule:

(A) Days 1-14 from planting; three times per day every day of such period at any time of day.

(B) Days 15-28 from planting; twice per day every day of such period at any time of day.

(10) Allowable Application Rates. The maximum amount of treated or raw city water, greywater or reclaimed water applied to established lawns, landscape plants, golf courses (except greens) or shrubs shall not exceed 1 inch per week.

(Ordinance adopted 2/7/12)

(11) Drip Irrigation. Landscape or foundation watering with a drip irrigation system such as a soaker hose, deep root watering system, drip pipe or tape, or bubbler shall be permitted on any day and at any time of day provided that the total amount of water applied shall not exceed 1 inch per week. For the purpose of this article, drip irrigation shall mean a water saving irrigation system designed to emit water at low volumes and low pressures directly onto or below the soil surface without airborne streams or droplets.

(12) Hand Watering. Hand watering of lawns, gardens, landscape areas, trees, shrubs or other plants being grown outdoors or foundations may be done on any day, except during the prohibited watering hours, provided the allowable application rate is not exceeded. Hand watering shall be watering with a hose that is hand held for the duration of the irrigation event, or watering with a container of five gallons or less.

(Sec. 1, Ordinance adopted 2/21/12)

(13) Excessive Usage of Water. Excessive usage of water as defined below shall be prohibited and shall be a violation of the water conservation and drought contingency plan:

(A) Any use of water by a customer in excess of the maximum allowable application rates under subsection (10) above.

(B) Usage of water in amounts such that an "Excessive Usage Fee" as set out in this article is assessed.

(14) Excessive Usage Fee. A fee shall be charged for excessive water usage in the amounts set forth below. This fee shall be in addition to the standard fee charged for water usage.

(A) For single-family residential accounts, an additional fee of $1.50 per 1,000 gallons shall be charged for all usage from 40,000 thru 49,000 gallons during a billing period, an additional fee of $2.50 per 1,000 gallons shall be charged for all usage from 50,000 thru 59,000 gallons during a billing period, and an additional fee of $5.00 per 1,000 gallons shall be charged for all usage over 59,000 gallons during a billing period. Usage on a single-family residential account shall be the total usage at the address which is determined by adding together the usage on the meter supplying the residence and the usage on the meter(s) supplying water to the landscape watering system.

(B) For all landscape meters, except those at single family residences, schools, colleges, parks, cemeteries, golf courses or athletic facilities, an additional fee of $1.50 per 1,000 gallons shall be charged for all usage from 90,000 thru 109,000 gallons during a billing period, an additional fee of $2.50 per 1,000 gallons shall be charged for all usage from 110,000 thru 129,000 gallons during a billing period, and an additional fee of $5.00 per 1,000 gallons shall be charged for all usage over 129,000 gallons during a billing period.

(15) Contracts with Other Political Subdivisions, Water Supply Corporations or Water Suppliers. Any political subdivision, water supply corporation, or water supplier that contracts with the city for the purchase of water shall adopt applicable provisions of the city's water conservation and drought contingency plan. Contracts for the sale of water that are already in effect will be revised to reflect the applicable provisions of the city's most current water conservation and drought contingency plan when the contracts are renewed or extended. To the extent of the city's legal authority, the city shall require the city's wholesale customers to issue a public notice advising their water customers of required drought management measures declared in the city as follows in Section 11.203.

(A) In the event that the triggering criteria specified in Section 11.203(f) of the Plan for Water Supply Stage - Drought Level III - have been met, the city manager is hereby authorized to initiate allocation of water supplies on a pro

rata basis in accordance with Texas Water Code Section 11.039 and according to the following water allocation policies and procedures.

(B) A wholesale customer's monthly allocation shall be a percentage of the customer's water usage baseline. The percentage will be set by resolution of the San Angelo City Council based on the administrator's assessment of the severity of the water shortage condition and the need to curtail water diversions and/or deliveries and may be adjusted periodically by resolution of the city council as conditions warrant. Once pro rata allocation is in effect, water diversions by or deliveries to each wholesale customer shall be limited to the allocation established for each month.

