WWE
Wright Water Engineers, Inc.
1666 N. Main Avenue, Suite C
Durango, Colorado 81301
(970) 259-7411 TEL
(970) 259-8758 FAX
www.wrightwater.com
e-mail:pfoster@wrightwater.com

Aug 18, 2020

Kevin Reidy
State Water Conservation Technical Specialist
Colorado Water Conservation Board
1313 Sherman St., Room 721
Denver, CO 80203

Re: City of Alamosa Water Efficiency Plan

Dear Mr. Reidy,

Wright Water Engineers, Inc., (WWE), on behalf of the City of Alamosa (City) is proud to present the *City of Alamosa Water Efficiency Plan* (WEP) for your review and approval. WWE developed the plan based on historical water demand data, water supply and distribution system information, and input provided by the City to best suit the City's future water supply needs.

The City completed a 60-day public comment period that lasted from March 20, 2020 through May 21, 2020. The City presented the draft WEP during a City Council work session on April 15, 2020. A copy of the public comment received, and the resolution are included in Appendix B of the WEP.

Sincerely,

WRIGHT WATER ENGINEERS, INC.

By _____
Peter R. Foster, P.E.
Vice-President

CITY OF ALAMOSA

By _____
Deacon Aspinwall
City of Alamosa Planning and Development Specialist

City of Alamosa
Water Efficiency Plan

Prepared for:

City of Alamosa
P.O. Box 419
Alamosa, CO 81101-0419

Wright Water Engineers, Inc.

Oct 2020

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ACRONYMS

Acronym	Term
AWWA	America Water Works Association
BMP	Guidebook of Best Practices for Municipal Water Conservation in Colorado
DOLA	Colorado Department of Local Affairs
EAWSD	East Alamosa Water Sanitation District
EPA	Environmental Protection Agency
gpcd	gallons per capita per day
gpd	gallons per day
IWR	Irrigation Water Requirement
MG	million gallons
MGD	million gallons per day
MWEPGD	Municipal Water Efficiency Plan Guidance Document
RGWCEI	Rio Grande Watershed Conservation and Education Initiative
SLV	San Luis Valley
SF	Square Foot
UDC	Uniform Development Code
WCP	Water Conservation Plan
WEP	Water Efficiency Plan
WLC	Water Audits and Water Loss Control for Public Water Systems document
WST	Water Smarts Team
WTP	Water Treatment Plant
WWE	Wright Water Engineers, Inc.

EXECUTIVE SUMMARY

The purpose of this Water Efficiency Plan (WEP) for the City of Alamosa (City) is to provide a guidance document to evaluate, prioritize, and implement water efficiency activities. The goals developed during this planning process are:

- to provide public education on water efficiency to the City
- to lower peak day water usage
- to assess new development for water use
- to reduce water consumption in parks by improving irrigation infrastructure
- to increase public awareness and support for the water efficiency activities
- to reduce metered residential water usage to 100 gallons per capita per day (gpcd)

The City's Water Treatment Plant (WTP) reached 88 percent of its current capacity and 74 percent of its peak capacity for treated water production during the past decade. The implementation of the WEP will help the City to improve water demand forecasts, plan for infrastructure needs, and manage water demands to stay within its available physical and legal water supply. The WEP proposes water efficiency activities that the City will implement for the main water supply infrastructure. The City will select water efficiency activities for implementation using a four-step process: assessment, identification, qualitative screening, and evaluation and selection. WWE provided the City with a spreadsheet for screening existing and potential water efficiency activities. The City will consider implementation of education and outreach measures, incentives for water efficiency appliances, low water use landscaping, and feasibility studies for increasing irrigation efficiency on public landscape areas including the golf course. The City will implement, monitor, and adjust the final selected water efficiency activities throughout the planning period for the effectiveness of water conservation.

The water efficiency activities selected by City of Alamosa's Water Smarts Committee are as follows:

1. Feasibility Study for City's Golf Course Irrigation System
2. K-12 Teacher and Classroom Education Programs
3. Message Development Campaign

4. Customer Surveys
5. Bill Stuffers
6. Conservation Kit Give-Aways
7. Irrigation Scheduling, Timing and Updates to systems
8. Incentives for Installation of Various Water Efficient Fixtures and Appliances Including Toilet Rebates
9. Assess xeriscaping and water efficient landscaping requirements in the Alamosa Unified Development Code

1.0 INTRODUCTION

1.1 Location

The City is located in Alamosa County on the eastern side of the San Juan Mountains and is considered the *Gateway to the Great Sand Dunes* (see Figure 1). The Rio Grande runs through town, flowing towards the southeast. The City was incorporated on August 30, 1878, and has a current estimated population of 9,296 people (Colorado State Demography Office, 2017), not including the East Alamosa Water and Sanitation District (EAWSD) population. The City has an elevation of 7,544 feet and receives 7.6 inches of annual precipitation on average.

1.2 Background

The City's water utility has experienced significant changes over the last few decades. Some of the key changes are provided in the following outline:

- 2007 Water Conservation Plan (2007 WCP) – The City completed a WCP to assist and motivate community members in water conservation planning and implementation.
- 2008 *Salmonella* Outbreak (2008 Outbreak) – Caused the City to perform multiple flushes of the municipal water supply.
- 2009 Water Treatment Plant (WTP) – A new WTP is constructed and is brought online in order to remove arsenic from the city's well water.
- 2010-2013 Institution Large-Scale Renovations (City Renovations) – Many institutions undergo large-scale renovations and reconstruction, including Adams State University,

San Luis Valley Regional Medical Center, Alamosa City Hall, and the consolidation of the two elementary schools into one new facility.

- 2011 Water Rate Increase (2011 Rate Increase) – Water usage rates were changed in 2011 and went into effect in 2012 with a 9.84 percent rate increase.
- 2015 Sub District No. 1 Summit – The State Engineer Promulgated Rules governing the withdrawal of Groundwater in the San Luis Valley to protect vested senior surface water rights and maintain a sustainable water supply in the confined and unconfined aquifer.
- 2015 Water Smarts Team (WST) – The team was organized to increase the water efficiency of the City through several means.
- 2016 Operational Assessments and Comprehensive Rate Studies – Willdan Financial Services and MSW Consultants prepared a rate study analysis for a ten-year forecast period of 2016-2025 with regards to the water, wastewater and solid waste divisions.
- 2016 Water Rate Increase (2016 Rate Increase) – Water usage rates were changed in 2016 and went into effect in 2017 with a 4.44 percent rate increase.

1.3 Approach

This WEP means to aid in spreading awareness and motivating action towards more efficient water management practices and water use. The City's agriculturally-dominant economy is a large factor in motivating the City to improve their water efficiency. For this WEP, Wright Water Engineers (WWE) relied on the *Municipal Water Efficiency Plan Guidance Document* prepared by AMEC (MWEPGD), *Guidebook of Best Practices for Municipal Water Conservation in Colorado* (BMP Guidebook), the EPA's *Water Audits and Water Loss Control for Public Water Systems* document (WLC), as well as information provided by City Staff. See Table for a summary of the team members who contributed towards this WEP and their role. For the City's WEP, WWE utilized the approach outlined below:

- Profile existing water supply system
- Profile water demands and historical water demand management
- Develop integrated planning and water efficiency benefits and goals
- Evaluate the land use code for potential water efficiency measures
- Select water efficiency activities

- Develop implementation and monitoring plan
- Public review and formal approval

2.0 PROFILE OF EXISTING WATER SUPPLY SYSTEM

2.1 Service Area

The City's current water service area within City limits covers approximately 3,564 acres, with an additional area of 874 acres located outside of City limits (see Figure 2). The City serves water to areas located outside of the City limits which include EAWSD, the Bonneyville Subdivision, and other parcels shown on Figure 2. The City serves approximately 2,309 residential accounts and the EAWSD provides water and sewer to approximately 1,700 residents. A master meter delivers water to EAWSD and the EAWSD tracks its metered deliveries by residential, commercial, institutional, and non-potable users. Table 2 shows the total population served for the City of Alamosa and EAWSD.

2.2 Water Supply Sources

The City water supply sources include ditches and groundwater wells, listed in Table 3 and shown on Figure 3. The City owns water rights in the Excelsior Ditch and the Independent Ditch. The sole source of potable drinking water is groundwater from the San Luis Valley aquifer from ten groundwater wells, seven of which are within City limits and one is located outside of City limits (see Figure 3). Two additional wells are currently unused for municipal water supply and are planned as water retirement sources. The annual groundwater production from the wells is listed in Table 4.

Additionally, EAWSD has two wells, the Highway 17 Well and the Brush Well, which may be used by the City for additional raw water if needed.

2.2.1 Irrigation and Non-Potable Water Supply Sources

Irrigation water supply sources include both the groundwater wells and the surface water from the ditches. Information on all the wells, ditches, and their rights are shown in Table 3. The Weber Street Well, Golf Course Well, and Murphy Street Well only supply non-potable water

for irrigation. The Price Well, Cole Park Well, Plant (Ross Street) Well, 12th Street Well, and 21st Street Well supply water for both non-potable irrigation and raw water to the water treatment plant (WTP) for potable use. The City owns 6.5 shares out of the 60 shares in the Excelsior Ditch, which diverts water directly from the Rio Grande. The shares in the Excelsior Ditch irrigate the back nine holes of the Municipal Golf Course, while the Golf Course Well irrigates the front nine holes.

2.2.2 Treated Potable Water Supply Sources (Wells)

As discussed above, the Price Well, Cole Park Well, Plant (Ross Street) Well, 12th Street Well, and 21st Street Well make up the City's supply water to the WTP where it is treated for drinking water, while also directly distributing non-potable water used for irrigation. The City constructed a new WTP which came online in 2009. The WTP has a capacity of 5 million gallons per day (MGD), with the ability to increase capacity to 6 MGD.

The Water Treatment Production Average is 2 MGD per year (see Table 5). Figure 4 shows the peak day finished water production (peak production) from the WTP. The City's peak day production of 4.4 MGD in 2010 and 2011 came close to existing capacity. In 2018, the peak day water production was 3.8 MGD. From 2009 to 2018, the peak day production of the WTP has ranged from 76 percent to 88 percent of current capacity. While the WTP can add an additional train, thereby increasing the capacity to 6 MGD, this is expensive to do. Thus, water conservation is an important consideration for the City in order to reduce water demand and extend the time before requiring the expansion of the WTP.

2.3 Water Storage and Distribution System

The City has two potable water storage tanks; Foster (1.25 million gallons) and Craft (500,000 gallons) totaling 1.75 million gallons. Additionally, the Ross Tower (194,000 gallons) is used as non-potable water storage. The City's average water use is 2.0 MGD (see Table 5). The City uses Weber Reservoir (375,000 gallons) for irrigation storage purposes when required. Total potable and non-potable water storage equal 2,319,000 gallons for the City.

From the storage tanks, the treated water is distributed through a network of pipes and is metered to the City's distribution system to approximately 2,720 billed accounts. Table 6 shows the

amount of water distributed starting from the water pumped from the wells to the metered water delivery to the users. Table 6 also shows the amount of water used for non-potable irrigation and calculates transmission and treatment losses. According to United States Environmental Protection Agency (EPA) the average transmission and distribution water losses in systems are 16 percent and up to 75 percent of that loss is recoverable. From years 2013 to 2017, the distribution system losses for unaccounted water only ranges from 5 percent to 8 percent (see Table 6).

2.4 Water Supply Limitations

Based on a review of the water supply sources, WWE identifies the following constraints that may limit the City's water supply:

- Groundwater Yield – Declining water pressure in the confined aquifer makes pumping more difficult and expensive. Also, this means less water is available, especially under the Rules Governing the Removal of Groundwater in District 3.
- Decreed Water Rights and Augmentation Supplies – The aquifers and surface water of the San Luis Valley are severely over-appropriated. The City's system returns much of the water pumped from the confined aquifer to the Rio Grande and surface streams, thereby offsetting injurious depletions (so called "accretion credits"). While judicial determination is still pending, the City plans to use this water as its augmentation source. However, the City has yet received judicial recognition of the accretion credits.
- Water Treatment Plant Capacity – The water treatment plant can produce up to 5 MGD and an additional capacity up to 6MGD. While the WTP reached a peak-day capacity of 88% in 2010 & 2011, the peak day production has decreased to 76% of capacity in 2018 due to conservation measures put in place by the City. Additionally, as State and Federal regulations pertaining to arsenic in drinking water become stricter, the ability of the plant to remove arsenic may have to be improved.
- Rio Grande Compact – The Compact governs all aspects of water usage, including water rights, augmentation, and future supplies. Also, the City is currently represented on the Municipal & Industrial Basin Implementation Plan update committee and working on ensuring municipal water supplies can be secured into the future.

Until the City has a decreed augmentation plan, it is difficult to fully understand how these constraints impact the City's water supply. Further, reuse of water is not an available option for the City. Under the pending augmentation plan, the City uses the accretion credits from the treated wastewater system to offset its injurious depletions.

3.0 WATER USE AND DEMANDS

3.1 Municipal User Categories and Historical Demands

Currently, there are 2,309 residential accounts, 333 commercial accounts, 72 institutional accounts, two non-potable accounts, and one East Alamosa Water and Sanitation District (EAWSD) account. The EAWSD serves approximately 1,700 residents and serves 427 taps.

The largest irrigators in the City are: 1) City of Alamosa Parks and Recreation Department 2) The municipal golf course, 3) Adams State University, and 4) The Alamosa School District. The City continues to work with the large irrigators to audit their irrigation systems and help access grants to fund irrigation system improvements. The City's non-potable irrigation water use fluctuates year to year. Since 2010 the irrigation water use overall has decreased by 15 percent (see Table 6).

Figure 5 shows the average water usage by sectors from 2013 to 2017, with the residential sector utilizing the most water at 59 percent. The commercial and institutional sectors equal 15 percent and 10 percent of water use, respectively. Figure 6 shows the water usage by sectors for 2017. The residential and commercial water usage in 2017 equals 61 percent and 20 percent, respectively, while the institutional water usage equals 4 percent of total water usage. Both Figure 5 and Figure 6 show that the City's residential sector consumes approximately two-thirds of the totaled metered water. Therefore, the City has focused more on residential water efficient processes.

Figure 7 shows the WTP finished water production and metered residential water usage over the 2013 to 2017 period. Over the 2013 to 2017 period, the WTP water production decreased by 16 gallons per-capita per-day (gpcd) and the residential water usage decreased by 8 gpcd. The average per capita residential meter water usage is 112 gpcd over the period. The City's goal is

100 gpcd for residential water usage. The City will apply the water efficiency activities to help increase future water conservation and reduce residential indoor and outdoor water use.

A typical household in Colorado averages about 150,000 gallons per year (411 gpd) to satisfy the typical demands of home and land water use (Waskom, R and Neibauer. M.,2014). Waskom and Neibauer (2014) indicate Colorado (state) uses an average of 55 percent of the total demands for outdoor use. The state's average outdoor demand is 226 gpd per tap (89 gpd per person) and the average indoor demand is 185 gpd (73 gpd per person). Table 7 represents the indoor and outdoor residential water usage only and should not include commercial, industrial and other municipal uses.

The City's residential indoor and outdoor use from 2013 through 2017 is summarize in Table 7. The City's residential indoor water use for the 2013 to 2017 period per tap is 229 gpd per tap (59 gpd per person). The City's outdoor water use typically occurs during roughly 180-day irrigation over May through October. The City's average annual residential outdoor water use for the 2013 to 2017 period is 199 gpd per tap (52 gpd per person), which is less than the state average annual outdoor use of 226 gallons per tap. The City's residential indoor and outdoor average totals 428 gpd per tap (199 gpd/tap plus 229 gpd/tap). The City's annual residential outdoor water use averages 46 percent of the of the total annual residential water use over the five-year period.

Table 8 represents a modelled residential account demand for the City based on:

- The annual average 2013 through 2017 calculated indoor water demand of 229 gpd per tap (Table 7)
- The average 2013 through 2017 calculated outdoor water demand of 199 gpd per tap (Table 7)
- Total 2013 through 2017 average residential water use of 428 gpd per account (tap).
- Modelled outdoor landscape demands are based on the average lawn irrigation water requirement (IWR) of 22.94 inches (1.91 Acre-Feet/Acre) calculated using a blaney-criddle method with adjustments for altitude, latitude, and turf grass.
- An irrigation efficiency of 70 percent. The irrigation efficiency equals the IWR (amount of water consumed by the turf grass) divided by the application rate (amount of water applied to the turf grass) and is a measure of over watering.

- A lawn irrigation application rate of 32.77 inches (2.73 Acre-Feet/Acre) based on 22.94 inches divided by 70 percent efficiency.
- An average lawn area of 3,575 square feet of bluegrass turf per residential Tap.

The efficiency and irrigated area were adjusted so that the annual average daily outdoor water use would equal 199 gallons per day. Thus, additional information on average residential lawn size may help in more accurately calculating the irrigation efficiency and vice versa. Given the modelled input the model is off by about 35 gallons per day on average. The model is over estimating the residential water demand in June by 73 gallons per day likely either because people are more efficient than 75% irrigation efficiency or the turf grass area per tap assumption is too high. The model is under estimating water use in October by 151 gallons per day, likely due to overwatering in October. Overall, the model shows there are water efficiencies that can be gained by increasing irrigation efficiencies and reducing landscape areas. More information on irrigation water needs in October is needed to better inform the model. Daily irrigation water requirements information to the public with a beginning and end of the landscape irrigation season can greatly reduce over water and increase irrigation water efficiencies.

3.2 Population Projection and Water Demand Forecast

For this WEP, the population projection estimates and future water demands calculation for the City uses a planning horizon of 2019 to 2050. Projected growth rates from the Colorado Department of Local Affairs (DOLA) for where and the following exponential equation calculates the population and water demand forecasts:

$$P = P_o e^{rt}$$

P = population

P_o = initial population

e = exponential

r = growth rate

t = time

3.2.1 Population Statistics and Projection

Based on population data from DOLA, the City's 2017 population is 9,296 people. EAWSD reports its population served equals 1,700 people. A summary of the City's and EAWSD's population from 2001 to 2017 is provided in Table 2, and the average annual growth rate (growth rate) of that period is 0.46 percent. DOLA's population forecast for Alamosa county from 2020 to 2050 predicts a growth rate of 0.39 percent. The growth rate calculates the standard population projection with the above equation. A growth rate of 0.1 percent is used for a low range population projection and a growth rate of 1.0 percent is used for a high range population projection. The population projections should be revisited on a regular basis to ensure that they are reflective of current available data and provide an approach to identify forecast demands suitable to meet the individual system water efficiency planning needs. The City and EAWSD's population projection for the year 2050 ranges from 11,286 people for the low range, to 15,189 people for the high range (See Figure 8).

