

Audit of Major Commercial and Irrigation Water Accounts

Town of Castle Rock

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Board*

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Section 1 Introduction and Objectives

The Town of Castle Rock Public Utilities Department received a Water Conservation Planning Grant from the Colorado Water Conservation Board to perform audits of the Town's largest commercial and irrigation accounts. The audits, which were performed based on the accounts identified by the Town, sought to:

- **Review water use by account over the past two years (2004 and 2005);**
- **Identify potential water savings options available for each account;**
- **Estimate potential water savings for the available options; and**
- **Estimate potential monetary benefits for each account based on revised water use practices and potential future costs for water.**

The accounts that the Town identified for receiving the audits include those summarized in Table 1.

The location of these various accounts within the Town are indicated in the map contained as Attachment 1.

Section 2 Audit Methodology

Auditing Individual Accounts

The audits were conducted at the nine commercial accounts and ten irrigation accounts identified and selected by the Town based on actual water use data from 2004 and 2005 (see Table 1). The audit methodology included the following activities:

- Contact the entity and schedule a site visit
- Identify the landscape irrigator (person or firm) and conduct phone interview
- Conduct site visits, when access was allowed
- Review past water usage from 2004 and 2005 based on Town records
- Evaluate influences to water use (e.g., major indoor water uses, irrigation needs, etc.)

Based on the results of the audit, an evaluation of water saving options and alternatives was made for each account. Typically, the water savings options involved placement of more water efficient landscape, however, in some cases where outdoor water use is limited, or non-existent, other types of water saving measures were identified, as appropriate.

Finally, the cost of the water efficiency improvements were developed and compared to the future cost of water based on current water usage, expected water savings and the capital cost of the improvement. In this way, the expected payback period for each recommended water efficiency measures could be estimated.

One of the most important, albeit unexpected outcomes of this project was related to the identification of water use changes being planned or ongoing at each of the facilities or accounts being audited. Most of the water users that were interviewed were aware of the changing water policies of the Town, thanks in part to the outreach and educational efforts of the Utilities Department. To this point, numerous entities that were interviewed divulged that they are in the process of implementing substantial changes to their outdoor water use – mainly through changing their landscape material or irrigation practices (e.g., improving their irrigation technology) or both. Although the outcome of those changes are not captured in the past two years of water use, some discussion is provided to indicated expected water savings and the related cost implications, where possible.

Water Budgets and Future Cost of Water

To estimate the pay back period for proposed water efficiency improvements, an estimate of future water pricing was established using a water budget approach. In this approach, a water budget was developed for each account, where possible, based on average wintertime water use (which should represent normal indoor

water use) and estimated summertime outdoor water use. Summertime outdoor water use was estimated based on irrigated acreage and 80% of the expected evapotranspiration (ET) of Kentucky bluegrass planted in that acreage for the particular water year. Monthly ET for each of the 2004 and 2005 summer months was made using the ET utility provided by Northern Colorado Water Conservancy District (NCWCD) and the average monthly temperature for each summer month (see Table 2).

This water budget, which was developed for each water account, except those facilities noted below, was used as the basis for developing an inclining block rate structure for future water pricing, since the future cost of water for commercial and irrigation accounts is expected to change from a flat rate structure to an inclining block rate structure to help promote more efficient water use and more appropriately price water based on its value to the customer and its cost to reliably produce. The future price of water was based on the current price of water which is charged to commercial and irrigation customers at a flat rate of \$ 4.13 per 1000 gallons of water used.

Note that the use of the water budget methodology was not applicable to those facilities that had varying water use without outdoor irrigation (e.g., Western Mobile Pre-Mix), or had substantial other uses that fluctuated seasonally or monthly (e.g., Safeway, Jenny's Market). For these situations, future water pricing and therefore proposed water use improvements were evaluated based on average monthly water use over the two years 2004 and 2005.