(C) Upon initiation of pro rata water allocation, water utility director shall provide notice, by certified mail, to each wholesale customer informing them of their monthly water usage allocations and shall notify the news media and the executive director of the Texas Commission on Environmental Quality.

(16) Water Demand Emergency. In the event the quantity of water usage from the city's water distribution system reaches a level that exceeds the amount which may be treated or safely delivered through the system, the water utilities director shall notify the city manager and the city council of such an occurrence. The city council shall be authorized to limit the use of water by passage of a resolution outlining such limitations which shall remain in effect until the water demand emergency can be met. Upon initiation of a water demand emergency, the water utility director shall provide notice, by certified mail, to the executive director of the Texas Commission on Environmental Quality and shall notify the news media.

(17) Water Supply Emergency. In the event of a water system failure or emergency (i.e. pressure zone deficiencies, chemical spills, broken water mains, power outages, failures of storage tanks or other equipment, treatment plant breakdown and/or water contamination) which limits the amount of water which may be treated or safely delivered through the system, the water utilities director shall notify the city manager and city council of such occurrence. The city council shall be authorized to limit the use of water by passage of a resolution outlining such limitations which shall remain in effect until the water supply emergency can be met. Upon initiation of a water supply emergency, the water utility director shall provide notice, by certified mail, to the executive director of the Texas Commission on Environmental Quality and shall notify the news media.

(18) Public Information. The water utilities director will provide regular public education and information about the importance of year-round water efficiency as delineated in the plan, and will provide general information about water supply conditions and drought plan provisions on at least an annual basis. The purpose of this effort shall be to keep the citizenry informed about the drought and conservation plans and their importance to the city's water supply.

Sec. 11.203 Drought Stages and Water Management Measures

(a) Water Supply Sources. The city has several water supply sources that it can draw upon to meet its needs. Local surface water sources include Lake Nasworthy, Twin Buttes Reservoir, O.C. Fisher Reservoir and the South Concho River. Nonlocal surface water supplies are available to the city from O.H. Ivie Reservoir and Spence Reservoir. The city has a groundwater source in the Hickory Aquifer.

When local reservoirs are full, the city's primary water supply will be from these reservoirs along with nonlocal or groundwater sources as needed. When local reservoirs are below full but above drought trigger points, the local sources may be utilized along with water brought in from nonlocal sources or groundwater sources. During drought conditions, the primary source of supply will be nonlocal sources, subject to the maximum amount available from each source, with the remaining amount of water coming from the local sources or groundwater sources that the city may develop.

(b) Drought Trigger Point. Whenever the total amount of water available to the city falls below the minimum criteria established for each water supply stage level, the city shall be deemed to have entered a drought stage for management of its water supplies.

The water utilities director shall notify the city manager and city council upon entering the threshold of a drought stage. The council shall implement each stage by resolution. A notice of such resolution shall be published one time in the local newspaper. The criteria for each stage and the water management measures which shall be enforced are as follows in subsections (d) to (f).

(c) Public Information. The water utilities director will provide reports to the news media with information regarding current water supply conditions, projected water supply and demand conditions if the current drought conditions continue, and consumer information on water conservation measures and practices. Information describing each water supply stage trigger point and drought level restrictions on water use shall be prepared and published on the city's website.

(d) Water Supply Stage - Drought Level I.

(1) The minimum criteria for this drought stage shall be the following.

The total amount of water available, as determined by the water utilities director, to the city from its developed water sources is less than a 24-month supply.

(2) In addition to the conservation measures stated in Section 11.202 of this article, the following additional water conservation measures shall be in force during Water Supply Stage - Drought Level I.

(A) The use of treated or raw city water for watering lawns, gardens, landscape areas, trees, shrubs, golf courses (except greens) or other plants being grown outdoors (not in a nursery) shall be prohibited at all times provided however a person may do such watering which shall be twice every seven days during the period of April 1 through October 31 and once every 14 days during the period of November 1 through March 31 except during the "prohibited watering hours" as stated in Section 11.202.

(B) Golf courses greens may be watered daily except during the "prohibited watering hours" as stated in Section 11.202.

(C) Watering of "new landscape" shall be allowed in accordance with the provisions as stated in Section 11.202 for "new landscape."