3.2.2 Water Demand Projections

Based on the WTP finished water production provided by the City, the average per-capita water demand from 2010 to 2017 equals 184 gpcd (see Figure 9). The 184 gpcd includes all water uses in addition to residential. A rate increase was implemented by the City in 2011. Over years 2012 to 2017 the average per-capita water demand dropped to 171 gpcd. Due to a continued decrease in water usage after the 2011 Rate Increase, the projections use the 2012 to 2017 average per-capita demand of 171 gpcd.

The range of the forecasted water demands is based on the projected population multiplied by the average per capita water demands. The low range water demand projection for 2050 equals 704 million gallons (MG). The average water demand projection for 2050 equals 775 MG. The high range water demand projection for 2050 equals 948 MG (see Figure 10).

3.2.3 Water Demand Projections under Various Water Savings Scenarios

To examine the City's projected water demands under various water saving conditions, WWE used the low, average, and high range population growth projection to calculate the water demand projection, and applied 10, 20, and 30 percent savings.

Figure 11 shows 10, 20, and 30 percent savings applied to the **low range** water demand projection, which results with water demands of 634 MG per year, 564 MG per year, and 493 MG per year, respectively by the year 2050. Figure 12 shows 10, 20, and 30 percent savings applied to the **average** water demand projection, which results in water demands of 698 MG per year, 620 MG per year, and 543 MG per year, respectively by the year 2050. Figure 13 shows 10, 20, and 30 percent savings applied to the **high range** water demand projection, which results in water demands of 853 MG per year, 758 MG per year, and 664 MG per year, respectively, by the year 2050. Based on the City's future growth rate, the projected demands help provide the timing of acquiring additional water supply or the need to expand the WTP.

4.0 FUTURE WATER SUPPLY

Future water supply is dependent on the yield of the San Luis Valley (SLV) Confined Aquifer, the legal water supply from wells, surface water supplies, and the Rio Grande Compact. The City is in the process of obtaining a decreed augmentation plan for the water supply. Once the City has a decreed augmentation plan, the future water supply will be better understood.

5.0 WATER EFFICIENCY MEASURES, GOALS, AND ACTIVITIES

5.1 Existing Water Efficiency Measures

The City has implemented water efficiency measures that show a positive impact. The changes from the 2011 Rate Increase went into effect starting in 2012, with increases through the end of 2016. For the 2011 Rate Increase, flat rates were at a base $6.00 per meter with an additional volumetric charge based on the amount used. For a usage quantity of 0 to 8,000 gallons in 2012, there is a charge of $1.22 per 1,000 gallons, and by 2016, that charge went up to $1.41. The quantity usage charge goes up a flat rate for any usage above 100,000 gallons. Since the 2011 Rate Increase, well water production decreased from 2.5 million gallons in 2012 to 2.2 million gallons in 2018 (see Table 4). Finished water production from the WTP also decreased from 2.1 million gallons produced per day in 2012 to 1.7 million gallons produced per day in 2017 (see Table 5).

Changes from the 2016 Rate Increase went into effect in 2017, with increases planned through the end of 2021. The 2016 Rate are in residential, commercial, and industrial categories with an

additional volumetric charge increase of $2.70 per 1,000 gallons in 2017, which increases to $3.45 by 2021. The flat rate for residential usage in 2017 is $5.72 per meter, while for commercial and industrial usage, the flat rate is $8.10 per meter. In 2021 the flat rate for residential meters is up to $7.50, and the industrial and commercial flat rate is $10.62 per meter.

EAWSD 2017 rate structures are in residential and commercial categories. The residential and commercial monthly water service fee per tap is $25.00 with a volumetric charge of $2.00 per 1,000 gallons for 4,000 to 9,999 gallons, $2.50 per 1,000 gallons for 10,000 to 19,999 gallons, and $3.00 per 1,000 gallons for 20,000 gallons and above. The sewer fees for residential is $25.00 per unit. The commercial sewer fees are $35.00 plus $2.00 per 1,000 gallons after 4,000 gallons.

The City created the Water Smarts Team (WST) in 2015 to increase the City's water efficiency. Members include representatives from Adams State University, local tree nurseries, the Alamosa Tree Board, the Historical Preservation Board, SLV Water Conservancy District, EAWSD, and City employees. Some of the actions that the WST has organized include:

- Selection of sites to improve upon the landscape by replacing impervious surfaces with water conserving plants, mulches and pervious surfaces
- Creating a platform for the WEP by starting an educational program on xeriscaping, which includes launching a website

The City has developed a land development code that directs the applicant to prepare a water budget for the proposed landscaping plan and provide recommendations on water conservation measures in the landscaping plan for review and approval by the planning entity. This would create a new subsection §21-5-302(e): **Establishing Water Budgets.** All proposed landscapes for nonresidential and multifamily development that involve more than 1,000 square feet (SF) of landscaped area must include a water budget. All projects that require landscaping undergo a site plan review by city planning, and all projects with over 1,000 SF of landscaping must be professionally designed by a landscape architect. The size of the City allows an easy integration and most developers xeriscape as the City's location causes difficulty for plants to thrive.

The existing water-smart practices built into the code are, as follows:

§21-5-302(c)(2) Native and low-water demanding plants and turf shall be used where practicable.

(d) *Irrigation and soil moisture control.*

(1) Plants with similar water requirements shall be grouped together on the same irrigation hydrozone;

(2) High-irrigation turf and plantings shall be limited to appropriate high-use areas with high visibility and functional needs;

(3) Soil improvements shall be incorporated where necessary for healthy plant growth; and

(4) In permeable areas that are not covered by groundcover vegetation, mulch or rock shall be applied to help retain water in the soil and to help prevent erosion.

For the Fiscal and Infrastructure Impact Analysis section of the code, the City prepared an analysis of potential water savings activities to reduce water and sewer demands, including implementation, and methods of tracking or accounting of proposed water and sewer demand reductions. It is easy to incorporate into §21-6-101(c)(1) and make a new subsection (e): prepare an analysis of potential water savings activities to reduce water and sewer demands, including implementation, and methods of tracking or accounting of proposed water and sewer demand reductions. This can be tracked through the required "Landscape Improvement Agreement."

5.2 Selection of Water Efficiency Goals

WWE provided the City with an initial list of potential goals for consideration and selection for the WEP. The Water Smarts Committee evaluated the potential goals and selected goals that best suit the City's water efficiency needs.

The Water Smarts Committee decided that *Public Involvement, Public Acceptance,* and general *Education* were all inter-related and should be a high priority. It is the belief of the committee that a successful education program will enable greater success of future WEP goals. The committee also selected *Lowering Peak Day Use, Water Use of New Development,* and added the specific goal of *Reducing Water Consumption in Parks by Improving Irrigation Infrastructure.*

An additional goal of meeting an average 100 gpcd for metered water delivery to residential household discussed during the development.

Currently the City is averaging 112 gpcd (see Figure 7). A reduction of 12 gpcd to meet the 100 gpcd goal is a 10.7% reduction. Thus, for purposes of this plan, the City is proposing a 10 percent water savings goal. For the water use over all of the water use sectors, the City is proposing an overall 4 percent water use reduction.

5.3 Selection of Water Efficiency Activities

5.3.1 Selection of Water Efficiency Activities for Final Review

WWE provided a spreadsheet to the City for screening existing and potential water efficiency activities. Appendix A documents the selection process.

The activities selected for further evaluation include:

- Review of rates charged to EAWSD versus the water budget for providing water to EAWSD.
- Water Audit training and perform Water Audit on the distribution system through the Colorado Water Loss Initiative free training program. Specifically, the American Water Works Association (AWWA) M36 Water Audit training.
- Feasibility Study for redoing the City Golf Course's aging irrigation system, as well as for high-use municipal parks, and potential replacement of cast iron pipes throughout the City's distribution system.
- Incentives for installation of various water efficient fixtures and appliances, including toilet rebates.
- Incentives for turfgrass replacement for water-efficient landscapes, xeriscaping, and efficient irrigation practices.
- Assess the inclusion of xeriscaping and water-efficient landscaping requirements into the Uniform Development Code (UDC).
- Public and customer education and outreach efforts for water efficiency, including bill stuffers, newsletters, web pages and online surveys, water audit training, water fairs,

classroom education for teachers and students. Another aspect of public education is feedback through customer surveys, letters, and conversations to more effectively convey water efficiency information and to reach a larger audience.

    - Customer water use and landscape design and maintenance workshop.

- Develop or assign position of Water Conservation Expert to work the City. Such duties will fall under responsibility of the recently created Public Information Officer position and/or the City Planning and Development Specialist.

5.3.2 Final Selected Water Efficiency Measure for This Plan

After the City's initial screening, WWE and the City met to evaluate the selected activities for further evaluation and decide upon the final water efficiency activities selected for the WEP.

- Assess xeriscaping and water efficient landscaping requirements in the Alamosa Uniform Development Code
- K-12 Teacher and Classroom Incentives including Toilet Rebates
- Bill Stuffers
- Customer Surveys
- Feasibility Study for City's Golf Course Irrigation System
- Message Development Campaign
- Education Programs Evaluating Efficiencies Plumbing
- Conservation Kit Give-Aways
- Irrigation Scheduling/Timing/Updates to Systems
- System Water Audits

5.4 Estimated Water Savings of Efficiency Activities

From the BMP Guidebook, there are estimated water savings for certain water efficiency activities, including the water efficiency activities selected by the City. The estimated annual savings for the final selected water efficiency measures for this plan is approximately 28 Million Gallons per Year (see Appendix A, Step 7). Given an annual water treatment production (2013 through 2017) of 627.8 million gallons per year, the proposed saving of 28 million gallon per

year equals a 4 percent annual percent savings. The water efficiency activities evaluation and selection process are provided in Appendix A.

6.0 IMPLEMENTATION AND MONITORING PLAN

6.1 Implementation Plan

6.1.1 Order and Timing for Plan Implementation

The anticipated order of the implementation of the selected water efficiency activities is by the following:

1) Feasibility Study for City's Golf Course Irrigation System
2) K-12 Teacher and Classroom Education Programs
3) Message Development Campaign
4) Customer Surveys
5) Bill Stuffers
6) Conservation Kit Give-Aways
7) System Water Audit
8) Irrigation Scheduling/Timing/Updates to systems
9) Evaluating Efficiencies Plumbing Incentives including Toilet Rebates
10) Assess xeriscaping and water efficient landscaping requirements in the Alamosa Uniform Development Code

For planning purposes only, the anticipated timing for selected water efficiency activities to begin are shown in Table 9. Approximated start times may vary depending on funding availability and costs.

6.1.2 Additional Actions for Plan Implementation

Once the WEP is reviewed and approved by CWCB there are several action items necessary to implement the water efficiency activities. These action items include conducting a feasibility study on the efficient irrigation systems, introduce future annual program for toilet rebates to the public, training staff to administer the WEP and monitor water savings, and training staff to preform public outreach and education for the water efficiency activities.

6.1.3 Entities or Staff Responsible for Implementing the Water Efficiency Activities

- Feasibility Study for City's Golf Course Irrigation System: Coordination among Parks and Recreation and Adams State University with the study.
- K-12 Teacher and Classroom Education Programs: Coordination among the Public Works, Parks and Recreation, and Rio Grande Watershed Conservation and Education Initiative (RGWCEI) for piggy-backing on the existing program.
- Message Development Campaign: Coordination among Public Works, Parks and Recreation, RGWCEI, and other regional partners.
- Customer Surveys: Coordination among Public Works and Parks and Recreation.
- Bill Stuffers: Coordination among Public Works, Parks and Recreation, and the Finance Department.
- Conservation Kit Give-Aways: Coordination among Public Works and Parks and Recreation.
- System Water Audit: Coordination among Public Works
- Irrigation Scheduling/Timing/Updates to systems: Coordination among the Parks and Recreation to manage installation, and Public Works to collect usage trends.
- Evaluating Efficiencies Plumbing Incentives including Toilet Rebates: Coordination among Public Works and Parks and Recreation.

6.2 Monitoring Plan

The monitoring plan will adapt and adjust over the course of plan implementation depending on changing conditions to capture the effectiveness of the water efficiency activities and to monitor water efficiency activities as they too may adapt properly. Would recommend assigning a staff person to monitor the effectiveness of the water efficiency activities.

6.2.1 Monitoring Considerations

In addition to collecting, maintaining and tracking the monitoring data, the City should periodically consider the following aspects for each water efficiency activity:

- Annual costs and avoided costs
- Actual water savings realized
- Public feedback
- Lessons learned
- Any significant changes relevant to the water efficiency activities
- Potential improvements for increased efficiency and ease

6.2.2 Evaluation and Communication of Monitoring Data

It is recommended that the City frequently provides its decision makers with evaluations and communications with regards to monitoring data, along with recommendations on how to improve the effectiveness of each activity. It is beneficial to keep these processes ongoing, occurring at a minimum of every two years. Frequency of these processes assists in effectively utilizing the monitoring data.

6.2.3 Monitoring of Water Savings

Comparing recent per-capita water demands to past demands provides an estimation of overall water savings. Per-capita savings may estimate for individual water efficiency activities, or for the water efficiency activities that are overlapping, depending on timing of implementation of water efficiency activities. When estimating water savings, consider additional factors such as drought, watering restrictions, and interruptions in service that will influence per-capita water demands.

6.2.4 Data Organization and Adaptive Adjustments

Thorough and well-organized documentation of monitoring data and the associated decisions made to adapt water efficiency activities will play a key role in the success of the WEP. Maintaining thorough and well-organized documentation will provide current and future decision makers with a clear idea of which activities are most effective for water savings, which aspects of WEP implementation could use improvement, and will assist when updates are made to the WEP.

7.0 PUBLIC REVIEW AND FORMAL APPROVAL

In March 2020, WWE provided the City a draft of the WEP, which the public reviewed and provided feedback. WWE corresponded with CWCB regarding the public review and provided a draft of the WEP.

7.1 Public Review Process

The City published the public notice regarding the WEP public review process in the local newspaper on March 16th, 2020 (see Appendix B). During the public review process, the City also had an interview with the local radio station, KRZA, on March 24th, 2020. The interview helped notify and allow the public a period of sixty days to review the draft WEP. WWE then incorporated the City's comments and provided feedback into the final WEP. The public comments received and resolution is attached in Appendix C.

7.2 Local Adoption and State Approval Processes

On April 15th, 2020 the City Council held a work session to review the WEP. The City Council adopted the WEP on May 21st, 2020.

As the first steps of implementation of the WEP, on May 20th, 2020, the Council passed Ordinance No. 12-2020, 5-2 that restricts the use of water, and limiting times when residents may water their lawns.

The City sent the final WEP to CWCB for formal state approval as of the date of this final report.

7.3 Periodic Review and Update

The Water Smarts Committee will review and update as needed on an annual basis. A formal review and update to the WEP is scheduled no later than every seven years.

8.0 REFERENCES

AMEC Environment & Infrastructure, Inc. 2012. *Municipal Water Efficiency Plan Guidance Document.* Colorado Water Conservation Board. Denver, CO.

Colorado WaterWise and Aquacraft, Inc. 2010. *Guidebook of Best Practices for Municipal Water Conservation in Colorado.* Colorado WaterWise. Denver, CO.

U.S. Environmental Protection Agency. 2013. Water Audits and Water Loss Control for Public Water Systems, EPA 816-F-13-002.

Waskom, R., and M. Neibauer. "Water Conservation In and Around the Home - 9.952." Extension, Colorado State University, Oct. 2014, https://extension.colostate.edu/topic-areas/family-home-consumer/water-conservation-in-and-around-the-home-9-952/.

P:\181-100 City of Alamosa\000\Red Dot WEP\RED DOT\To CWCB\2020.08.18 Alamosa Final WEP with CWCB's comments.docx

TABLES

Table 1
City of Alamosa
Project Team

Name	Title/Role	Expected Contribution
Wright Water Engineers, Inc.		
Peter Foster, P.E.	Project Manager	Lead overall project, direct consultant team, and perform project work.
Ben Von Thaden	Consultant	Compose significant portions of the WEP including profile of the City's distribution system, attend meetings with City of Alamosa Officials, gather data and information from the City for inclusion into the WEP, GIS mapping, coordination, and support the Project Manager and fellow project team members throughout development of the WEP.
Trevor Downing	Consultant	Provide GIS assistance, contribution of content and review of the WEP document.
Hayes Lenhart, P.E.	Consultant	Provide counsel and QA/QC review of the WEP, attended meetings with City of Alamosa Officials, and ensure the WWE team has organizational resources needed to successfully and efficiently complete the project.
Danielle Nelson	Consultant	Assisting with compiling data and information to make progress on the WEP.
City of Alamosa		
Harry Reynolds	Public Works Director	Will help provide additional data and information to profile the existing water supply system, profile water demands and historical demand management, and help select potential water efficiency approaches and water conservation efforts.
Nicole Valdez	Public Works Department Office Manager	Will assist Harry with providing data for historical water demands and demand management.
Kristen Reynolds	Financial Analyst	Will provide detailed historical billing information.
Deacon Aspinwall	Planning and Development Specialist	Will act as the primary contact for the City, as well as with the selection of potential water efficiency approaches and water conservation efforts.