Although a number of inclining block rate models exist in the literature, this project used the block rate structure that is currently being used in Highlands Ranch, Colorado by the Metro Districts (McCloud, 2006) to estimate potential future costs of water to commercial and irrigation accounts in Castle Rock. Specifically, the number of tiers, the percent of increase of water cost between tiers, and the change from one tier to the other based on percent of the water budget used were obtained from the Highlands Ranch model. The cost of the lowest tier was set at the current commercial flat rate currently being used by the Town.

The block rate structure that Metro Districts currently uses evolved from the application of Irvine Ranch, California inclining block rate structure. The inclining block rate structure that was developed for this project to evaluate the cost benefit of proposed water use efficiency recommendations is presented in Table 3.

Note that Castle Rock is currently in the process of evaluating the cost of providing reliable water to its customers, and as a result, the Town may find that it will be required to implement a rate structure that is different than presented herein; however, for the purposes of this project, the inclining rate structure was used.

The actual cost of water to the Town's customers combines the cost of water used (calculated using Table 3) and a base rate. For the future cost of water analyses presented herein, it was assumed that the base rate for commercial and irrigation user is based on the single family equivalent (SFE) cost per tap size using the factors presented in Table 4. These SFE factors are the same as those currently used by the Town.

Landscape Improvements

Estimating the cost benefit of more water efficient landscapes was another key component to this project. Landscape improvements were categorized as replacement of bluegrass or other high water use plant material with a mix of hardscape and xeriscape. Hardscape includes the removal of the existing bluegrass and other unwanted, non-functional plantings as well as capping off the existing sprinkler heads. The landscape is then covered with geotextiles over which rock landscaping is placed. This type of landscaping requires no watering, and limited maintenance.

Xeriscaping, which can include a wide range of plantings, requires the removal of the existing bluegrass or other high water use plant materials, and in many cases, the replacement of the existing irrigation system. The soil that remains after removal of the high water use plant materials is amended with sand for drainage and organic material to help breakdown the clays that are prevalent throughout the Castle Rock area. Once the soil is appropriately amended, subsurface drip irrigation and limited surface spray irrigation is installed in those areas where planting materials will be placed. For the purposes of this study, it has been assumed that the planting will include a mixture of native grasses, to maintain green spaces, as well as a mixture of low water use native grasses, trees, shrubs, and flowers. Xeriscape plant materials are expected to reduce the water use from bluegrass by 60 percent, which is about 32 percent of ET (Bureau of Reclamation, 2004).

It is expected that in practice, all entities will choose to implement their own combination of hardscape and xeriscape to meet future landscaping needs in accordance with the Town ordinances. In most cases, due to soils or economics, or both, it is expected that the majority of the landscaping will become hardscape, or in larger setting, allowed to revert back to native, with smaller, more accessible areas becoming xeriscaped. This report provides the cost and benefit for both hardscape and xeriscape in an attempt to develop a likely range of costs for the proposed landscape improvements. Individual facilities will be left to choose the degree to which they implement some combination of hardscape, xeriscape and natural areas.

The cost of hardscape and xeriscape can vary widely depending on the size of the retrofit, the nature of the underlying soil, the type of rock or planting material used, the type and extent of the irrigation system installed, etc. Based on the YARDX Report (Bureau of Reclamation, 2004), which looked at over 200 projects in the

Front Range, the cost of xeriscape retrofits range from \$ 0.90 to 1.45 per square foot. As another price point, the Target Store in Castle Rock just completed a retrofit of approximately 2 acres of landscaping, which included removing bluegrass, replacing it with native grasses after amending the soil, and planting limited amounts of flowers and shrubs at a cost of \$70,000, or about \$ 0.80 per square foot. Although the retrofits could cost into the higher range as estimated by the Town, for purposes of this report and analyses, hardscape was estimated to cost about \$ 0.60 per square foot, and xeriscape was estimated to cost about \$ 0.80 per square foot given that the typical retrofit will occur in a space of one half acre or larger which allows for some economy of scale.