(3) A fee shall be charged for water usage in the amounts as set forth below. This fee shall be in addition to the standard fee charged for water usage and shall be in lieu of the "excessive usage fee" as defined in Section 11.202.

(A) For single-family residential accounts, an additional fee of $2.00 per 1,000 gallons shall be charged for all usage from 25,000 thru 34,000 gallons during a billing period, an additional fee of $3.50 per 1,000 gallons shall be charged for all usage from 35,000 thru 44,000 gallons during a billing period, and an additional fee of $6.00 per 1,000 gallons shall be charged for all usage over 44,000 gallons during a billing period. Usage on a single-family residential account shall be the total usage at the address which is determined by adding together the usage on the meter supplying the residence and the usage on the meter(s) supplying water to the landscape watering system.

(B) For all landscape meters, except those at single family residences, schools, colleges, parks, cemeteries, golf courses or athletic facilities; an additional fee of $2.00 per 1,000 gallons shall be charged for all usage from 75,000 thru 94,000 gallons during a billing period, an additional fee of $3.50 per 1,000 gallons shall be charged for all usage from 95,000 thru 114,000 gallons during a billing period, and an additional fee of $6.00 per 1,000 gallons shall be charged for all usage over 114,000 gallons during a billing period.

(e) Water Supply Stage - Drought Level II.

(1) The minimum criteria for this drought stage shall be the following.

The total amount of water available, as determined by the water utilities director, to the city from its developed water sources is less than an 18-month supply.

(2) In addition to the conservation measures stated in Section 11.202 of this article, the following additional water conservation measures shall be in force during Water Supply Stage - Drought Level II.

(A) The use of treated or raw city water for watering lawns, gardens, landscape areas, trees, shrubs, golf courses (except greens) or other plants being grown outdoors (not in a nursery) shall be prohibited at all times provided however a person may do such watering which shall be once every seven days during the period of April 1 through October 31 and once every 14 days during the period of November 1 through March 31 except during the "prohibited watering hours" as stated in Section 11.202.

(B) Golf courses greens may be watered daily except during the "prohibited watering hours" as stated in Section 11.202.

(C) Watering of "new landscape" shall not be allowed as stated in Section 11.202 for "new landscape."

(3) A fee shall be charged for water usage in the amounts as set forth below. This fee shall be in addition to the standard fee charged for water usage and in lieu of the water usage fee set out in subsection (d)(3) the "excessive usage fee" as defined in Section 11.202.

(A) For single-family residential accounts, an additional fee of $3.50 per 1,000 gallons shall be charged for all usage from 10,000 thru 19,000 gallons during a billing period, an additional fee of $5.00 per 1,000 gallons shall be charged for all usage from 20,000 thru 29,000 gallons during a billing period, and an additional fee of $8.00 per 1,000 gallons shall be charged for all usage over 29,000 gallons during a billing period. Usage on a single-family residential account shall be the total usage at the address which is determined by adding together the usage on the meter supplying the residence and the usage on the meter(s) supplying water to the landscape watering system.

(B) For all landscape meters except those at single family residences, an additional fee of $3.50 per 1,000 gallons shall be charged for all usage from 60,000 thru 79,000 gallons during a billing period, an additional fee of $5.00 per 1,000 gallons shall be charged for all usage from 80,000 thru 99,000 gallons during a billing period, and an additional fee of $8.00 per 1,000 gallons shall be charged for all usage over 99,000 gallons during a billing period.

(f) Water Supply Stage - Drought Level III.

(1) The minimum criteria for this drought stage shall be the following.

The total amount of water available, as determined by the water utilities director, to the city from its developed water sources is less than a 12-month supply.

(2) In addition to the water conservation measures stated in Section 11.202 of this article, the following water conservation measures shall be in force during Water Supply Stage - Drought Level III.

(Ordinance adopted 2/7/12)

(A) The use of treated or raw city water for watering of lawns, gardens, landscape areas, golf courses (including greens), shrubs or other plants being grown outdoors is prohibited. Hand Watering or Drip Irrigation of trees and foundations may be done on days and at times as established by the City Council. (Sec. 2, Ordinance adopted 2/21/12)

(B) The use of treated or raw city water to fill, refill or maintain the level of any fountain or swimming pool is prohibited.