Table 2
City of Alamosa
Population Data
(Including EAWSD)

Census Year	Total Population	Average Annual Rate
	(1)	(2)
2001	10,124	-
2002	10,168	0.44%
2003	10,263	0.94%
2004	10,317	0.52%
2005	10,327	0.10%
2006	10,315	-0.11%
2007	10,289	-0.25%
2008	10,302	0.12%
2009	10,289	-0.12%
2010	10,270	-0.18%
2011	10,413	1.39%
2012	10,429	0.16%
2013	10,547	1.13%
2014	10,632	0.81%
2015	10,728	0.90%
2016	10,854	1.18%
2017	10,920	0.60%
Average (2001-2017)		**0.46%**

Notes

Column (1): City Population data from the Colorado Department of Local Affairs (DOLA) for Alamosa City + Average EAWSD Population data from United States Census of Bureau (USCB)

Column (2): (Current year Column (2) - previous year Column(2)) / previous year Column (2)

Table 3
City of Alamosa
Water Rights Summary

Structure Name	Decreed Name	Structure ID (WDID)	Administration Number	Adjudication Date	Appropriation Date	Registration/ Permit Number	Case Number	Original Decreed Rate (CFS)	Alternate Point Decreed Rate (CFS)	Decreed Volume (AF/day)	Adjudication Type	Priority	Status	Decreed Uses	Decree Comments	Notes
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
12th Street Well	2 W-1778	2006316	36828	12/31/1972	10/31/1950	4568-R-R	W-1778, 02CW0043	4.01		8.02	O		Absolute	Municipal, Domestic	W1778 NO 1 + W3526 NO 7 ALT PTS 4568	
[1]21st Street Well	7 W-3526	2005143	39232	12/31/1972	5/31/1957	16667-F	W-3526	5.35	0.223	0.446	AP		Absolute	Municipal, Domestic	ALT PT FOR ALAMOSA PLANT WELL NO. 1	Not decreed as separate water right, only as an alternate point for W-1778 Nos. 1,2,3,4. Original decreed rate (not as an alternate point) was 5.35
			33602		12/31/1941				1.78	3.56					ALT PT FOR ALAMOSA PLANT WELL NO. 1	
			36828		10/31/1950				4.01	8.02					ALT PT FOR ALAMOSA 12TH STREET WELL NO. 2	
			31776		12/31/1936				1.34	2.68					ALT PT FOR ALAMOSA COLE PARK WELL NO. 3	
			41424		6/1/1963				4.01	8.02					ALT PT FOR ALAMOSA MURPHY ST WELL NO. 4	
Cole Park Well	3 W-1778	2006317, 2007061	31776	12/31/1972	12/31/1936	4569-R	W-1778, 02CW0043	1.34		2.68	O		Absolute	Municipal, Domestic, Evaporation	W1778 NO 1 + W3526 NO 7 ALT PTS 4569, EVAPORATION SWAP	
Golf Course Well	6 W-1778	2006406	38928	12/31/1972	7/31/1956	013419-F	W-1778, 02CW0043	1.34		2.68	O		Absolute	Municipal, Domestic	W1778 NO 1 + W3526 NO 7 ALT PTS 4345	
Murphy Street Well	4 W-1778	2006408	41424	12/31/1972	6/1/1963	4345-F	W-1778, 02CW0043	4.01		8.02	O		Absolute	Municipal, Domestic	W1778 NO 1 + W3526 NO 7 ALT PTS 4345	
Plant Well (Ross Street)	1 W-1778	2005066	33602	12/31/1972	12/31/1941	4567-R	W-1778, 02CW0043	1.78		3.56	O		Absolute	Municipal, Domestic	W1778 NO 1 + W3526 NO 7 ALT PTS,LOC IN LOT 7,BLK58,ALAMOSA 4567	
			39232		5/31/1957			0.223		0.44	O				W1778 NO 1+ W3526 NO 7 ALT PTS	
[1]Weber Street Well	5 W-1778	2005067	39232	12/31/1972	5/31/1957	16665-F	W-1778, 02CW0043	1.78	0.223	0.446	AP		Absolute	Municipal, Domestic	ALT PT FOR ALAMOSA PLANT WELL NO. 1	Not decreed as separate water right, only as an alternate point for W-1778 Nos. 1,2,3,4
			33602		12/31/1941				1.78	3.56					ALT PT FOR ALAMOSA PLANT WELL NO. 1	
			36828		10/31/1950				4.01	8.02					ALT PT FOR ALAMOSA 12TH STREET WELL NO. 2	
			31776		12/31/1936				1.34	2.68					ALT PT FOR ALAMOSA COLE PARK WELL NO. 3	
			41424		6/1/1963				4.01	8.02					ALT PT FOR ALAMOSA MURPHY ST WELL NO. 4	
Price Well	1 W-1294	10478	42652	12/31/1972	10/11/1966	10893-F	W-1294	3.34		6.68	O		Absolute	Municipal, Commercial, Industrial, Recreation, Domestic	10893	Owned by EAWSD and only relevant pursuant to contact for treatment
Vercoles Well	1 W-2431	2005419	41957	12/31/1972	11/15/1964	6147-F-R, 6147-F	W-3951, 10CW0013 (formerly W-2431)	2.97		5.94	O		Absolute	Irrigation, stock	6147	Planned to retire as source of sustainability, pending case No. 2018CW3012. Alamosa city owns a 250 AF share of the well.
			27758		12/31/1925				0.334	0.668	O,TT		Absolute		TF W2431 WELL NO. 2	
			27758		12/31/1925				0.334	0.668	O,TT		Absolute		TF W2431 WELL NO. 3	
			42063		3/1/1965				0.033	0.066	O,TT		Absolute		TF W2431 WELL NO. 4	
			35063		12/31/1945				0.045	0.09	O,TT		Absolute		TF W2431 WELL NO. 12	
Valley Land Well	1 W-2233	2005927	39817	12/31/1972	1/6/1959	2053-F	W-2233	5.34		10.68	O		Absolute	Irrigation	2053	Planned to retire as source of sustainability, pending case No. 2018CW3012. Alamosa city owns a 700 AF share of the well.
Excelsior Ditch	Excelsior Ditch	627	9222	5/1/1896	4/1/1875		CA0741	8.4			O,TT	74	Absolute	Irrigation	CA 4/ 8/1924 TF SAN LUIS VALLEY CANAL 74	Associated with Alamosa Ranch. Not yet been quantified for a change in use, as the City would have to negotiate or litigate with the Excelsior Ditch board of directors to change their bylaws to allow for a change in type of use for this water. Alamosa city owns 6.5 shares out of the total 60 shares.
			10500	5/1/1896	9/30/1878		5/1/1896	45.7			O	163	Absolute	Irrigation	CORR LOC ACB 163	
			12204	5/1/1896	5/31/1883		CA0741	6.2			O,TT	249	Absolute	Irrigation	CA 4/ 8/1924 TF SAN LUIS VALLEY CANAL 249	
			12569	5/1/1896	5/30/1884		5/1/1896	29.4			O	262	Absolute	Irrigation	262	
			47116.40116	12/31/1979	11/1/1959		01CW0020	89.7			S		Absolute	Recharge	DIVERSIONS LTD TO NOVEMBER & DECEMBER. NEW POD FOR 79CW91.	
											S,C		Conditional			
Independent Ditch	Independent Ditch	680	10675	5/1/1896	3/24/1879		05/01/1896	[2]11.2			O	166	Absolute	Irrigation	166. Water source: Rio Grande [01385432] @ stream mile 56.22	Associated with Alamosa Ranch. The Independent Ditch water has previously been quantified (Agro Engineering, 2011) and the excursions of the amount of water available in wet and dry years. The City of Almosa owns 6.5 out of the 60 shares. 1 cfs of this water belongs to the Polston school property. Another 2.3 cfs has been dedicated in Case 2009CW33 to allow for the irrigation of the Back 9 of the Golf Course and to cover the ground water evaporation from the Borrow Pond. From 2007 City of Alamosa Water Conservation Plan "The City also owns water rights associated with the "Alamosa Ranch" purchased in 1997. The most significant of these rights are associated with the Independent or "Maddux Ditch" at 470 af/yr of consumptive use and the Excelsior Ditch at 526 af/yr of consumptive use. Converting the rights from the Maddux Ditch or Excelsior Ditch, which are decreed for agricultural use, to municipal use would require a "change of beneficial use" by the Colorado Water Court. This is a complex process that could take some time." (p. 5)

Notes

[1]These wells do not have separate adjudication of rights. They are alternate points of diversion for the other wells.

[2]From Agro Engineering - Alamosa Augmentation Plan Options and Needs Analysis - April 15 2015

Adjudication Types: O - Original, AP - Alternate Point, TT - Transfer to, S - Supplemental, C - Conditional

Column (1): Structure name from City of Alamosa Judgement and Decree Adjudicating Water Right
Column (2): Decreed name from City of Alamosa Judgement and Decree Adjudicating Water Right
Column (3): Structure ID from City of Alamosa Judgement and Decree Adjudicating Water Right
Column (4): Administration number from City of Alamosa Judgement and Decree Adjudicating Water Right
Column (5): Adjudication date from City of Alamosa Judgement and Decree Adjudicating Water Right
Column (6): Appropriation date from City of Alamosa Judgement and Decree Adjudicating Water Right
Column (7): Registration number from City of Alamosa Judgement and Decree Adjudicating Water Right
Column (8): Case number from City of Alamosa Judgement and Decree Adjudicating Water Right
Column (9): Original decree rate from City of Alamosa Judgement and Decree Adjudicating Water Right
Column (10): Alternate point decreed rate from City of Alamosa Judgement and Decree Adjudicating Water Right
Column (11): Decreed volume from City of Alamosa Judgement and Decree Adjudicating Water Right
Column (12): Adjudication type from City of Alamosa Judgement and Decree Adjudicating Water Right
Column (13): Priority number from Colorado Division of Water Resources Department of Natural Resources Structure Summary Report
Column (14): Status from Colorado Division of Water Resources Department of Natural Resources Structure Summary Report
Column (15): Decreed uses from City of Alamosa Judgement and Decree Adjudicating Water Right
Column (16): Decreed comments from City of Alamosa Judgement and Decree Adjudicating Water Right
Column (17): Notes from various sources

Table 4
City of Alamosa
Well Production

Year	Water Pumped From Wells	
	(million gallons/year)	(million gallons/day)
	(1)	(2)
2001	860.8	2.4
2002	941.0	2.6
2003	821.5	2.3
2004	783.3	2.1
2005	837.6	2.3
2006	818.9	2.2
2007	817.7	2.2
2008	895.7	2.5
2009	885.7	2.4
2010	985.6	2.7
2011	866.3	2.4
2012	897.7	2.5
2013	783.2	2.1
2014	845.2	2.3
2015	770.5	2.1
2016	748.0	2.0
2017	721.7	2.0
2018	789.1	2.2
Minimum	**721.7**	**2.0**
Maximum	**985.6**	**2.7**
Average	**840.0**	**2.3**

Notes

Column (1): Total water pumped from the City's wells each year, provided by the City of Alamosa

Column (2): Column (1) / 365 days

Table 5
City of Alamosa
Water Treatment Plant Finished Water Production
(Including EAWSD)

Year	Population	WTP Finished Water Production (million gallons/year)	WTP Finished Water Production (million gallons/day)	WTP Finished Water Production per Person (gallons/day/ person)	WTP Finished Peak Day Water Production (million gallons/day)	Metered Water (million gallons/year)	Metered Water (gallons/day/ person)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
2010	10,270	789.8	2.2	210.7	4.4	-	-
2011	10,413	796.0	2.2	209.4	4.4	-	-
2012	10,429	765.7	2.1	201.2	4.0	-	-
2013	10,547	701.9	1.9	182.3	3.9	646.4	167.9
2014	10,632	680.2	1.9	175.3	3.6	645.7	166.4
2015	10,728	667.3	1.8	170.4	3.9	627.6	160.3
2016	10,854	665.5	1.8	168.0	4.1	621.1	156.8
2017	10,920	631.7	1.7	158.5	4.0	592.6	148.7
Minimum	**10,270**	**631.7**	**1.7**	**168.5**	**3.6**	**592.6**	**148.7**
Maximum	**10,920**	**796.0**	**2.2**	**199.7**	**4.4**	**646.4**	**167.9**
Average	**10,599**	**712.3**	**2.0**	**184.1**	**4.0**	**626.7**	**160.0**

Notes

Column (1): City of Alamosa population data from the Colorado Department of Local Affairs (DOLA) + EAWSD population data from the United States Census of Bureau (USCB).

Column (2): Finished million gallons of water produced from the water treatment plant per year, provided by the City of Alamosa

Column (3): Column (2) / number of days per year

Column (4): Column (3) x 1,000,000 / Column (1)

Column (5): Finished million gallons of peak day water production from the water treatment plant per year, provided by the City of Alamosa

Column (6): Total water measured by the meters per year, provided by the City of Alamosa (no records before 2013)

Column (7): Column (5) x 1,000,000 / Column (1) / 365

Table 6
City of Alamosa
Water Production Usage
(Including EAWSD)

Year	Metered Water Pumped from Wells	Calculated Non-potable Irrigation Water from Wells and Transmission and Treatment Losses	Metered Treated Water Production	Metered Water Delivered	Calculated Unaccounted for Water (Distribution System Losses and Unbilled Water)	
	(million gallons/year)	(million gallons/year)	(million gallons/year)	(million gallons/year)	(million gallons/year)	(%)
	(1)	(2)	(3)	(4)	(5)	(6)
2010	985.6	195.8	789.8	-	-	-
2011	866.3	70.3	796.0	-	-	-
2012	897.7	132.0	765.7	-	-	-
2013	783.2	81.3	701.9	646.4	55.5	8%
2014	845.2	165.0	680.2	645.7	34.5	5%
2015	770.5	103.2	667.3	627.6	39.8	6%
2016	748.0	82.5	665.5	621.1	44.4	7%
2017	721.7	90.0	631.7	592.6	39.1	6%

Notes

Column (1): Total water pumped from City's wells each year, provided by the City of Alamosa

Column (2): Column (1) - Column (3)

Column (3): Finished million gallons of water produced from the water treatment plant per year, provided by the City of Alamosa

Column (4): Total water measured by the meters per year, provided by the City of Alamosa (no records before 2013)

Column (5): Column (3) - Column (4)

Column (6): Column (5) / Column (3)

Table 7

Indoor versus Outdoor Residential Water Usage (Excluding EAWSD)

City of Alamosa

Year	Population	Approx. Number of Household Accounts (taps)	Residential Indoor (Non Irrigation) Water Use			Residential Outdoor (Irrigation) Water Use			% Annual Of Outdoor Water Use
			(million gallons)	(gallons/day/ person)	(gallons/day/ tap)	(million gallons)	(gallons/day/ person)	(gallons/day/ tap)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2013	9,010	2,308	215	65	255	165	50	195	43%
2014	9,061	2,404	205	62	234	167	51	191	45%
2015	9,126	2,408	190	57	217	175	53	199	48%
2016	9,205	2,459	189	56	211	184	55	205	49%
2017	9,296	2,309	193	57	228	170	50	202	47%
City's Average			198	59	229	172	52	199	46%
Colorado State Average				73	185		89	226	55%

Notes:

Column (1): Population data from the Colorado Department of Local Affairs (DOLA) (population without EAWSD)

Column (2): The number of residential accounts in the City of Alamosa provided by the City of Alamosa (without EAWSD accounts)

Column (3): The annual average residential indoor water usage, provided by the City of Alamosa

Column (4): Column (3) / Column (1) / 365

Column (5): Column (3) / Column (2) / 365

Column (6): The annual average residential outdoor water usage, provided by the City of Alamosa

Column (7): Column (6) / Column (1) / 365

Column (8): Column (6) / Column (2) / 365

Column (9): Column (6) / (Column (3) + Column (6))

Table 8
City of Alamosa
Modelled Residential Water Demands

Month	Modelled Water Usage				Metered Water Usage	
	Indoor Use	Average Irrigation Water Requirement	Landscaping	Total Demands	Total Residential Use	Difference between Modelled and Metered
	(gallons/day)	(Inches)	(gallons/day)	(gallons/day)	(gallons/day)	(gallons/day)
	(1)	(2)	(3)	(4)	(5)	(6)
January	204	0.00	0	204	204	0
February	276	0.00	0	276	276	0
March	193	0.00	0	193	193	0
April	291	0.00	0	291	291	0
May	229	2.79	287	516	471	45
June	229	5.75	610	839	766	73
July	229	5.83	599	828	756	72
August	229	4.72	485	714	678	36
September	229	3.66	388	617	659	42
October	229	0.19	20	249	399	151
November	228	0.00	0	228	228	0
December	197	0.00	0	197	197	0
Averages	230	22.94	199	429	427	35

Notes:

Column (1): Gallons of average indoor water usage based on metered usage from November through April and average indoor use of 229 during May through October

Column (2): The average irrigation water requirement for the City of Alamosa.

Column (3): Using a calculated irrigation water requirement of 1.91 ft per year for bluegrass use on a total lawn area of 3,575 sqft with an irrigation efficiency of 70%, equaling an application rate of 2.39 ft per year.

Column (4): Equals Column (1) + Column (3)

Column (5): Gallons of average indoor water usage based on metered usage from 2013 to 2017, provided by the City of Alamosa.

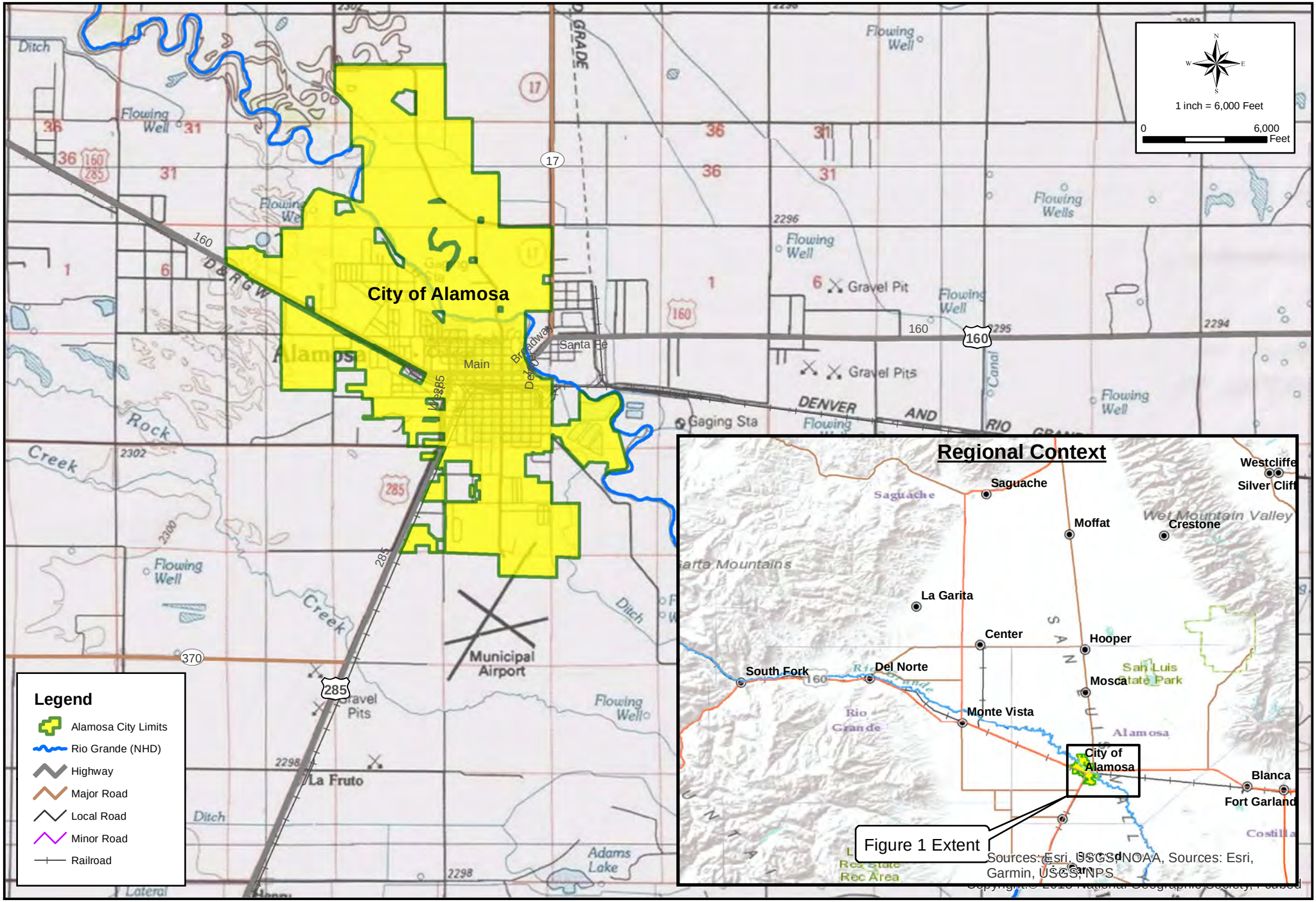
Column (6): Gallons of water difference between total residential water use and total modelled water demands.