Section 3 Review of Accounts

Each account that was identified by the Town (see Table 1) was contacted such that an audit of the entity's water use related to the specified tap could be performed. For the commercial users, the audit included characterizing indoor and related water use (including process water and car wash use), such that outdoor water patterns could be understood and characterized. For the irrigation accounts, where the specified taps were dedicated to only outdoor water use, the interactive portion of the audit focused on understanding the location of the tap and the ongoing nature of the irrigation effort, including determination of irrigation equipment, sensors and control measures.

Unfortunately, many of those with identified water accounts were not amiable to the audits even though they were provided free of charge. The large retail houses (i.e., Target and Safeway) refused to allow access to the property in question. Other entities such as Jenny's Market (formerly BP Products), Escavera, Douglas County Maintenance (related to the Douglas County Jail), the Players Club Villas Homeowners Association (HOA) (related to Apricot Pool), and numerous contracted irrigators did not return numerous phone calls and/or provide information in a timely fashion that would have aided the audit process. Nonetheless, a review of all nineteen water accounts was performed using the available information.

Please make note of the attachments that are relevant to this section as noted below:

- Attachment 3 presents an aerial photograph of each of the facilities/entities that were audited.
- Attachment 4 presents a graphic representation of the 2004 and 2005 water use for each of the audited facilities/entities, with a trend line included for selected accounts indicating the rate of change of water use over the 2 year period.
- Attachment 5 presents the summertime water use for each entity (less the average wintertime water use) in comparison to the target outdoor water budget based on 80% of estimated ET.

These attachments are referenced throughout the following section.

Commercial Accounts

The commercial accounts that were audited are discussed individually in the subsections below. Table 5 presents a summary of these accounts, including the irrigated acreage per account, total outdoor water use, total cost of water purchased for each of the past two years, estimated cost of purchasing the same amount of

water using the water budget model, and the percent increase in future water bills for each individual entity based on the water budget approach.

Western Mobile Pre-Mix (account 4457)

Western Mobile Pre-Mix, shown in Attachment 3, operates a year-round concrete batch plant on Gilbert Street in south-central Castle Rock. Town water at this facility is chiefly used as make-up water for the batches of concrete, although a minor amount of water is used to clean the cement trucks, provide for dust suppression, maintain temperature control of the aggregate during the summer months, and support a minor amount of indoor water use (a sink and a toilet).

All of the various water uses at this facility are directly tied to local construction activity and to a lesser extent the available supply of cement – locally and nationally. Because of the dependency of the facility on construction activity, the water usage at Western Premix demonstrates seasonal fluctuations over the summer. These fluctuations are not related to irrigation practices, however, since the facility maintains no irrigatable plantings. Attachment 4 presents the monthly water use at this facility in 2004 and 2005.

The facility does employ a modest amount of water conservation based chiefly on the use of a truck wash pad that collects and recirculates truck wash water for dust control. Dust control is maintained through the use of a single Rainbird sprinkler mounted near the facility entrance. It is operated manually, as needed. The facility, which is over 30 years old, also uses water for boiler make up water.

There are times when the existing 2-inch tap does not meet peak water demands of the facility. For this reason, Western Pre Mix has installed a 6,000-gallon tank on site to assist with peak demand requirements.

Future water savings are planned for the facility, based on discussion with Eric, the plant manager. The facility is looking to upgrade its batch plant and related water handling facilities within 2 years. The new plant would look to batch with recycled water.

Alternatives and Recommendations

Western Pre-Mix is not the type of facility that lends itself readily to improved water use without substantial process plumbing changes. Concrete requires a certain volume of make-up water to be of appropriate strength and consistency. As long as the local demand for concrete exists, the water use of this facility will continue to fluctuate based on the demand for concrete.

One option that the Town has for this and other like facilities in Town is to provide untreated or reclaimed water for their use. Although this option is not readily implemented at this time, it may become feasible at some point in the future.