(C) Washing of automobiles, trucks, trailers, boats, or other types of vehicles or mobile equipment is prohibited except if the health, safety and welfare of the public is contingent upon vehicle cleaning, as determined by the director of city health services; then the washing of such vehicles shall be allowed.

(3) A fee shall be charged for water usage in the amounts as set forth below. This fee shall be in addition to the standard fee charged for water usage and shall be in lieu of the water usage fee set out in subsections (d)(3) and (e)(3) and the "excessive usage fee" as defined in Section 11.202.

(A) For single-family residential accounts, an additional fee of $6.00 per 1,000 gallons shall be charged for all usage over 10,000 gallons during a billing period.

(B) For apartment unit accounts, an additional fee of $5.00 per 1,000 gallons shall be charged for all usage over an amount equal to the number of units in the apartment times 3,000 gallons during a billing period.

(C) For all other water users, an additional fee of $2.50 per 1,000 gallons shall be charged for all usage.

(Ordinance adopted 2/7/12)

Sec. 11.204 Exception and Variance

(a) Exceptions. The City Council may allow exceptions to any of the provisions of this article. The Council may place conditions on any exception.

(b) Watering Restrictions. There shall be an exception to the prohibitions of this article regarding watering restrictions:

(1) Use of water for installing, testing and repairing sprinkler systems.

(2) Watering frequency and schedules for public parks, athletic facilities, schools, colleges and cemeteries shall be as approved by the City Council.

(Ordinance adopted 9/27/12)

(c) Variance.

(1) A person desiring an exemption from any provision of this article shall file a petition for variance with the city manager. All petitions for variances shall be reviewed and acted upon by the city council. The petition shall include at a minimum the following information:

(A) Name and address of the petitioner(s).

(B) Purpose and estimated amount of water use.

(C) Specific provision(s) of the article from which the petitioner is requesting an exemption.

(D) Detailed statement as to how the specific provision of the article adversely affects the petitioner or what damage or harm will occur to the petitioner or others if petitioner complies with this article.

(E) Description of the relief requested.

(F) Period of time for which the variance is sought.

(G) Alternative water use restrictions or other measures the petitioner is taking or proposes to take to meet the intent of this article and the effective date of such other measures.

(H) Other pertinent information.

(I) Statement that petitioner has not within the last six months intentionally violated the current ordinance for which a variance is sought or, if such violations have occurred, a statement setting out all reasons why such ordinance was violated.

(2) The city council may grant a variance from the requirements of this article after determining that because of special circumstances applicable to the applicant, compliance with this article:

(A) Cannot be technically accomplished during the expected duration of the water supply shortage or other condition for which the article is in effect; or

(B) Will cause undue hardship on a program or service offered by a public entity; or

(C) Substantially threatens the applicant's primary source of income.

(3) Additionally, the city council may grant a variance from the requirements of this article if it determines that the applicant can implement alternative water use restrictions which meet or exceed the intent of this article. The city council shall approve specific alternative water use restrictions.

(4) Any variance granted by the city council may be revoked after a determination by the city council that revocation is necessary for the public health and safety or upon a finding that the holder of a variance allowing alternative water use restrictions has not complied with such alternative restrictions.

Sec. 11.205 Implementation and Service Restrictions

(a) Implementation.

(1) The water utilities director for the city will act as the administrator of the water conservation drought contingency plan. The administrator will oversee the execution and implementation of all elements of the program. The administrator will be responsible for supervising the promulgation and retention of adequate records for program verification.

(2) The water conservation plan will be maintained for the duration of the city's financial obligation to the state under the State Revolving Loan Fund program.

(b) Contracts With Other Political Subdivisions, Water Supply Corporations or Water Suppliers. Any political subdivision, water supply corporation, or water supplier that contracts with the city for the purchase of water shall adopt applicable provisions of the city's water conservation and drought contingency plan. Contracts for the sale of water that are already in effect will be revised to reflect the applicable provisions of the city's most current water conservation and drought contingency plan when the contracts are renewed.

(c) Service Restrictions. The water conservation and drought contingency plan shall be enforced by the following service restrictions:

(1) Water service taps will not be provided to customers not meeting the plan requirements.