Table 9
Implementing Alamosa Water Efficiency Activities Approximated Dates (For Planning Purposes)
City of Alamosa

	Activities	Start Date
1	Feasibility Study for City's Golf Course Irrigation System	*3/1/2021*
2	K-12 Teacher and Classroom Education Programs	*4/1/2021*
3	Message Development Campaign	*4/1/2021*
4	Bill Stuffers	*5/1/2021*
5	Customer Surveys	*8/1/2021*
6	Conservation Kit Give-Aways	*1/1/2022*
7	System Water Audit	*2/1/2022*
8	Irrigation Scheduling/Timing/Updates to Systems	*3/1/2023*
9	Incentives for Installation of Various Water Efficient Fixtures and Appliances Including Toilet Rebates	*1/1/2024*
10	Assess xeriscaping and water efficiency landscaping requirements in the Alamosa Unified Development Code	*2/1/2024*

Notes
*Start Dates may vary on available funding and cost of WEP activities.
**Final Water Efficiency Plan must be submitted reviewed and accepted by the CWCB prior to final issuance of grant money.

FIGURES



Date: 8/26/2019 Document Path: P:\181-100 City of Alamosa\000\Mapping\Figure 1 - Alamosa General Location Map_ landscape_10.2.mxd

User Name: bvonthaden

WWE
Wright Water Engineers, Inc.
1666 N. Main Ave., Ste.C
Durango, CO 81301
(970) 259-7411 ph 259-8758 fx

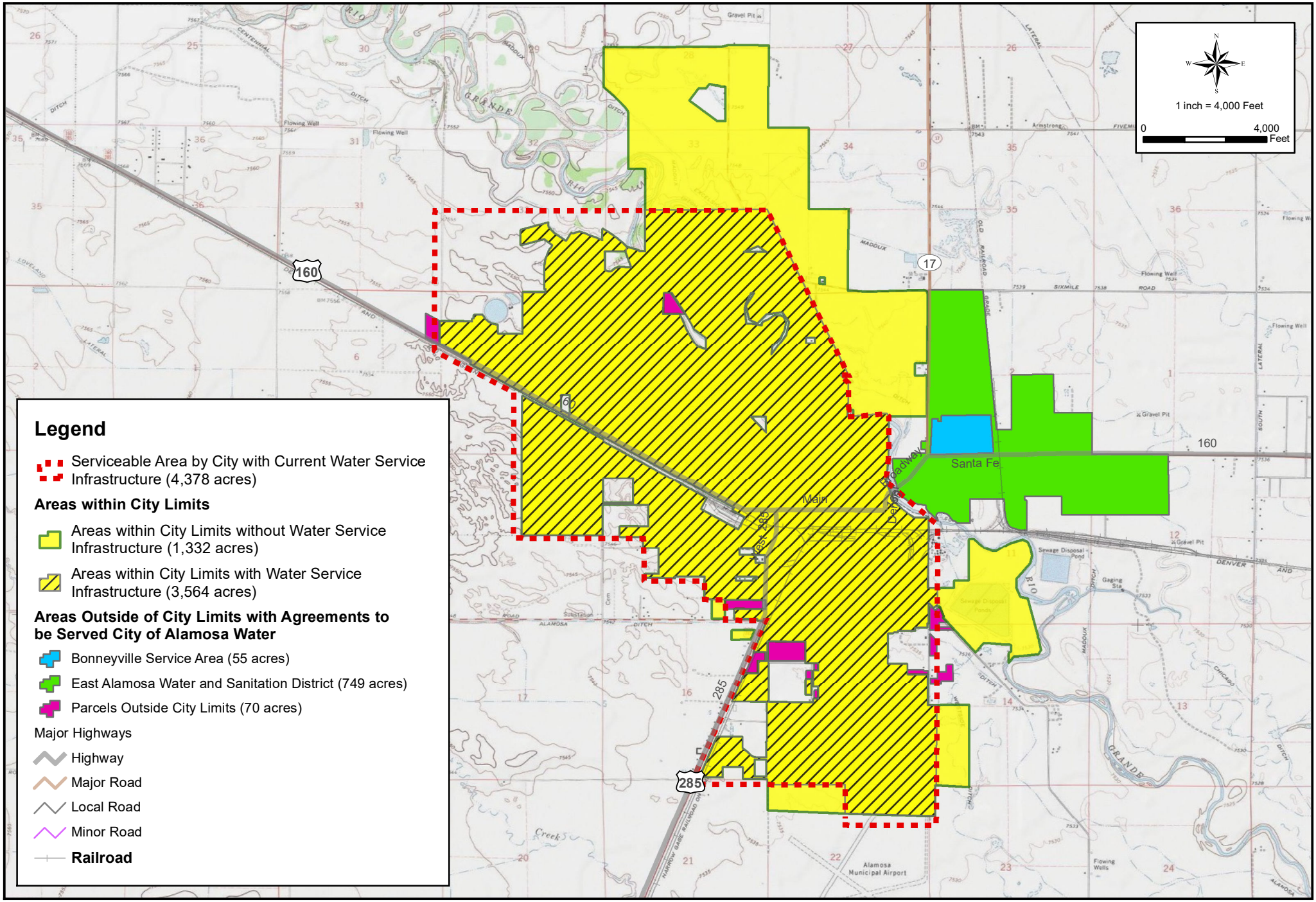
ALAMOSA COUNTY, COLORADO

CITY OF ALAMOSA GENERAL LOCATION

CITY OF ALAMOSA

PROJECT NO. 181-100.000

FIGURE 1



Date: 10/23/2019 Document Path: Z:\Project Files\18\181-100\181-100.000\CAD-GIS\GIS\MXD\Figure 3 - Alamosa & EAWSD map 10.2.mxd

User Name: boliver

WWE
Wright Water Engineers, Inc.
1666 N. Main Ave., Ste.C
Durango, CO 81301
(970) 259-7411 ph 259-8758 fx

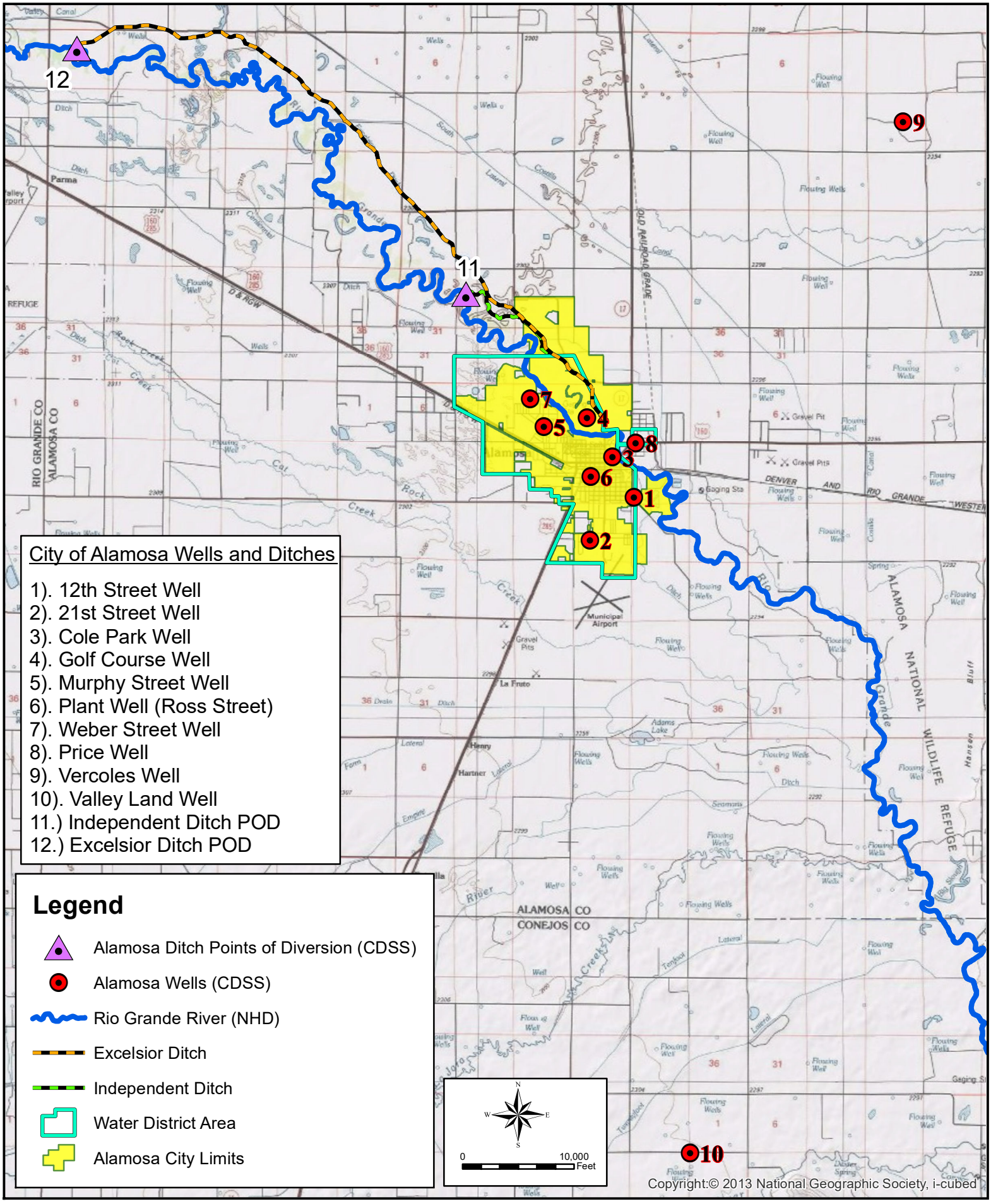
ALAMOSA COUNTY, COLORADO

WATER SERVICE AREAS WITHIN AND OUTSIDE OF CITY LIMITS AND AREAS WITH AGREEMENTS TO BE SERVED CITY OF ALAMOSA WATER

CITY OF ALAMOSA

PROJECT NO. 181-100.000

FIGURE 2



Date: 2/11/2020 Document Path: P:\181-100 City of Alamosa\000\Mapping\Figure 3 - Alamosa Wells Map_portrait_10.2.mxd

User Name: boliver

WWE
Wright Water Engineers, Inc.
1666 N. Main Ave., Ste.C
Durango, CO 81301
(970) 259-7411 ph 259-8758 fx

ALAMOSA COUNTY, COLORADO

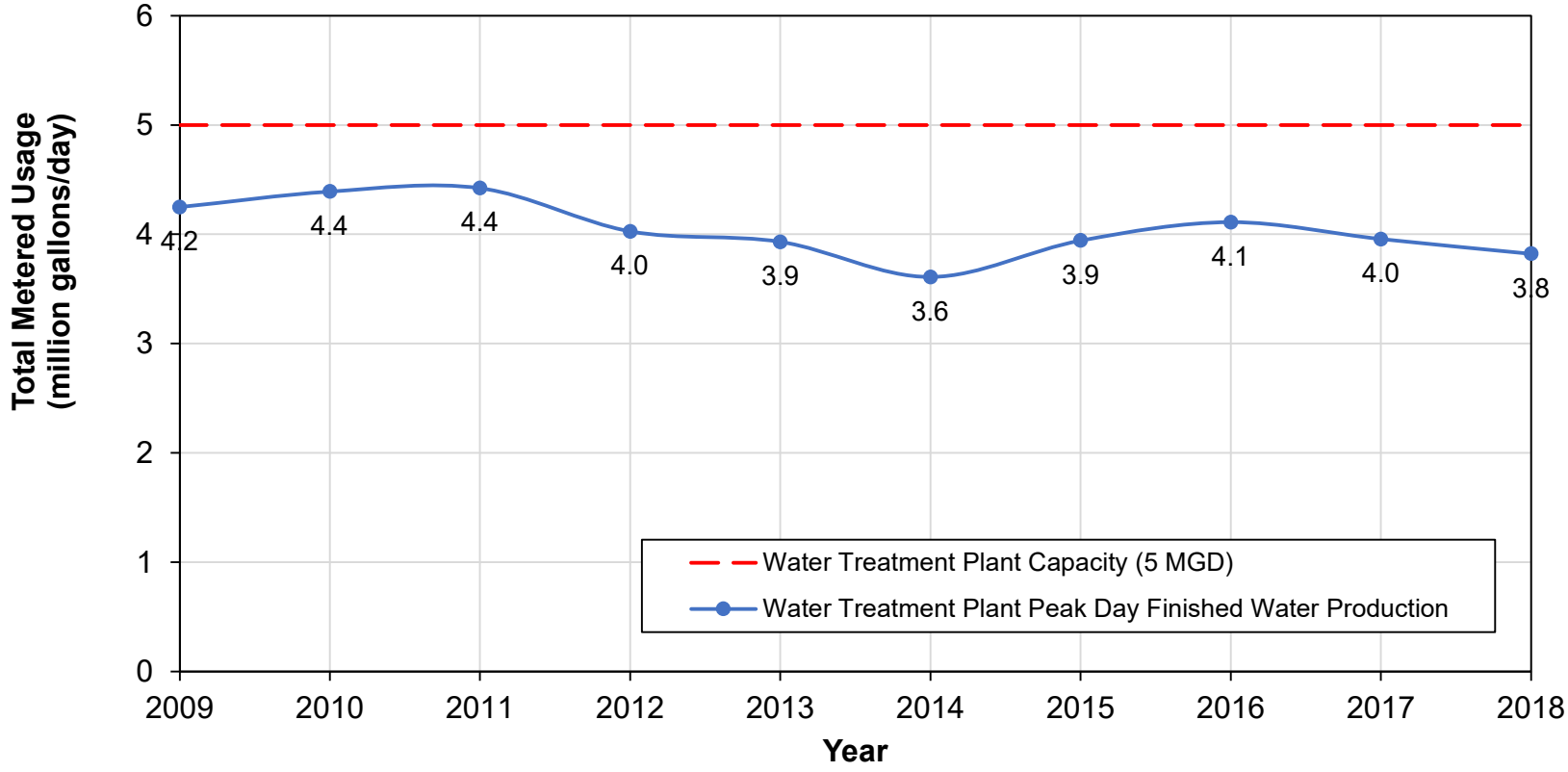
CITY OF ALAMOSA POINTS OF DIVERSION OF WELLS AND DITCHES

CITY OF ALAMOSA

PROJECT NO. 181-100.000

DRAFT FIGURE 3

Figure 4 - Water Treatment Plant Peak Day Finished Water Production



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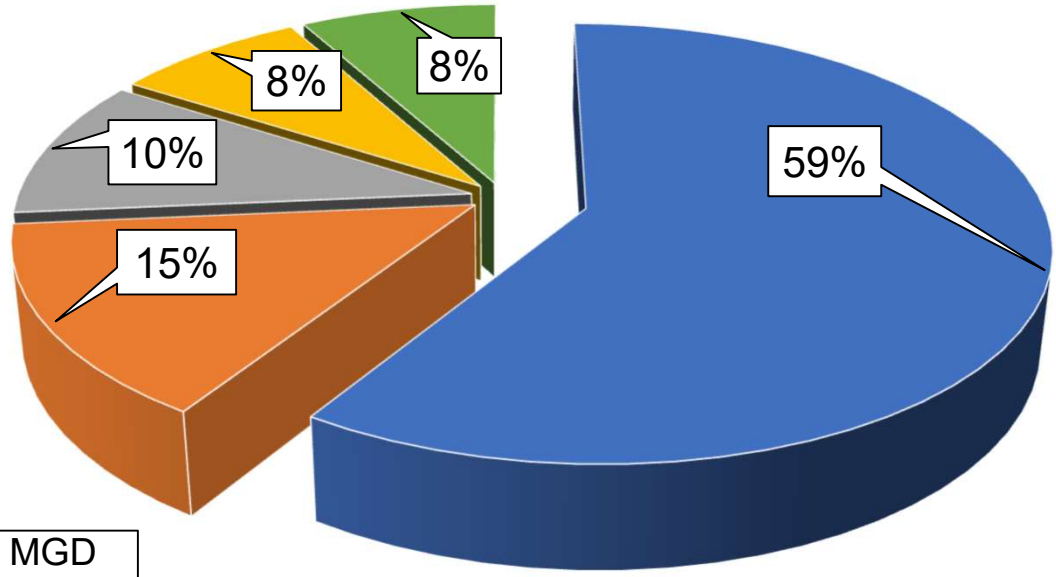
Alamosa WEP Tables and Figures.xlsx