(2) The inclining block water rate structure should encourage retrofitting of old plumbing fixtures which use large quantities of water.

(3) Customers who do not pay their water bills shall be subject to discontinuance or disconnection of service.

(4) The building inspection department will not certify new construction which fails to meet the plan requirements.

Sec. 11.206 Enforcement

(a) Violations of any provisions of the water conservation and drought contingency plan may be enforced as follows:

(1) First violation. Any person or entity as defined under this chapter may be given a verbal or written warning.

(2) Second and subsequent violations.

(A) Violation of any provision of the water conservation and drought contingency plan constitutes a Class C misdemeanor offense for which a citation may be issued.

(B) Second and subsequent violations shall be punishable by a maximum fine of up to two thousand dollars ($2,000.00) per day per violation as provided by Section 1.106 of the Code of Ordinances of the City of San Angelo.

(C) Proof of a culpable mental state is not required for a conviction of an offense under this section. Each day any person or entity fails to comply with the water conservation and drought contingency plan is a separate violation.

(3) Third and subsequent violations. For third and subsequent violations of the water conservation and drought contingency plan, the water utilities director shall, upon due notice to the customer, be authorized to discontinue water service to the premises where such violations occur. Services discontinued or disconnected under such circumstances shall be restored only upon payment of charges as provided for in Article 11.300.

(b) Compliance with any provision of the water conservation and drought contingency plan may be enforced by civil court action as provided by state and federal law.

(Ordinance adopted 2/7/12)

AN ORDINANCE OF THE CITY OF SAN ANGELO, TEXAS, AMENDING CHAPTER 11, ARTICLE 11.200 "WATER CONSERVATION AND DROUGHT CONTINGENCY PLAN", BY AMENDING SUBPART (d) ENTITLED "WATER SUPPLY STAGE-DROUGHT LEVEL I", OF SECTION 11.203 "DROUGHT STAGES AND WATER MANAGEMENT MEASURES" TO LIMIT WATERING OF LAWNS, GARDENS, LANDSCAPE AREAS, TREES, SHRUBS, GOLF COURSES (EXCEPT GREENS) OR OTHER PLANTS BEING GROWN OUTDOORS TO ONCE EVERY SEVEN DAYS; PROVIDING FOR SEVERABILITY; AND, PROVIDING FOR AN EFFECTIVE DATE.

BE IT ORDAINED BY THE CITY OF SAN ANGELO, TEXAS, THAT:

Section 1. THAT, Chapter 11, "Utilities & Solid Waste", Article 11.200 "Water Conservation and Drought Contingency Plan" of the Code of Ordinances of the City of San Angelo, Section 11.203 "Drought Stages and Water management Measures", subpart (d) "Water Supply Stage-Drought Level I", is hereby repealed in its entirety and a new subpart (d) entitled "Water Supply Stage-Drought Level I" of said Section 11.203 is hereby adopted to read as follows:

Section 11.203. **Drought Stages and Water Management Measures,** subpart (d):

"(d) Water Supply Stage - Drought Level I.

(1) The minimum criteria for this drought stage shall be the following.

The total amount of water available, as determined by the water utilities director, to the city from its developed water sources is less than a 24-month supply.

(2) In addition to the conservation measures stated in Section 11.202 of this article, the following additional water conservation measures shall be in force during Water Supply Stage - Drought Level I.

(A) The use of treated or raw city water for watering lawns, gardens, landscape areas, trees, shrubs, golf courses (except greens) or other plants being grown outdoors (not in a nursery) shall be prohibited at all times provided however a person may do such watering which shall be once ~~twice~~ every seven days during the period of April 1 through October 31 and once every 14 days during the period of November 1 through March 31 except during the "prohibited watering hours" as stated in Section 11.202.

(B) Golf courses greens may be watered daily except during the "prohibited watering hours" as stated in Section 11.202.

(C) Watering of "new landscape" shall be allowed in accordance with the provisions as stated in Section 11.202 for "new landscape."

(3) A fee shall be charged for water usage in the amounts as set forth below. This fee shall be in addition to the standard fee charged for water usage and shall be in lieu of the "excessive usage fee" as defined in Section 11.202.

(A) For single-family residential accounts, an additional fee of $2.00 per 1,000 gallons shall be charged for all usage from 25,000 thru 34,000 gallons during a billing period, an additional fee of $3.50 per 1,000 gallons shall be charged for all usage from 35,000 thru 44,000 gallons during a billing period, and an additional fee of $6.00 per 1,000 gallons shall be charged for all usage over 44,000 gallons during a billing period. Usage on a single-family residential account shall be the total usage at the address which is determined by adding together the usage on the meter supplying the residence and the usage on the meter(s) supplying water to the landscape watering system.

(B) For all landscape meters, except those at single family residences, schools, colleges, parks, cemeteries, golf courses or athletic facilities; an additional fee of $2.00 per 1,000 gallons shall be charged for all usage from 75,000 thru 94,000 gallons during a billing period, an additional fee of $3.50 per 1,000 gallons shall be charged for all usage from 95,000 thru 114,000 gallons during a billing period, and an additional fee of $6.00 per 1,000 gallons shall be charged for all usage over 114,000 gallons during a billing period."

Section 2. THAT, the terms and provisions of this Ordinance shall be deemed to be severable in that if any portion of this Ordinance shall be declared to be invalid, the same shall not affect the validity of the other provisions of this Ordinance

Section 3. THAT, this Ordinance shall be effective on the date of its adoption.

INTRODUCED on the 16th day of July, 2013, and finally PASSED, APPROVED and ADOPTED on this the 6th day of August, 2013

CITY OF SAN ANGELO, TEXAS

Dwain Morrison, Mayor

Attest:

Alicia Ramirez, City Clerk

Approved As to Content:

Ricky Dickson, Water Utilities Director

Approved As to Form:

Lysia Bowling, City Attorney

AN ORDINANCE OF THE CITY OF SAN ANGELO, TEXAS, ADOPTING A REVISED WATER CONSERVATION PLAN FOR THE CITY OF SAN ANGELO ENTITLED THE "CITY OF SAN ANGELO WATER CONSERVATION PLAN," DATED MARCH 20, 2014; SAID REVISED PLAN TO REPLACE THE "CITY OF SAN ANGELO WATER CONSERVATION PLAN" DATED MARCH 2, 2009 IN ITS ENTIRETY; AMENDING CHAPTER 11, ENTITLED "UTILITIES & SOLID WASTE", MORE PARTICULARLY BY AMENDING ARTICLE 11.200, ENTITLED "WATER CONSERVATION AND DROUGHT CONTINGENCY PLAN", SECTION 11.202, ENTITLED "WATER CONSERVATION MEASURES", TO REFLECT UNDER SAID SECTION THE MARCH 20, 2014 "CITY OF SAN ANGELO WATER CONSERVATION PLAN" ADOPTED BY CITY OF SAN ANGELO CITY COUNCIL HERETO; PROVIDING FOR SEVERABILITY; AND PROVIDING FOR AN EFFECTIVE DATE OF THIS ORDINANCE

WHEREAS, the City of San Angelo has completed a revision to its March 2, 2009 water conservation plan in compliance with Texas Commission on Environmental Quality and Texas Water Development Board minimum requirements; and

WHEREAS, the revised water conservation plan dated March 20, 2014, is required to be reviewed and revised every five years to include specific quantified 5 and 10 year targets and goals for water savings plan (the "City of San Angelo Water Conservation Plan" dated March 20, 2014) ; and

WHEREAS, the City of San Angelo City Council has determined that adoption of the "City of San Angelo Water Conservation Plan" dated March 20, 2014 is in the best interests of the City and its citizens to conserve its water supply;

WHEREAS, the "City of San Angelo Water Conservation Plan", Exhibit "A", dated March 20, 2014 replaces the "City of San Angelo Water Conservation Plan" dated March 2, 2009; and

WHEREAS, an amendment to Subsection 11.202(1), Conservation Plan, Section 11.202, Water Conservation Measures, Article 11.200, Water Conservation and Drought Contingency Plan, Chapter 11, Utilities & Solid Waste is required to adopt and incorporate said revised plan thereunder;

NOW THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF SAN ANGELO, TEXAS:

Section 1. The recitals and findings contained in the Preamble of this Ordinance are adopted by reference and incorporated as if fully set forth in this Section.