Wright Water Engineers, Inc.
11/26/2019

Des by: RED
Ckd by:BVT

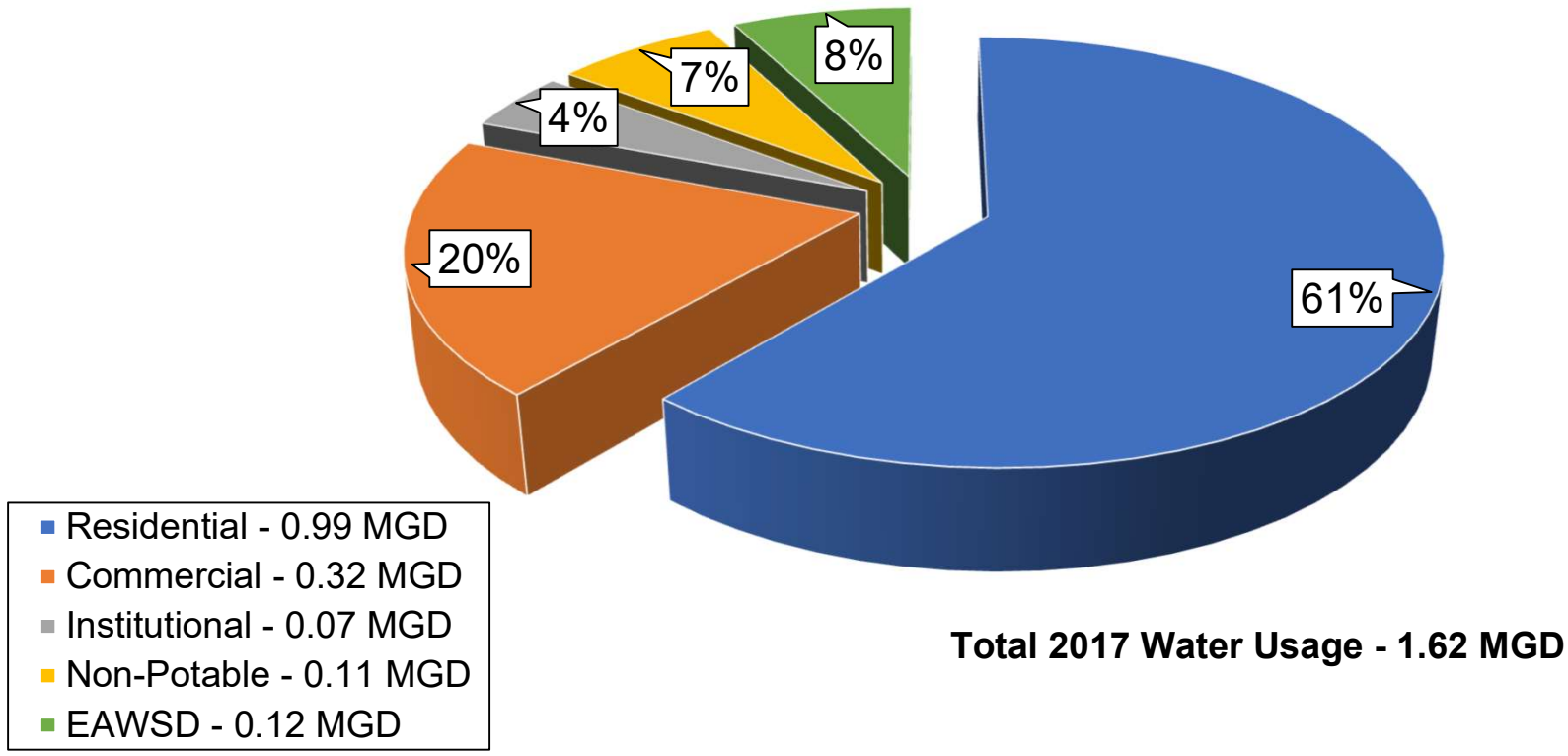
Figure 5 - Average Treated Water Usage by Sector (2013-2017) (million gallons per day (MGD))



- Residential - 1.02 MGD
- Commercial - 0.25 MGD
- Institutional - 0.18 MGD
- Non-Potable - 0.14 MGD
- EAWSD - 0.14 MGD

Total Average Water Usage - 1.72 MGD

Figure 6 - 2017 Treated Water Usage by Sector (million gallons per day (MGD))



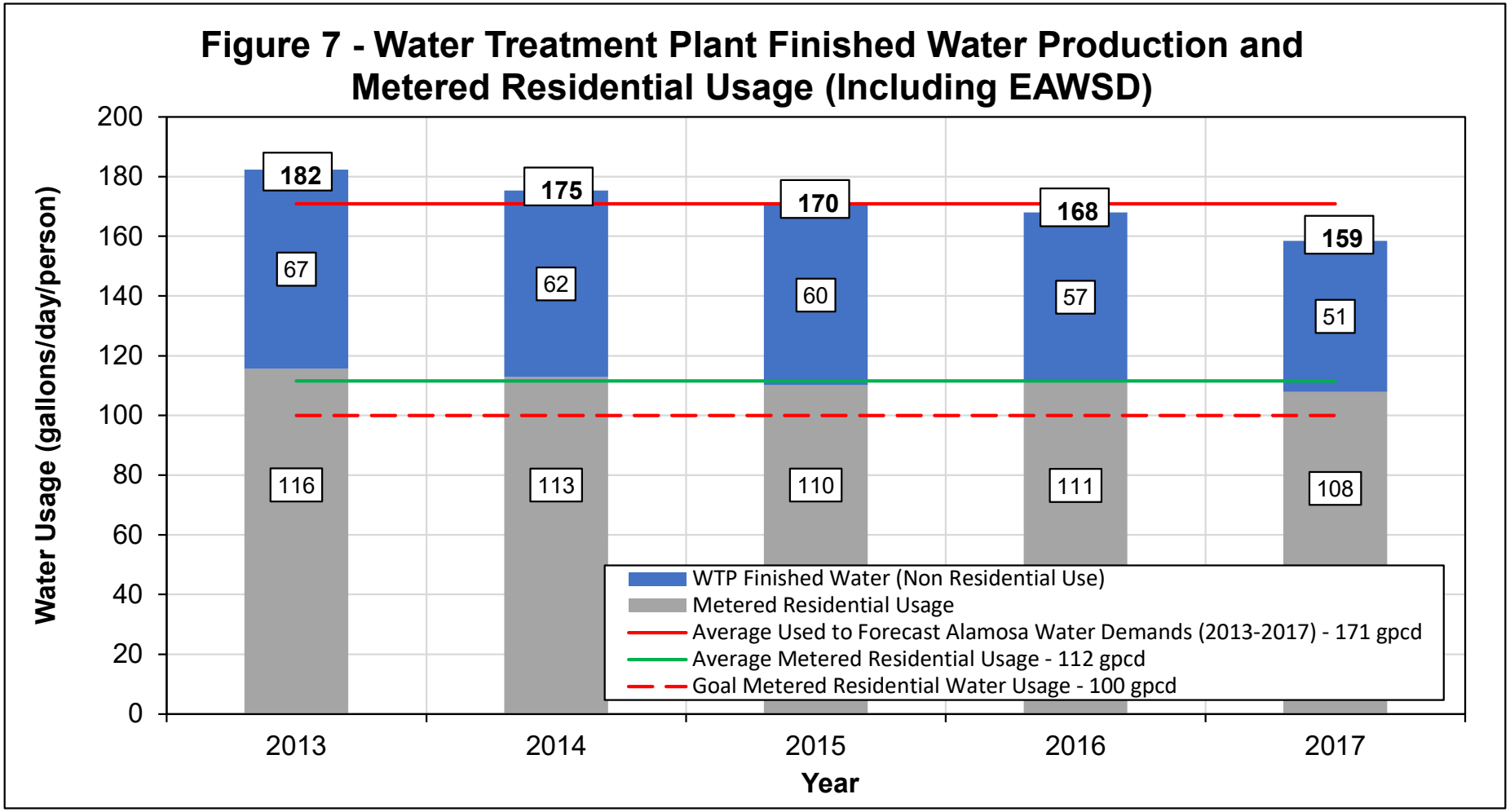


Figure 7 - Water Treatment Plant Finished Water Production and Metered Residential Usage (Including EAWSD)
Water Usage (gallons/day/person)
200
180
160
140
120
100
80
60
40
20
0
182
175
170
168
159
67
62
60
57
51
116
113
110
111
108
2013
2014
2015
2016
2017
Year
WTP Finished Water (Non Residential Use)
Metered Residential Usage
Average Used to Forecast Alamosa Water Demands (2013-2017) - 171 gpcd
Average Metered Residential Usage - 112 gpcd
Goal Metered Residential Water Usage - 100 gpcd

Figure 8 - Population - City of Alamosa and EAWSD

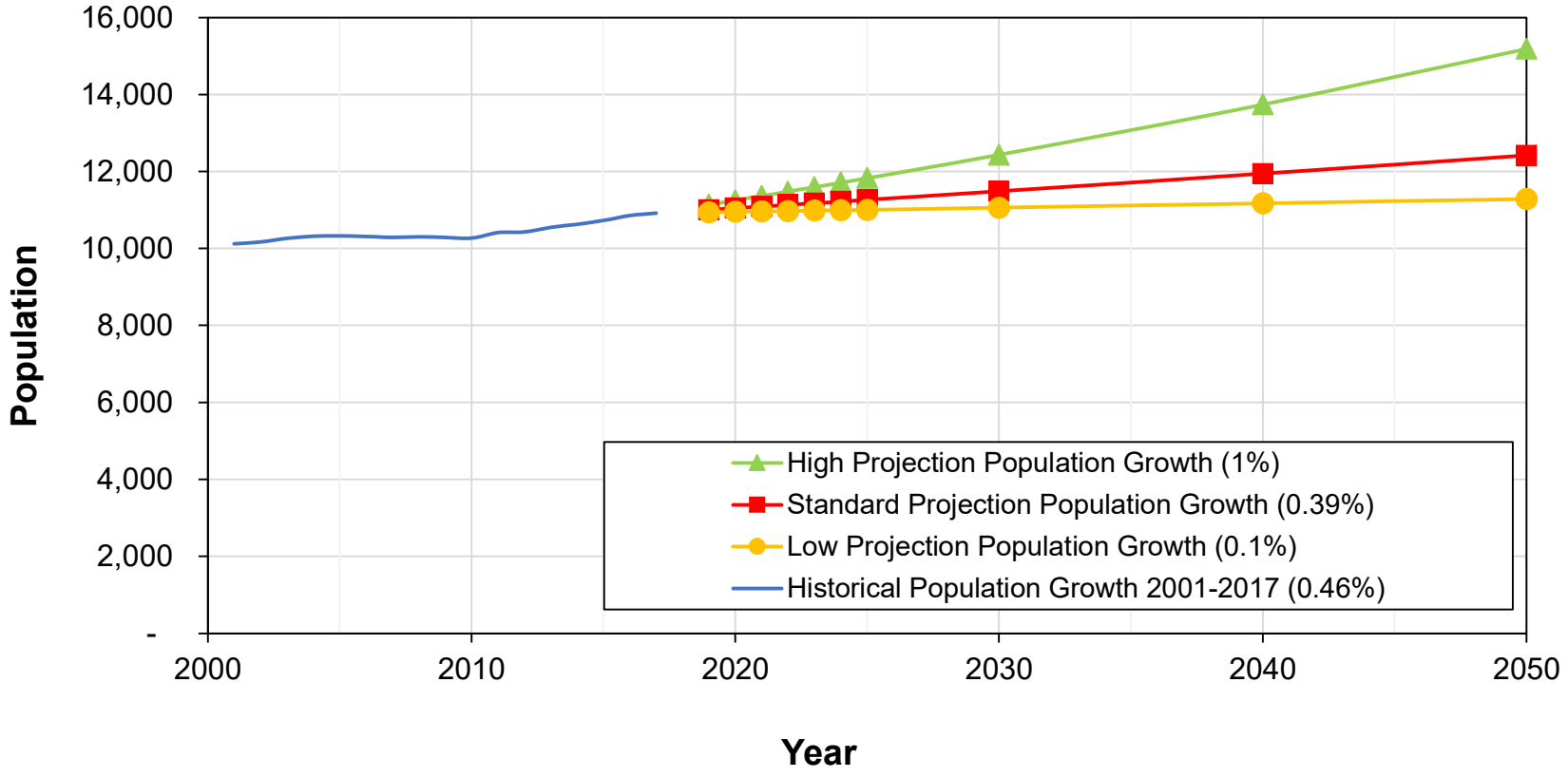


Figure 9 - Water Treatment Plant Finished Water Production (Including EAWSD)

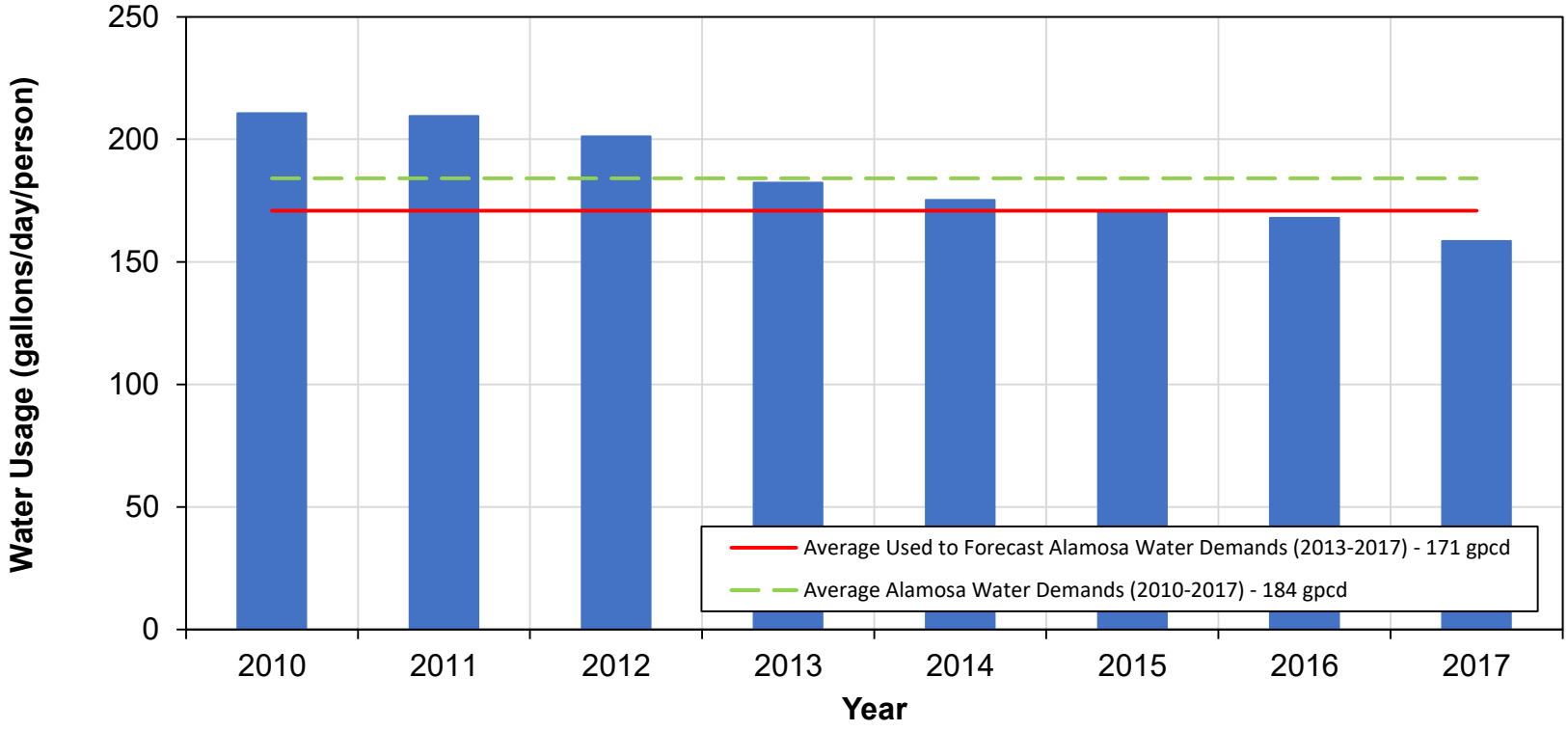
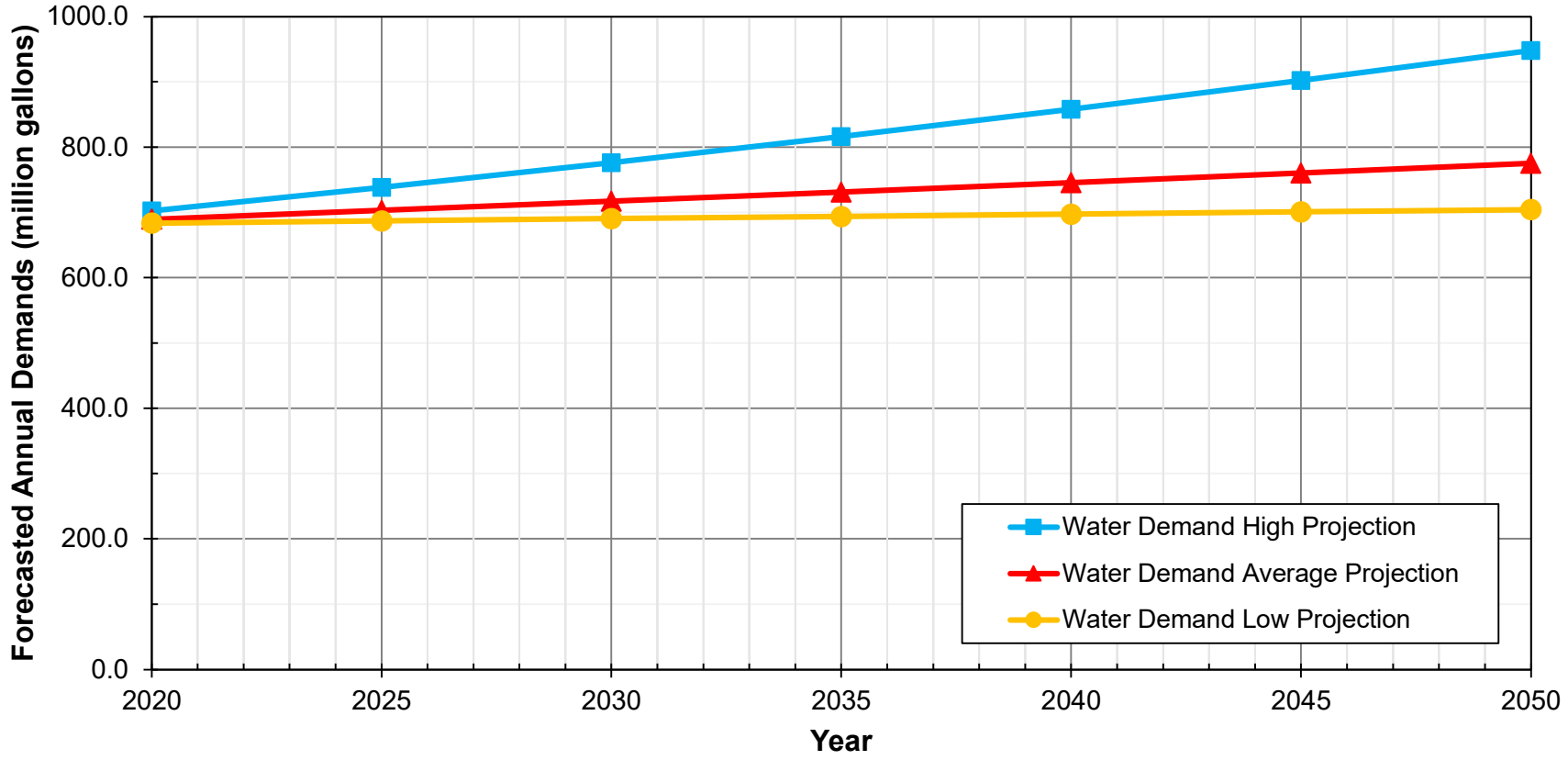
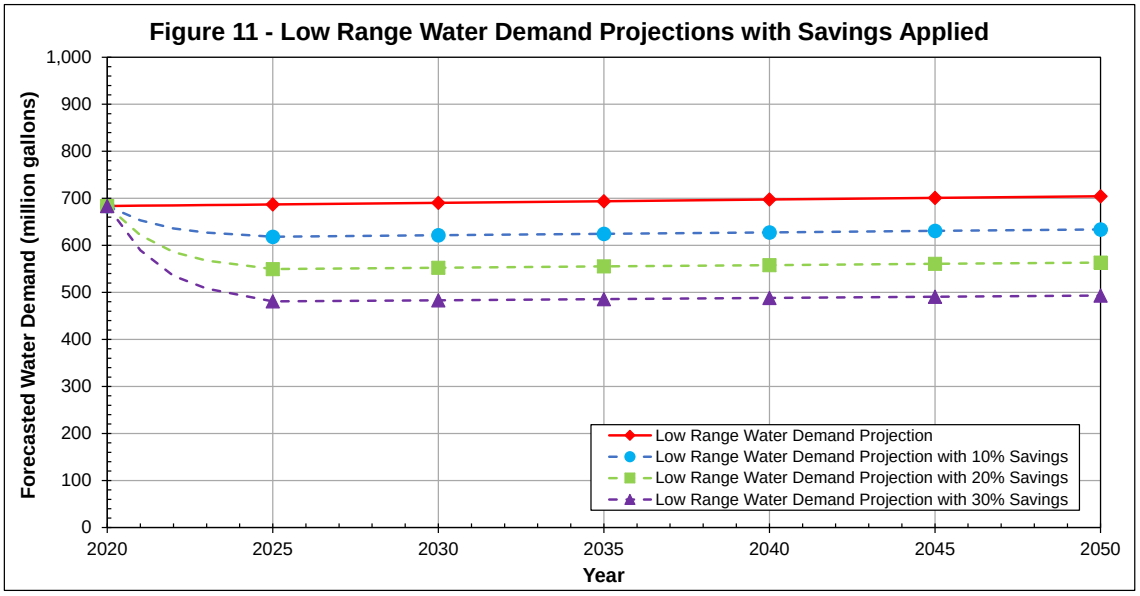
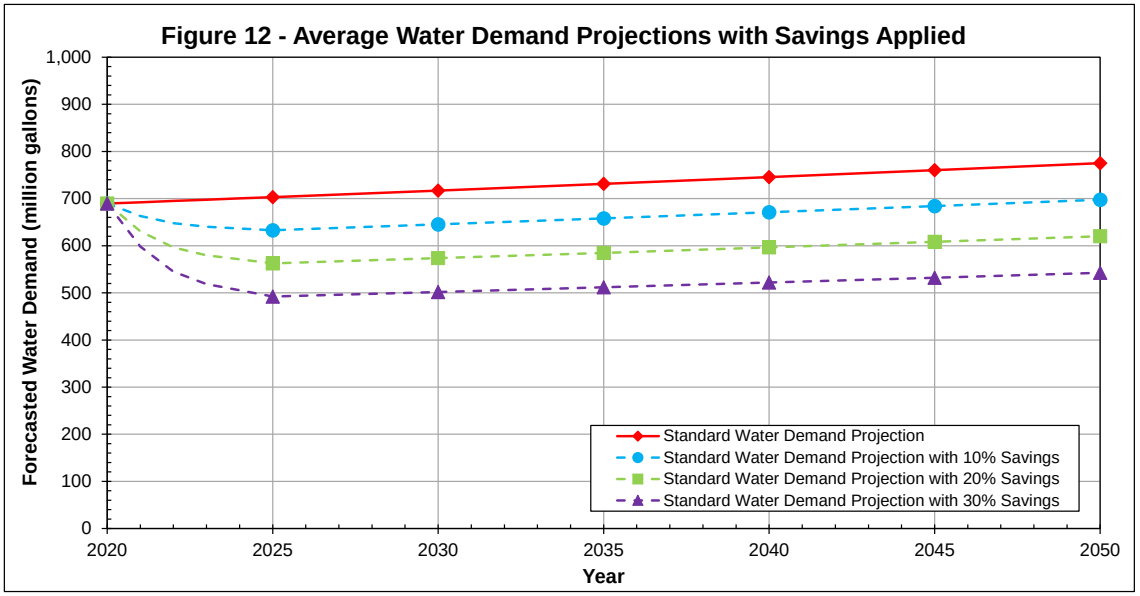
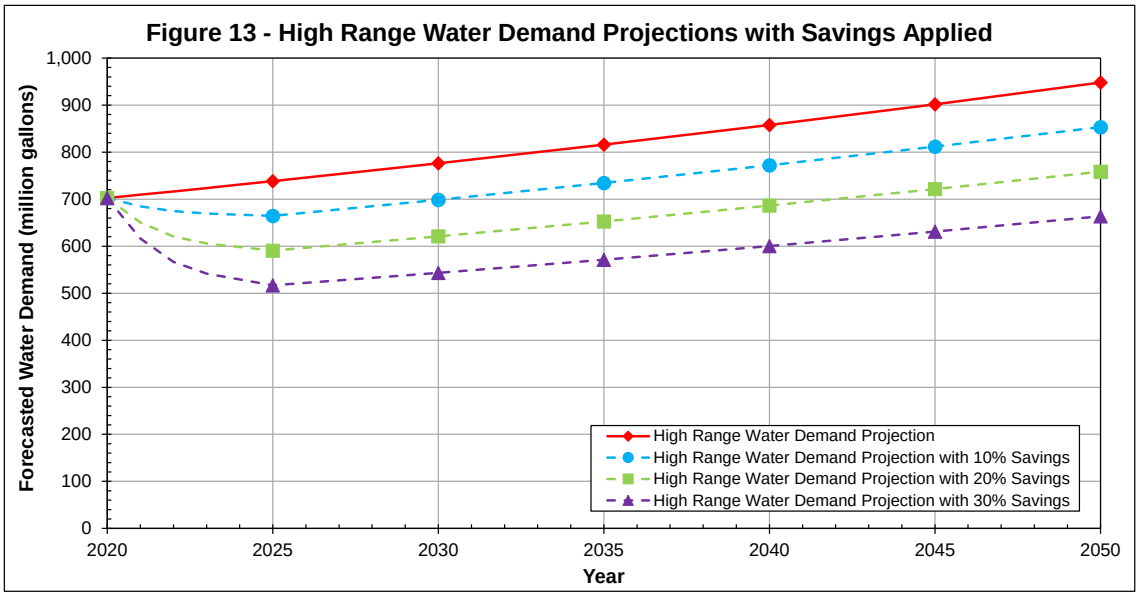


Figure 10 - Water Demand Forcast









Note: Based on savings realized on the five years of implementation.

APPENDICES

Appendix A

Alamosa Proposed Efficiency Activities Screenings and Selections

Appendix A
Water Efficiency Plan
Step 1: Identification and Screening of Foundational Activities

Water Efficiency Activities for Screening	State Statute Requirement	Identification		Qualitative Screening					Carry to Evaluation	Reason for Elimination
		Existing/ Potential Activity	Targeted Customer Category	Provides or Improves Water Use Data Collection and Monitoring	Provides Operational Cost Information	Helps to Decrease System Losses	Public Acceptance or Public Education	Additional Pro/Cons (i.e. financial feasible, measurable, appropriate for City's current system)		
Water Use Efficiency Oriented Rates and Tap Fees										
Volumetric Billing		**E**								In place
Water Rate Adjustments		**E**						Local use data has shown it to be effective		Recently Done - 2017
Frequency of Billing		**P**						Requires more staff time than available		Not enough staff - Currently bill on a monthly basis
Inclining/Tiered Rates		**E**								Recently Done - 2017
Water Budgets		**P**							Yes	
Tap Fees with Water Use Efficiency Incentives		**E**								Tap fee already based on diameter of tap
System Water Loss Management and Control										
System Water Audit		**P**						AWWA M36 training and Audit to efficiently locate and prioritize leaks/issues.	Yes	
Control of Apparent Losses (with Measuring on system infrastructure)		**P**								Currently have a relatively low loss that will improve as older infrastructure is replaced.
Leak Detection and Repair		**P**								No official system to monitor leaks but water crew does attempt to as best as possible.
Water Line Replacement Program		**E**								Currently have a cast iron pipe replacement program.
Water Service Meter Program		**E**								Recently updated meters - look for anomolies, will replace meters as needed.
Planning										
Integrated Water Resources Plans		**?**								After Augmentation Plan is decreed.
Master Plans/Water Supply Plans		**P**								Pushed back bid for Utility Master Plan.
Capital Improvement Plans		**P/E**								Currently have a 5-year CIP which is revised annually. However more effective planning could be achieved with a master utility plan.
Feasibility Studies		**?**							Yes	Redo Golf Course and high-usage municipal park's irrigation infrastructure. Replace cast iron pipes.
Staff										
Water Conservation Coordinator		**P**						This will likely be Deacon (GIS Analyst)	Yes	

Appendix A
Water Efficiency Plan
Step 2: Identification and Screening of Targeted Technical Assistance Incentives

Water Efficiency Activities for Screening	State Statute Requirement	Identification					Qualitative Screening					Carry to Evaluation	Reason for Elimination
		Existing or Potential Activity	SWSI Framework Levels: Level 1 Municipal Uses	SWSI Framework Levels: Level 2 Customers with the Largest Water Use	SWSI Framework Levels: Level 3 Customer Type(s) in Service Area	Targeted Customer Category	Provides or Improves Water Use Data Collection and Monitoring	Provides Operational Cost Information	Helps to Decrease System Losses	Public Acceptance or Public Education	Additional Pro/Cons (i.e. financial feasible, measurable, appropriate for City's current system)		
Installation of Water Efficient Fixtures and Appliances													
Indoor Audits		**P**	X			R	Y	Y	Y	?	Is not feasible at current staffing levels		
Toilet Retrofits		**P**	X	X		R/C	Y	Y	Y	Y	Would be more effective due to house age and income levels	Y	
Urinal Retrofits		**P**	X	X		R/C	Y	Y	Y	Y	Would be more effective due to house age and income levels	Y	
Showerhead Retrofits		**P**	X			R	Y	Y	Y	Y	Would be more effective due to house age and income levels	Y	
Faucet Retrofits (e.g. aerator installation)		**P**	X	X		R/C	Y	Y	Y	Y	Would be more effective due to house age and income levels	Y	
Water Efficient Washing Machines		**P**	X			R	Y	Y	Y	Y	Would be more effective due to house age and income levels	Y	
Water Efficient Dishwashers		**P**	X			R	Y	Y	Y	Y	Would be more effective due to house age and income levels	Y	
Efficient Swamp Cooler and Air Conditioning Use		**P**		X		C					Likely will have only a small impact		Not many swamp coolers/AC in City (Except some commercial).
Low Water Use Landscapes													
Drought Resistant Vegetation		**P**	X	X	X	R/C	Y	Y	Y	Y	Pilot program in place. Targets a high-usage area of consumption that can be easily reduced.	Y	
Removal of Phreatophytes		**P**	X	X	X	R/C	Y	Y	Y	Y	Pilot program in place. Targets a high-usage area of consumption that can be easily reduced.	Y	
Irrigation Efficiency Evaluations/Outdoor Water Audits		**P**	X	X	X	R/C	Y	Y	Y	Y	Would be best targeted commercial at users with large irrigation systems (ASU, Schools). Expensive, and lack of know-how is a hinderance		Not feasible with current staff/funding
Outdoor Irrigation Controllers		**P**	X	X	X	R/C	Y	Y	Y	Y			Not feasible with current staff/funding
Irrigation Scheduling/Timing		**P**	X	X	X	R/C	Y	Y	Y	Y	Could be accomplished with city ordinances. Inexpensive to implement, difficult to monitor.	Y	
Rain Sensors		**P**	X	X	X	R/C	Y	Y	Y	Y	Would be best targeted commercial at users with large irrigation systems (ASU, Schools)		
Residential Outdoor Meter Installations		**P**	X	X	X	R	Y	Y	Y	Y	Expensive for the reduction in use.		Information can be extrapolated from billing data. Expensive to implement, maintain, and monitor.
Xeriscaping		**P**	X	X	X	R/C	Y	Y	Y	Y	Pilot program in place. Targets a high-usage area of consumption that can be easily reduced.	Y	
Other Low Water Use Landscapes		**P**	X	X	X	R/C	Y	Y	Y	Y	Pilot program in place. Targets a high-usage area of consumption that can be easily reduced.	Y	
Irrigation Equipment Retrofits		**P**	X	X	X	R/C	Y	Y	Y	Y	Expensive to implement		
Water Efficient Industrial and Commercial Water-Using Processes													
Specialized Nonresidential Surveys, Audits, and Equipment Efficiency Improvements		**P**		X							Expensive to implement		Financially infeasible
Commercial Indoor Fixture and Appliance Rebates/Retrofits		**P**		X							Expensive to implement		Financially infeasible
Cooling Equipment Efficiency		**P**		X							Expensive to implement		Very small target
Restaurant Equipment		**P**		X							Expensive to implement		Financially infeasible
Incentives													
Toilet Rebates		**P**	X	X	X	R/C	N			Y	Would need to find alternate sources of funding, but would be easy to implement	Y	
Urinal Rebates		**P**	X	X	X	R/C	N			Y	Would need to find alternate sources of funding, but would be easy to implement	Y	
Showerhead Rebates		**P**	X	X	X	R/C	N			Y	Would need to find alternate sources of funding, but would be easy to implement	Y	
Water Efficient Faucet or Aerator Rebates		**P**	X	X	X	R/C	N			Y	Would need to find alternate sources of funding, but would be easy to implement	Y	
Water Efficient Washing Machine Rebates		**P**	X	X	X	R/C	N			Y	Would need to find alternate sources of funding, but would be easy to implement	Y	
Water Efficient Dishwasher Rebates		**P**	X	X	X	R/C	N			Y	Would need to find alternate sources of funding, but would be easy to implement	Y	
Efficient Irrigation Equipment Rebates		**P**	X	X	X	R/C	N			Y	Would need to find alternate sources of funding, but would be easy to implement	Y	
Landscape Water Budgets Information and Customer Feedback		**P**	X	X	X	R/C	N			Y	Need to develop the information and find a away to monitor individual usage.	Y	
Turf Replacement Programs/Xeriscaping Incentives		**P**	X	X	X	R/C	N			Y	Would be expensive and difficult to monitor, but the benefit would be large	Y	
Give-Aways		**P**	X	X	X	R/C	N			Y	Would need to find alternate sources of funding, but would be easy to implement	Y	

Appendix A
Water Efficiency Plan
Step 3: Identification and Screening of Ordinances and Regulations

Water Efficiency Activities for Screening	State Statute Requirement	Identification					Qualitative Screening					Carry to Evaluation	Reason for Elimination
		Existing or Potential Activity	SWSI Framework Levels: Level 1 Customer Type(s) within the Existing Service Area	SWSI Framework Levels: Level 2 New Development	SWSI Framework Levels: Level 3 Point of Sales on Existing Building Stock	Targeted Customer Category	Provides or Improves Water Use Data Collection and Monitoring	Provides Operational Cost Information	Helps to Decrease System Losses	Public Acceptance or Public Education	Additional Pro/Cons (i.e. financial feasible, measurable, appropriate for City's current system)		
General Water Use Regulations													
Waste Water Ordinance		**E**											Existing: Ord. 16-2018
Time of Day Watering Restriction		**E**											Existing: Ord. 16-2018
Day of Week Watering Restriction		**P**											
Water Overspray Limitations		**E**											Existing: Ord. 16-2018
Landscape Design/Installation Rules and Regulations													
Rules and Regulations for Landscape Design/Installation		**P/E**									Currently exists under UDC, but could be expanded		
Landscaper Training and Certification		**P**											Inadequate expertise to implement
Soil Amendment Requirements		**P**									Could be feasible for development of certain size		
Turf Restrictions		**P**									Could be feasible for development of certain size, may add to new development code.		Will include as recommendation in WEP.
Irrigation Equipment Requirements		**P**									Could be feasible for development of certain size, may add to new development code.		Will include as recommendation in WEP.
Outdoor Water Audits/Irrigation Efficiency Regulations		**P**											Not feasible with staff levels, funding, or expertise
Outdoor Green Building Construction		**P**											Does not seem to carry weight of other activities
Indoor and Commercial Regulations													
High Efficiency Fixture and Appliance Replacement		**P**											Financially infeasible
Commercial Cooling and Process Water Requirements		**?**											
Green Building Construction													Infeasible require in community
Indoor Plumbing Requirements		**P**											City uses State requirements
City Facility Requirements		**P**											
Required Indoor Residential Audits		**P**											Not feasible with staff levels, funding, or expertise
Required Indoor Commercial Audits		**P**											Not feasible with staff levels, funding, or expertise
Commercial Water Wise Use Regulations (Car Washes, Restaurants, etc.)		**P**									Need more information		