Section 2. The City of San Angelo City Council hereby approves and adopts the "City of San Angelo Water Conservation Plan" dated March 20, 2014, Exhibit "A".

Section 3. Chapter 11, entitled "Utilities & Solid Waste", Article 11.200, entitled "Water Conservation and Drought Contingency Plan", is amended in the following particulars:[1]

"CHAPTER 11

UTILITIES & SOLID WASTE

* * * * *

ARTICLE 11.200 WATER CONSERVATION AND DROUGHT CONTINGENCY PLAN

* * * * *

Sec. 11.202. Water Conservation Measures

* * * * *

(1) Conservation Plan. The "City of San Angelo Water Conservation Plan," dated ~~March 2, 2009~~ March 20, 2014, which is on file in the office of the city clerk, and available for public inspection, is adopted and incorporated herein.

* * * * *

Section 3. **THAT**, the following severability clause is adopted with this amendment:

SEVERABILITY:

That the terms and provisions of this ordinance shall be deemed to be severable in that if any portion of this ordinance shall be declared to be invalid, the same shall not affect the validity of the other provisions of this ordinance.

Section 4. **THAT**, this Ordinance shall be effective on, from and after the date of adoption.

INTRODUCED on the 1st day of April 2014, and finally PASSED, APPROVED and ADOPTED on this the 6th day of May, 2014.

CITY OF SAN ANGELO, TEXAS

Dwain Morrison, Mayor

ATTEST:

Alicia Ramirez, City Clerk

Approved as to content:

Ricky Dickson, Water Utilities Director

Approved as to form:

Lysia H. Bowling, City Attorney

[1] Words or figures stricken through shall be deleted. Underscored words or figures shall be added. The remaining provisions are now in effect and remain unchanged. Asterisks indicate omitted and unchanged material.

Appendix C
Water Rates — Current Rate Structure

#2012-02-017

AN ORDINANCE AMENDING APPENDIX A, ARTICLE 8.000 OF THE CODE OF ORDINANCES, CITY OF SAN ANGELO TEXAS, BY AMENDING SECTION 8.200 ENTITLED "MONTHLY WATER RATES" BY REPEALING SUBSECTION 8.200(a)(1) IN ITS ENTIRETY; AND ADOPTING A NEW SUBSECTION 8.200(a)(1) ESTABLISHING NEW USAGE RATES FOR RESIDENTIAL BUILDING AND LANDSCAPE METERS AND FIRE HYDRANT METERS, PROVIDING FOR SEVERABILITY, PROVIDING FOR A PENALTY AND PROVIDING FOR AN EFFECTIVE DATE

BE IT ORDAINED BY THE CITY OF SAN ANGELO:

1) THAT, Appendix A, Article 8.000 of the Code of Ordinances, City of San Angelo, Texas, Section 8.200, Monthly Water Rates, is hereby amended by repealing Subsection 8.200(a)(1) in its entirety and adopting a new Subsection 8.200(a)(1) to read as follows:

Sec. 8.200 Monthly Water Rates

(a) All persons supplied with water by the city shall be billed for water at the following monthly rates for water supplied on or after March 1, 2012.

(1)	Meter Size	Base Rate
	5/8"	$19.12
	1"	$23.14
	1-1/2"	$27.19
	2"	$35.86
	3"	$104.71
	4"	$130.73
	6"	$190.31
	8"	$257.97
	Residential Untreated Water	$23.14

Classifications — Rate per 1,000 Gallons

RESIDENTIAL (single-family residence, duplex, or other individually metered residential unit). Residential usage shall be the combined usage of the building meter and any landscape meter(s) serving the tract.