Appendix A
Water Efficiency Plan
Step 4: Identification and Screening of Education Activities

Water Efficiency Activities for Screening	Identification					Qualitative Screening					Carry to Evaluation	Reason for Elimination
	Existing/Potential Activity	SWSI Framework Levels			Targeted Customer Category	Provides or Improves Water Use Data Collection and Monitoring	Provides Operational Cost Information	Helps to Decrease System Losses	Public Acceptance or Public Education	Additional Pro/Cons (i.e. financial feasible, measurable, appropriate for City's current system)		
		Level 1 One-Way	Level 2 One-Way with Feedback	Level 3 Two-Way Communication								
Customer Education												
Bill Stuffers	**P/E**	X			R			X	X		Y	
Newsletter	**P**	X			R			X	X		Y	
Newspaper Articles	**P/E**	X			R			X	X		Y	
Mass Mailings	**P/E**	X			R			X	X		Y	
Web Pages	**E**	X			R			X	X		Y	
Water Fairs	**P/E**			X	R			X	X	Existing water services fair with Rio Grande Water Conservancy group participation.	Y	
K-12 Teacher and Classroom Education Programs	**P**			X	R			X	X	Provide simple program for teachers to present to students.	Y	
Message Development/Campaign	**P**	X			R			X	X	Through existing Water Smarts Committee.	Y	
Interactive Websites	**P**	X			R			X	X	Deacon willing to set up online surveys.	Y	
Social Networking	**P/E**		X		R			X	X		Y	
Customer Surveys	**P**			X	R			X	X		Y	
Focus Groups	**E**			X	R			X	X			Existing - Water Smarts Committee
Citizen Advisory Boards	**E**			X	R			X	X			Existing - Water Smarts Committee
Technical Assistance												
Customer Water Use and Landscape Design and Maintenance Workshops	**P**											May be difficult to implement with staff levels, funding, or expertise
Xeriscaping Demonstration Garden	**E**											Several sites underway via CWCB grant
Water Conservation Expert Available	**P**									We do not currently have a staff person with this expertise… could be developed?	Y	

Appendix A
Water Efficiency Plan
Step 5: Evaluation and Selection of Proposed Efficiency Activities

Water Efficiency Activities for Evaluation	Information on the Activates	Existing/ Potential Activity	Targeted Customer Category	Review of Qualitative Screening: Qualitative Goals: Provides or Improves Water Use Data Collection and Monitoring	Qualitative Goals: Provides Operational Cost Information	Qualitative Goals: Helps to Decrease System Losses	Qualitative Goals: Promotes Public Acceptance or Public Education	Evaluation: Projected Water Savings: Total Water Savings (gallons)	Projected Water Savings: Average Annual Water Savings (gallons)	Projected Implementation Costs	Quantitative Goals: Improved ability to track water use through main system infrastructure	Quantitative Goals: Provides data on quantity of water processed by system	Quantitative Goals: Reduction in system losses as meter data becomes available	Quantitative Goals: Public approval of funding allocations to activity	Notes on Additional Pros/Cons to Consider	Final Selection: Selected for Implementation	Final Selection: If Eliminated, Reason Why Eliminated
Water Use Efficiency Oriented Rates and Tap Fees																	
Water Budgets	Compares metered consumption against indoor and outdoor water needs of the customer based on landscape area, plant materials, and climate conditions. The customer is provided powerful information about irrigation practices and efficiency at the property. Could prepare a example water demand for a model single family residence for comparison purposes.	P	R/C	Y	Y	Y	Y	NA	NA	$ 44,100	Y	Y	Y	Y	Water budgets can enhance drought response and help identify leakage and supply issues.		
System Water Loss Management and Control																	
System Water Audit	Water auditing gives water utilities the potential to conserve significant volumes of treated water by reducing real losses and increase revenue by reducing apparent losses. American Water Works Association (AWWA) has free software and guidance documents on water audits. CWCB also provides technical assistance for the AWWA software on water audit programs.	P	R/C	Y	Y	Y	Y	43,946,000	6,278,000	$ 25,200	Y	Y	Y	Y	Provides useful measures of utility water loss and can significantly increase conservation.	X	
Planning																	
Feasibility Studies	An assessment of the practice of a proposed plan or method. Does not included the cost of implementation. Total 2017 water demand for parks= 0.13 MG (Reads in 1000s) 10% reduction savings=0.013 MG (reads in 1000s) 20% reduction savings= 0.026 MG (reads in 1000s)	P	C	Y	Y	Y	Y	43,946,000	6,278,000	$ 50,000	Y	Y	Y	Y	Does not include the cost of implementation.	**X**	
Installation of Water Efficient Fixtures and Appliances																	
Toilet Retrofits	Adding a component to the existing utilities that will help save water without replacing the entire utility.	P	R/C	Y	Y	Y	Y	33,883,500	4,840,500	$ 21,490	N	N	N	Y	Less Expensive Not for long period use.		Rejected due to the short-term effectiveness.
Urinal Retrofits		P	R/C	Y	Y	Y	Y	6,776,700	968,100	$ 21,490	N	N	N	Y			
Showerhead Retrofits		P	R	Y	Y	Y	Y	67,884,600	9,697,800	$ 31,990	N	N	N	Y			
Faucet Retrofits (e.g. aerator installation)		P	R/C	Y	Y	Y	Y	226,282,000	32,326,000	$ 63,490	N	N	N	Y			
Water Efficient Washing Machines Retrofits		P	R	Y	Y	Y	Y	49,596,055	7,085,151	$ 17,290	N	N	N	Y			
Water Efficient Dishwashers Retrofits		P	R	Y	Y	Y	Y	18,102,560	2,586,080	$ 17,290	N	N	N	Y			
Low Water Use Landscapes																	
Drought Resistant Vegetation	Planting drought-tolerant species that can survive during water restricting periods. Grouping plants by their water needs is also beneficiary and help prevent over/under watering.	P	R/C	Y	Y	Y	Y	43,946,000	6,278,000	$ 234,500	Y	Y	Y	Y	Significantly Increases Conservation Expensive.		
Removal of Phreatophytes	Remove Phreatophytes plants near water sources. Phreatophytes absorb a significant amount of water.	P	R/C	Y	Y	Y	Y	65,919,000	9,417,000	$ 374,500	N	N	N	Y	Expensive. Improve stormwater management, provide recreation opportunities, offer habitat to local wildlife, provide aesthetic benefits.		
Irrigation Scheduling/Timing	Irrigation systems using low flow drip, bubblers, or sprinkler systems. A system shut off that occurs during rainfall or windy conditions. Wind can cause a undistributed watering system that actually wastes water than it actually provides.	P	R/C	Y	Y	Y	Y	21,973,000	3,139,000	$ 164,500	Y	Y	Y	Y	Time Consuming: Weather watch. Conserves water with better Irrigation	**X**	
Xeriscaping	Xeriscaping provide drought flexibility and mandatory water restrictions. Low-water using plants may survive better and therefore reduce replacement costs.	P	R/C	Y	Y	Y	Y	43,946,000	6,278,000	$ 374,500	N	N	N	Y	Significantly Increases Conservation Expensive.		
Other Low Water Use Landscapes	Other water conservation ideas.	P	R/C	Y	Y	Y	Y	21,973,000	3,139,000	$ 164,500	Y	Y	Y	Y	Significantly Increases Conservation		
Incentives																	
Toilet Rebates	Utility Rebates are a pay of reduction or partial refund on replacing the entire old utilities with Water Efficiency utilities. (Ex: Flagstaff toilet rebates are $50 for the first 50 customers per year, Required: Receipt, photo of old toilet year label, photo of new 1.28 or less gallons per flush toilet year label.)	P	R/C	N	Y	Y	Y	29,400,000	4,200,000	$ 48,825	N	N	N	Y	<u>Pros:</u> Rebates drive customers to replace devices before the end of their useful life. Wastewater bill reduction. Greatest impact when exchanging inefficient fixtures and appliances. <u>Cons:</u> Only a handful of rebates per utility allowed per year.	**X**	
Urinal Rebates		P	R/C	N	Y	Y	Y	2,205,000	315,000	$ 42,525	N	N	N	Y			
Showerhead Rebates		P	R/C	N	Y	Y	Y	12,250,000	1,750,000	$ 76,720	N	N	N	Y			
Water Efficient Faucet Retrofits or Aerator Rebates		P	R/C	N	Y	Y	Y	39,200,000	5,600,000	$ 167,510	N	N	N	Y			
Water Efficient Washing Machines Rebates		P	R/C	N	Y	Y	Y	19,600,000	2,800,000	$ 47,075	N	N	N	Y			
Water Efficient Dishwashers Rebates		P	R/C	N	Y	Y	Y	4,900,000	700,000	$ 36,575	N	N	N	Y			
Efficient Irrigation Equipment Rebates		P	R/C	N	Y	Y	Y	6,438,600	919,800	$ 42,525	N	N	N	Y			

Landscape Water Budgets Information and Customer Feedback	Provides a reasonable target level of water use that is customized for each customer and landscape. They provide utilities with a powerful tool for identifying which customers are over-irrigating and could most benefit from an irrigation efficiency evaluation.	P	R/C	N	Y	Y	Y	4,394,600	627,800	$ 6,020	N	N	N	Y	Water management		
Turf Replacement Programs/Xeriscaping Incentives	Provides replacing or redoing landscapes with high water usage to a low water landscape.	P	R/C	N	Y	Y	Y	43,946,000	6,278,000	$ 991,900	N	N	N	Y	Expensive		
Give-Aways		P	R/C	N	Y	Y	Y	43,946,000	6,278,000	$ 35,000	N	N	N	Y	N/A	X	
Public Education and Outreach																	
Bill Stuffers	Information about water conservation stuffed in bills.	P/E	R	Y	N	Y	Y	439,460	62,780	$ 16,100	N	N	N	Y	Cost of developing, printing, and inserting into bills.	X	
Newsletters	A newsletter for Alamosa information about water conservation.	P	R	Y	N	Y	Y	439,460	62,780	$ 9,800	N	N	N	Y	Able to reach audience not familiar with online. Cost of developing, printing, and postaging.		
Newspaper Articles	Inserting an article as a reminder of water conservation. Updates on the water usage within the City. Provide updated information.	P/E	R	Y	N	Y	Y	439,460	62,780	$ 12,740	N	N	N	Y	Low cost. Misinformation or misunderstandings possible.		
Mass Mailing	Send Water Conservation Information (only) to individual billing accounts.	P/E	R	Y	N	Y	Y	439,460	62,780	$ 16,100	N	N	N	Y	Cost of developing, printing, and inserting into bills.		
Web Pages and Social Media	Other techniques that will deliver the message about water conservation through the internet. (An example of Water Information through the Flagstaff's web page in link below) https://www.flagstaff.az.gov/3917/Water-Check-Up-Program	E	R	Y	N	Y	Y	4,394,600	627,800	$ 20,475	N	N	N	Y	Unable to reach audience with no online access.		Will continue to do
Water Fairs	Physical interaction with residentials and commercial about water conservation.	P/E	R	Y	N	Y	Y	4,394,600	627,800	$ 84,000	N	N	N	Y	Get the attention of residents and commercial users.		Will continue to do
K-12 Teacher and Classroom Education Programs	Teaching the younger generation about water conservation.	P	R	Y	N	Y	Y	439,460	62,780	$ 6,440	N	N	N	Y	Learning about water conservation early.	X	
Message Development Campaign	Applying principles and recommendations in this checklist to the extent possible will improve the effectiveness of water conservation education and information programs.	P	R	Y	N	Y	Y	439,460	62,780	$ 54,600	N	N	N	Y	Misinformation or misunderstandings possible.	X	
Customer Surveys	Customer surveys from City's residents. To help track where City lies within water usage.	P	R	Y	N	Y	Y	439,460	62,780	$ 14,000	N	N	N	Y	Trackable changes. Issues with city returning their feedback.	X	
Technical Assistance																	
Water Conservation Expert Available.	A conservation coordinator impacts utility operations, improves customer understanding of conservation, assists in development and dissemination of information, develops and supports conservation planning and program activities, and when necessary assists in implementing mandatory demand restrictions.	P	R/C	Y	Y	Y	Y	N/A	N/A	$ 315,000	Y	Y	Y	Y	Need to start looking and training for position.		Will build partnerships with local organizations who already have this kind of expertise.

Notes:
Only measures selected for further evaluation are included here (see appendices A-D)
See Appendix E2 for detailed cost and water savings assumptions. Costs subject to change during refinement of measure and implementation.

Appendix A
Water Efficiency Plan
Step 6: Cost and Water Savings Calculations for Proposed Efficiency Activities

Water Efficiency Activities for Evaluation	Planning Period (No. of Years)	Total Cost					Total Water Savings*			Cost per Thousand Gallons Saved ($)	Notes on Measure	Sources
		Quantity (#)	One Time Labor/ Material ($)	Average Annual Staff Labor ($ = # hrs. x $35/hr.)	Annual Materials ($)	Total Cost in Planning Period ($)	Gallons saved per unit	Annual Gallons Saved	Total Gallons Saved			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Water Use Efficiency Oriented Rates and Tap Fees												
Water Budgets	7	7	$ -	$ 3,150	$ -	$ 44,100	NA	NA	NA	$ -	Assume 90 hours at end of water year to account of the rates of water movement and the change in water storage in all or parts of the atmosphere, land surface, and subsurface.	1
System Water Loss Management and Control												
System Water Audit	7	1	$ -	$ 3,150	$ -	$ 25,200		6,278,000	43,946,000	$ 0.001	Assume 90 hours/year of staff time to collect data, compile, analyze water use system wide. Assume savings of 1% per year due to identifying leaks/losses and improve management. Assume the audit is implemented in year 1 of the 7 year planning period. Cost savings to reducing volume of water processed by system are not included in this cost analysis.	2
Planning												
Feasibility Studies	7	1	$ 50,000	$ -	$ -	$ 50,000		6,278,000	43,946,000	$ 0.001	Assume a initial conceptual budget of $50,000 to collect data, analyze, and compile information to complete a feasibility study. Does not include the price of project to replace iron pipes. Should be updated after receiving proposals from contractor. Assume to save 3% of water per year.	1
Installation of Water Efficient Fixtures and Appliances												
Toilet Retrofits	7	210	$ 30	$ 70	$ -	$ 21,490	23,050	4,840,500	33,883,500	$ 0.0006	Assumes a 1.8 gallon per flush toilet to a 1.26 gallon per flush toilet. May save 0.5 gal/flush. An average person uses 5 flushes/day. Using 2017 City population of 9,220, to determine gallons saved per person. Assume 30 retrofits per year. The 'Annual Gallons Saved' is 'Gallons saved per unit' multiply by 'quantity'.	1,2,3
Urinal Retrofits	7	210	$ 30	$ 70	$ -	$ 21,490	4,610	968,100	6,776,700	$ 0.0032	Assumes urinals with a 2 gal/flush rate to a 1.5 gal/flush rate. May save 0.5 gal/flush. Assuming half the city population of 9,220 is male and have 2 flushes per day in urinals. Assume 30 retrofits per year. The 'Annual Gallons Saved' is 'Gallons saved per unit' multiply by 'quantity'.	
Showerhead Retrofits	7	350	$ 20	$ 70	$ -	$ 31,990	27,708	9,697,800	67,884,600	$ 0.0005	Assume an average family in Alamosa has 1.5 shower heads per household. The City has 2,309 residents. Assume a 2.5 gpm showerhead to 1.5 showerhead. May save 1 gpm. Assume an average person takes an 8 min/day. Assume 50 retrofits per year. The 'Annual Gallons Saved' is 'Gallons saved per unit' multiply by 'quantity'.	
Faucet Retrofits (e.g. aerator installation)	7	700	$ 20	$ 70	$ -	$ 63,490	46,180	32,326,000	226,282,000	$ 0.0003	An average person uses 20 gal/day. May save 1 gpd. The City population has 2,309 residents, assuming an average home has 2.52 faucets, both kitchen and bathroom faucets. Assume 100 retrofits per year. The 'Annual Gallons Saved' is 'Gallons saved per unit' multiply by 'quantity'.	
Water Efficient Washing Machines	7	140	$ 50	$ 70	$ -	$ 17,290	50,608	7,085,151	49,596,055	$ 0.0003	An average Water Efficiency Washer saves 20 gal/wash. An average family washes 400 loads of laundry annually. The City of Alamosa has 2,309 residential. Assume 20 retrofits per year. The 'Annual Gallons Saved' is 'Gallons saved per unit' multiply by 'quantity'.	
Water Efficient Dishwashers	7	140	$ 50	$ 70	$ -	$ 17,290	18,472	2,586,080	18,102,560	$ 0.0010	Assume 20 gallon per wash to 10 gal/wash. May save 10 gal/wash. An average family has 0.8 dishwashers, using the same residential status of 2,309. Assume 20 retrofits per year. The 'Annual Gallons Saved' is 'Gallons saved per unit' multiply by 'quantity'.	
Low Water Use Landscapes												
Drought Resistant Vegetation	7	7	$ -	$ 1,750	$ 30,000	$ 234,500		6,278,000	43,946,000	$ 0.005	Assume an annual initial conceptual budget of $30,000 to replace vegetation. Assume to save at least 1.0% of water per year. Assume 50 hours/year to inspect and coordinate work.	1,3
Removal of Phreatophytes	7	7	$ -	$ 1,750	$ 50,000	$ 374,500		9,417,000	65,919,000	$ 0.006	Assume an annual initial conceptual budget of $50,000 for phreatophyte removal. Assume 50 hours/year to inspect and coordinate work. Assuming this will save 1.5% of water.	1,3
Irrigation Scheduling/Timing	7	7	$ -	$ 1,750	$ 20,000	$ 164,500		3,139,000	21,973,000	$ 0.007	Assume that we reflect schedule to changes in the weather and turn it off after adequate rainfall and during windy conditions. And only allow the watering between the hours of 6:00pm to 6:00am time zone. Assuming an annual initial conceptual budget of $20,000. Assume 50 hours/year to inspect and coordinate work. Assume can save 0.5% of annual water.	1,3
Xeriscaping	7	7	$ -	$ 1,750	$ 50,000	$ 374,500		6,278,000	43,946,000	$ 0.009	Assume the xeriscape will save 1.0% of irrigated water annual (data from 2017). Assume 50 hours/year to inspect and coordinate work. Assuming an annual initial conceptual budget of $50,000.	1,3
Other Low Water Use Landscapes	7	7	$ -	$ 1,750	$ 20,000	$ 164,500		3,139,000	21,973,000	$ 0.007	Assume an annual initial conceptual budget of $20,000.Assume 50 hours/year to inspect and coordinate work. Assuming other ideas will save approximately 0.05% of the total annual water usage.	1
Incentives												
Toilet Rebates	7	210	$ 50	$ 175	$ 50	$ 48,825	20,000	4,200,000	29,400,000	$ 0.002	Assume replacement with HE utility. Assume 30 rebates per year. Assume 5 hours to fill out and review all applications per year. Annual Material is the rebate cost per model. Average 1.28 gallon per flush toilet costs $230, and 20% rebate is approximately $50. The gallons saved per unit was an estimate from Source. Multiply the 'gallons saved per unit' to the quantity of retrofits prohibited per year to determine 'annual gallons saved'. Customer cost for installation is not accounted for. This section all annual materials will be charges with application printouts.	1
Urinal Rebates	7	210	$ 20	$ 175	$ 50	$ 42,525	1,500	315,000	2,205,000	$ 0.019	Assume replacement with HE utility. Assume 30 rebates per year. Assume 5 hours to fill out and review all applications. A high efficiency urinal uses 0.5 gallons per flush, and cost $95. 20% rebate is approximately $20. The gallons saved per unit was an estimate from Source. Multiply the 'gallons saved per unit' to the quantity of retrofits prohibited per year to determine 'annual gallons saved'. Customer cost for installation is not accounted for.	
Showerhead Rebates	7	350	$ 4	$ 210	$ 50	$ 76,720	5,000	1,750,000	12,250,000	$ 0.006	Assume replacement with HE utility. Assume 50 rebates per year. Assume 6 hours to fill out and review all applications. A high efficiency shower head uses 1.5 gpm and the max price is $20. 20% rebate is $4. The gallons saved per unit was an estimate from Source. Multiply the 'gallons saved per unit' to the quantity of retrofits prohibited per year to determine 'annual gallons saved'. Customer cost for installation is not accounted for.	
Water Efficient Faucet Retrofits or Aerator Rebates	7	560	$ 15	$ 280	$ 50	$ 167,510	10,000	5,600,000	39,200,000	$ 0.004	Assume replacement with HE utility. Assume 80 rebates per year. Assume 8 hours to fill out and review all applications. A high efficiency faucet for kitchen or bathroom sink, the average price for both is roughly $80 with a 20% rebate of $15. The gallons saved per unit was an estimate from Source. Multiply the 'gallons saved per unit' to the quantity of retrofits prohibited per year to determine 'annual gallons saved'. Customer cost for installation is not accounted for.	

Water Efficient Washing Machines Rebates	7	140	$ 150	$ 175	$ 50	$ 47,075	20,000	2,800,000	19,600,000	$ 0.002	Assume replacement with HE utility. Assume 20 rebates per year. Assume 5 hours to fill out and review all applications. Assume high efficiency washer will be an average price of $1000. Therefore rebate is set at $150. The gallons saved per unit was an estimate from Source. Multiplied the 'gallons saved per unit' to the quantity of retrofits prohibited per year to determine 'annual gallons saved'. Customer cost for installation is not accounted for.	
Water Efficient Dishwashers Rebates	7	140	$ 75	$ 175	$ 50	$ 36,575	5,000	700,000	4,900,000	$ 0.007	Assume replacement with HE utility. Assume 20 rebates per year. Assume 5 hours to fill out and review all applications. Assume an average high efficiency dishwasher is roughly $500, therefore, the rebate is set to $75. Multiplied the 'gallons saved per unit' to the quantity of retrofits prohibited per year to determine 'annual gallons saved'. Customer cost for installation is not accounted for.	1
Efficient Irrigation Equipment Rebates	7	210	$ 20	$ 175	$ 50	$ 42,525	4,380	919,800	6,438,600	$ 0.007	Assume replacement with HE utility. Assume 30 rebates per year. Assume 6 hours to fill out and review all applications. Assume residential yard irrigation equipment to roughly $100 therefore $20 rebate. Assuming that high efficiency watering equipment saves 0.5 to 4 gallons per hour, and used 3 hours per day. Customer cost for installation is not accounted for.	
Landscape Water Budgets Information and Customer Feedback	7	7	$ -	$ 280	$ 300	$ 6,020		627,800	4,394,600	$ 0.001	Assume $300 for materials for customer feedback, and 8 hours to compile and analyze data. Assume native species account for 75% of plants and these must be drought tolerated species. Watering will meet plants need, there saves 0.1% of total park irrigation water.	1
Turf Replacement Programs/Xeriscaping Incentives	7	7	$ -	$ 2,100	$ 137,500	$ 991,900		6,278,000	43,946,000	$ 0.023	Assume 10,000 SF of turf replacement per year . Assume site preparation is $3.75 per square foot (SF). Assume installation cost is $10/SF. Also assume 60 hours/year of staff time to inspect and coordinate work. Assume it saves 1% of total water.	1
Give-Aways	7	7	$ -	$ -	$ 5,000	$ 35,000		6,278,000	43,946,000	$ 0.001	Assume an annual initial conceptual budget of $5,000 and saves 1% of water annual.	1
Public Education and Outreach												
Bill Stuffers	7	7	$ -	$ 700	$ 900	$ 16,100		62,780	439,460	$ 0.037	The city has 2,717 accounts that include EASWD as one account. Assumes 10 hours per year to prepare flyer with information, 10 hours per year to prepare mailing, and annual cost of $300 per year to print for 1,000 accounts. Assumes an annual saving of 0.01% from voluntary conservation resulting from education and conservation is cumulative over the planning period.	1
Newsletters	7	7	$ 300	$ 350	$ 400	$ 9,800		62,780	439,460	$ 0.022	Assume 10 hours to gather information on Newsletter and prepare for print out. Assume 200 for annual costs of materials, to print twice a year. Assume to piggyback off newsletter has a cost of $300. Assumes it saves 0.01% of water.	1
Newspaper Articles	7	21	$ 300	$ 105	$ 500	$ 12,740		62,780	439,460	$ 0.029	Assume 3 articles per year and 5 hours of staff time per article. Assumes it saves 0.01% of water from voluntary conservation resulting from article education over 2,000 account holders. Assume $300 to add article.	1
Mass Mailing	7	7	$ -	$ 700	$ 900	$ 16,100		62,780	439,460	$ 0.037	Assume 20 hours of staff time to prepare information and mailing, and an annual cost of $300 per year to print for 1,000 accounts. The City has 2,717 accounts. Assume annual saving 0.01 % from voluntary conservation requirements.	1
Web Pages and Social Media	7	28	$ 300	$ 245	$ 500	$ 20,475		627,800	4,394,600	$ 0.005	Assumes 6 hrs. of staff time per quarter to provide updated water conservation content to web/social media, plus 1 hr. per quarter of web managers time. Assumes savings of 0.1% from voluntary conservation over 1,000 account holders and program begins in year 1 of 7 year planning period. Assume $300 to piggyback off website.	1
Water Fairs	7	7	$ -	$ 3,500	$ 5,000	$ 84,000		627,800	4,394,600	$ 0.019	Assume fairs has 5 of labored staff to help with the event. Also assume another 20 hours for the planning and holding of the event for each of the labored staff. Assuming the city is on a budget account of spending $5,000. Assume 0.1% water savings.	1
K-12 Teacher and Classroom Education Programs	7	7	$ -	$ 210	$ 500	$ 6,440		62,780	439,460	$ 0.0147	City staff will make public presentations on water conservation issues relevant to the City during City Council meetings an estimated 2 times per year, requiring 3 hours of staff time per presentation. The resulting saving to the City and through education is assumed to be 0.01%. Its is assumed that $500 per year is budget on materials to purchase.	1
Message Development Campaign	7	7	$ -	$ 1,400	$ 5,000	$ 54,600		62,780	439,460	$ 0.124	Assume 20 hours each with 2 of staff labor to organize campaign. Assume a $5,000 annual budget for public relations, advertising, etc. and a savings of 0.01% water savings.	1
Customer Surveys	7	7	$ -	$ 700	$ 600	$ 14,000		62,780	439,460	$ 0.032	Assume 20 hours of staff time to put together surveys, hand them out and review the results, and $600 for materials (paper, ink, etc.). Assume savings of 0.01% of water.	1
Technical Assistance												
Water Conservation Expert Available.	7	7	$ -	$ -	$ 45,000.00	$ 315,000	N/A	N/A	N/A	$ -	Assume the staff hired for job works a full time and continues to do so through the year. Assume the annual average staff labor is on a initial consumption salary of $45,000.	2

Total Cost	**$ 3,648,770**	**Total Water Saved:**	**906,320,035**	gallons/plan period
Annual Cost	**$ 521,253**	**Annual Savings:**	**129,474,291**	gallons/year
		(2013-2017) Average Water Usage:	**627,800,000**	gallons/year
		Annual Percent Savings:	**21%**	

Notes:

(1) Only measures selected for further evaluation are included here (see appendices A-D).
(2) Planning period for implementation of measure: WEP Renewal - 7 years.
(3) Total number of units to be implemented over the planning period for each measure.
(4) Capital costs to implement the program such as purchase of equipment. Labor required to manage the program, install equipment or otherwise carry out the measure is also included. Costs subject to change upon further study and implementation
(5) Annual City staff labor costs for maintaining the equipment or program. Costs subject to change upon further study and implementation
(6) Annual material costs for maintaining the equipment or program. If installation of equipment is annually completed by contractor, the contractor costs are included in this column. Costs subject to change upon further study and implementation
(7) Equals (Column 2 x (Column 5 + Column 6) + (Column 3 x (Column 4 + Column 5))).
(8) May be based on savings per unit x no. of units or may be a percentage of water savings over the entire system (see notes in Column 12).
(9) Equals water saved on an annual basis by the measure.
(10) Equals Column 8 X Column 9 x Column 2.
(11) Equals Column 7 / Column 10. Costs subject to change upon further study and implementation
(12) Notes on implementation of the measures. Notes on the basis of assumptions for the calculations used in this sheet.
(13) Sources to accommodate the assumptions for cost and water savings.
1) The Colorado Waterwise Guidebook of Best Practices for Municipal Water Conservation in Colorado (Colorado Water Conservation Board)
2) United States Environmental Protection Agency (EPA) website
3) Colorado Waterwise website

Appendix A
Water Efficiency Plan
Step 7: Proposed Implementation and Monitoring Plan

Selected Water Efficiency Activities	Period of Implementation	Implementation Actions	Milestone Deadlines	Total Budget	Entity/Staff Responsible for Implementation	Entity/Staff Responsible for Data Collection	Schedule of Data Collection	Coordination and Public Involvement	Estimated Annual Gallons Saved	Additional Comments
Feasibility Study	1 Year	Hire a firm to study City Parks, Golf Course (back 9), and Adams State Uses. Propose a plan/design more efficent irrigation systems, reduce waste, etc.	Solicit study early 2021	$50,000.00	Parks and Recreation	Successful consultant	By end of 2021	Coordinate with Adams State University with the study	6,278,000	Will inform Irrigation Scheduling/Timing/Updates to Systems activity
Irrigation Scheduling/Timing/Updates to Systems	6 Years	Replace, adjust, and implement findings from feasibility study	System Updates by 2023. Continued Monitoring thereafter.	$164,500.00	Parks and Recreation	Public Works	Annually	P&R to manage installation. PW to collect usage trends.	3,139,000	
Toilet Rebates	7 Years	Offer an annual program for toilet replacement	2021	$35,000.00	Public Works	Public Works	Annually	PW and PR	4,200,000	Consider a similar program as the existing concrete replacement program, however also consider some portion set aside for giveaway.
Give-Aways	6 Years	Annual give-aways that include: bucket, information, faucet, and showerhead replacements.	Will require one year of research to develop the program. Program end year 7.	$5,000.00	Public Works	Public Works	Annually	PW and PR	6,278,000	
Bill Stuffers	7 Years	Plan on at least 2 bill stuffers per year.	Year 7	$16,100.00	Public Works, Finance Department, PR	Public Works	Annually	PW and PR	62,780	Should be timed at beginning of summer to help reduce outdoor irrigation.
System Water Audit	2 Years	Assign WTP Operator to attend classes to perform M36 Audit	Year 4	$25,200.00	Public Works	Public Works	Annually	PW and PR	6,278,000	
K-12 Teacher and Classroom Education Programs	7 Years	Utilize local resources and develop collaborative projects using the existing skills, staff, and resources at Rio Grande Watershed Conservation & Education Initiative.	Year 7	$6,440.00	RGWCEI, Public Works, PR	Public Works	Annually	RGWCEI & PW	62,780	RGWCEI currently has the content and contacts for K-12 classroom outreach. The City would plan on piggy-backing on this existing program.
Message Development Campaign	7 Years	Utilize local resources and develop collaborative projects using the existing skills, staff, and resources from around the basin.	Year 7	$54,600.00	RGWCEI, Public Works, PR	Public Works	Annually	RGWCEI & PW	62,780	Adapt information from RGWCEI and other regional water partners.
Customer Surveys	7 Years	Distribute surveys through bills and via online social media.	Year 7	$3,000.00	PW, PR	PW, PR	Bi-annually	PW and PR	62,780	Will be used to gauge effectiveness of various message campaigns.

Total Cost for Implementation of All Proposed Measures: $359,840

Estimated Annual Savings:	**26,424,120**	**gallons/year**
(2013-2017) Total Average Water Usage:	**627,800,000**	**gallons/year**
Estimated Annual Percent Savings:	**4%**	

Deadlines are based on time from the approval of the Water conservation Plan. For example '1 year' is 1 year from the time the plan is approved
Data collection is only for system-wide meters and the leak detection study. Future updates to the plan may consider more extensive monitoring once system baseline data is available.
For cost estimate basis, see Appendix E2: Cost and Water Savings Calculations for Efficiency Measures

Appendix B

Proof of Publication – Public Notice of Draft Water Efficiency Plan for Public Review and Public Comment Period

FOR IMMEDIATE RELEASE

Monday, March 16, 2020

City Unveils Water Efficiency Plan

ALAMOSA—The City of Alamosa has completed a draft Water Efficiency Plan. The Plan is designed to promote the efficient consumption of all water usage by residents, businesses, and local governments; the goal of the Plan is to encourage more beneficial use of our water resources and ensure an adequate future water supply.

Prior to finalization of the Plan, the City welcomes input from its customers. The City will conduct a 60-day public review period beginning March 20, 2020 that runs through May 21, 2020. A complete copy is on file and available for public inspection in the City of Alamosa Public Works Office, 300 Hunt Ave, Alamosa, CO 81101 during regular business hours. The Water Efficiency Plan draft and a place to leave comments about the draft plan are available online at cityofalamosa.org/departments/city-planning/water-efficiency-plan/.

###

The City of Alamosa is a multicultural community of 9,000+ centrally located in the San Luis Valley of Southern Colorado. The City was incorporated in 1878 and is the gateway to the Great Sand Dunes National Park and Preserve where more than 525,000 visitors enjoy Colorado's natural beauty each year. For more information, visit us at www.cityofalamosa.org.

Appendix C

Public Comments Received and Resolution

Black text are public comments on the Draft WEP.

Blue text are WWE's answers and resolutions to the public comments.

The following comments were received during the Public Comment and Review Period:

It would be prudent to review how residents landscape their properties. I would like us to take into consideration that we live in a desert, and that grasses, like Kentucky Blue, are not native. Perhaps an outline or recommendation on landscaping; maybe an incentive to those households that use very little water throughout the year? Or a higher charger for those thousands of gallons over, say, 2000/household.

When the Water Smarts Committee is able to reconvene, one plan is to discuss awards for low-water landscaping. However, this will not be incorporated into this iteration of the WEP. The Water Smarts Committee do have the tiered rate, and we have a few guides for landscaping.

The only thing in the draft plan that I would change is in the description of Alamosa, it is said to be in the east San Luis Valley and should say east of the San Juan Mountains. I did not find anything else that I though should be changed.

Edits have been considered and changed in the Final WEP.

RESOLUTION NO. 9-2020

A RESOLUTION ADOPTING THE CITY OF ALAMOSA WATER EFFICIENCY PLAN

WHEREAS, water conservation is extremely important across Colorado, but Alamosa and the San Luis Valley, consistent with its "high desert" classification, is in a constant state of water shortage, with water supplies in the Valley severely over-appropriated; and

WHEREAS, the City of Alamosa has demonstrated a long-term commitment to wise water stewardship and responsible and efficient use of its water resources; and

WHEREAS, the City of Alamosa has developed a City of Alamosa Water Efficiency Plan, attached hereto as Exhibit A and incorporated by this reference (the "Alamosa Water Efficiency Plan," or "Plan"), in accordance with the Colorado Water Conservation Act of 2004 so that it meets or exceeds all statutory requirements according to Colorado Revised Statute §37-60-126; and

WHEREAS, the Alamosa Water Efficiency Plan was created to identify opportunities for further efficiencies in the Alamosa municipal water system; and

WHEREAS, the City provided public notice and received comments on the Plan for sixty days and considered those comments with regards to the Plan; and

WHEREAS, the City of Alamosa has been successful in implementing a number of water conservation measures, and has now identified future measures that particularly focus on education and on outdoor water efficiency to reduce water demand and provide reasonable cost savings for water utility customers; and,

WHEREAS, Council desires to adopt the Alamosa Water Efficiency Plan in order to further the city's water conservation practices;

NOW, THEREFORE, BE IT HEREBY RESOLVED, by the City Council of the City of Alamosa, Colorado that with this Resolution, the City of Alamosa adopts the attached Alamosa Water Efficiency Plan dated March, 2020.

This Resolution shall become effective immediately upon its adoption.

APPROVED, PASSED AND ADOPTED this 3rd day of June, 2020.

CITY OF ALAMOSA

By _____
Ty Coleman, Mayor

ATTEST:

_____
Holly C. Martinez, City Clerk

DENVER
2490 W. 26th Avenue Suite 100A
Denver, Colorado 80211
Phone: 303.480.1700
Fax: 303.480.1020

GLENWOOD SPRINGS
818 Colorado Avenue
P.O.Box 219
Glenwood Springs, Colorado 81602
Phone: 970.945.7755
Fax: 970.945.9210

DURANGO
1666 N. Main Avenue Suite C
Durango, Colorado 81301
Phone: 970.259.7411
Fax: 970.259.8758

www.wrightwater.com

Wright Water Engineers, Inc.