0-2,000 gallons — $2.32

Next 3,000 gallons	$3.46
Next 10,000 gallons	$4.07
Next 50,000 gallons	$4.37
Next 35,000 gallons	$4.52
Over 100,000 gallons	$4.82

COMMERCIAL, APARTMENT AND MOBILE HOME PARK

Building Meter

1,000 gallons and up	$3.83

Landscape Meter

1,000 gallons and up	
Winter*	$3.87
Summer**	$4.12

INDUSTRIAL, HOTEL, MOTEL, HOSPITAL, SCHOOL AND GOVERNMENT

Building Meter

1,000 gallons and up	$3.95

Landscape Meter

1,000 gallons and up	
Winter*	$3.92
Summer**	$4.17

Millersview-Doole

1,000 gallons and up	
Winter*	$5.62
Summer**	$6.32

Producers Lamb and Goat

1,000 gallons and up	$3.95
<u>Fire Hydrants</u>	
1,000 gallons and up	$3.95
<u>UNTREATED WATER</u>	
<u>Residential</u>	
0-5,000 gallons	$1.81
Next 5,000 gallons	$2.31
Over 10,000 gallons	$3.02
<u>Commercial, Apartment and Mobile Home Parks, Industrial, Hotel, Motel, Hospital, School and Government</u>	
1,000 gallons and up	$3.02

*Winter is the billing period of October through April.

**Summer is the billing period of May through September.

2) THAT all remaining subsections of Section 8.200 not amended by this ordinance remain in full force and effect.

3) THAT, the following severability clause is hereby adopted with this amendment:

SEVERABILITY:

That the terms and provisions of this Ordinance shall be deemed to be severable in that if any portion of this Ordinance shall be declared to be invalid, the same shall not affect the validity of the other provisions of this Ordinance.

4) THAT, the following penalty clause is adopted with this amendment:

PENALTY:

Any person who violates any provisions of this article shall be guilty of a misdemeanor and upon conviction shall be subject to a fine as provided for in Section 1.106 of this Code. Each day of such violation shall constitute a separate offense.

5) THAT, this Ordinance shall be effective on, from and after the 1st day of March 2012.

INTRODUCED on the 17th day of January, 2012, and finally PASSED, APPROVED and ADOPTED on this the 7th day of February, 2012.

CITY OF SAN ANGELO

Alvin New

Alvin New, Mayor

ATTEST:

By: Alicia Ramirez, City Clerk

Approved as to Content:

Will Wilde
Water Utilities Director

Approved as to Form:

Lysia H. Bowling
City Attorney

Appendix D
Water Conservation Plan
5 and 10 year goals for Water Savings

Development Board

WATER CONSERVATION PLAN
5- AND 10-YR GOALS FOR WATER SAVINGS

Facility Name: COSA - Water Utilities

Water Conservation Plan Year: 2014

	Historic 5yr Average	Baseline	5-yr Goal for year 2019	10-yr Goal for year 2024
Total GPCD[1]	156	168	150	145
Residential GPCD[2]	71	89	68	65
Water Loss (GPCD)[3]	19	22	17	15
Water Loss (Percentage)[4]	12 %	13 %	11 %	10 %

1. Total GPCD = (Total Gallons in System ÷ Permanent Population) ÷ 365
2. Residential GPCD = (Gallons Used for Residential Use ÷ Residential Population) ÷ 365
3. Water Loss GPCD = (Total Water Loss ÷ Permanent Population) ÷ 365
4. Water Loss Percentage = (Total Water Loss ÷ Total Gallons in System) x 100; or (Water Loss GPCD ÷ Total GPCD) x 100

Appendix E
Certificate of Convenience and Necessity

Public Utility Commission of Texas

By These Presents Be It Known To All That

CITY OF SAN ANGELO, TEXAS

having duly applied for certification to provide water utility service for the convenience and necessity of the public, and it having been determined by this Commission that the public convenience and necessity would in fact be advanced by the provision of such service by this Applicant, is entitled to and is hereby granted this

Certificate of Convenience and Necessity

numbered 10242 , to provide water utility service to that service area or those service areas designated by final Order or Orders duly entered by this Commission, which Order or Orders are on file at the Commission offices in Austin, Texas; and are matters of official record available for public inspection; and be it known further that these presents do evidence the authority and the duty of this Grantee to provide such utility service in accordance with the laws of this State and the Rules of this Commission, subject only to any power and responsibility of this Commission to revoke or amend this Certificate in whole or in part upon a subsequent showing that the public convenience and necessity would be better served thereby.

Issued at Austin, Texas, this 1st day of November, 1979.

Philip F. Ricketts
SECRETARY OF THE COMMISSION

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