Finally, it will be difficult to employ a water budget approach to this commercial enterprise, since its water use is based on concrete demand. It may be worthwhile to continue to monitor this facility's water use into the future to better understand the range of normal water use activities, since this type of information will be needed to develop an appropriate water budget.

Apricot Pool (account 5677)

The Apricot Pool which is owned and operated by the Players Club Villa HOA maintains roughly 1.5 acres of irrigated landscape within the area adjacent to the swimming pool. This area is mainly Kentucky bluegrass as shown in Attachment 3. The facility uses Town water to fill the swimming pool each May, and drains, and for frost heave protection refills the pool in September. In addition, the pool uses Town water to back wash its filters on a weekly basis to maintain a clean pool environment, provide replacement water for the pool, and provide irrigation water for the surrounding landscape.

The pool volume is estimated to be about 50,000 gallons. The pool filter back washing and replacement water is estimated to be another 36,000 gallons over a four month period (May through August). The remaining water use is expected to be ostensibly irrigation water. Outdoor irrigation occurs from April to September.

Attachment 4 presents the monthly water usage at the pool for 2004 and 2005, whereas Attachment 5 presents a comparison of irrigation water use to the target for the equivalent area of bluegrass.

Based on these figures and related analyses, it appears that irrigation watering at the Apricot Pool exceeds the recommended watering target by a factor of about 10% since the middle of 2004. Prior to this time, irrigation was two or more times greater than was needed for the turf and other plantings. Since the individuals responsible for irrigation were not available for comment during preparation of this report, it is not known whether or not the irrigation system uses an ET controller or precipitation sensor.

Alternatives and Recommendations

Based on the 2005 water use, it appears that the facility is exceeding the ET-based water budget by about 12 percent over the course of the summer months. To improve water efficiency, the pool could install and operate an ET controller saving the HOA about 10 to 70 percent of its future seasonal water costs. It would cost the HOA about \$800 to purchase, install and program the ET Controller for a 14-zone system, paying for itself in less than one season.

A more aggressive move would be to replace about 1/2 of the high water use plants and turf with native grasses and other xeriscape plant materials current on property

for a cost of about \$22,500. This cost, which would be offset by substantially reduced water cost, would be paid back in about 5 to 6 years. Of course the HOA needs to be careful not to compromise its bathing area use, such that any turf replacement will need to be appropriate for barefoot traffic. This is why only 1/2 of the existing turf was included for replacement.

Brookside Inn (account 11912)

Brookside Inn (see Attachment 3) presents a particular challenge to water managers since this facility houses senior citizens in high-density living. Not only is this facility self-contained – providing all laundry, bathing and food service needs for its 120 residents – it does the same for its fulltime (24 hour/7 days a week) staff of approximately 180 employees.

The facility which is reasonably new (9 years old) is equipped with low-flow toilets and low-flow and manually operated shut off shower heads. Given the nature of the facility, which has 24 hour facility maintenance, there are mechanisms in place to identify and repair leaks on a regular basis. It does utilize large washing machines, which are not high-efficiency, and it does not recycle any kitchen water. It also has over an acre of planted bluegrass which is used passively and actively by the facility residents and their visitors. They do not have a precipitation sensor or ET controller on their irrigation system, which consists of pop-up spray and rotors.

Water use at the facility (see Attachment 4) rose from 2004 to 2005, chiefly due to the increase outdoor irrigation applied in the summer of 2005. Otherwise the facility maintains a fairly steady water use. The cost of water for outdoor irrigation at Brookside in 2004 and 2005 combined was roughly \$7,000. Attachment 5 presents the outdoor water use for Brookside Inn as compared to the target water use.

Based on the water budget evaluation, Brookside Inn would have had an increase in their water bill in 2005 by about 20% due to excessive outdoor watering, which translates into cost increase of about \$3,000 over the last year.

Alternatives and Recommendations

Brookside Inn could reduce water use first by improving the outdoor landscaping. The landscaping especially in the south side of the building could be replaced with a mixture of hardscape and xeriscape plantings. If about one half of the bluegrass was replaced (this target was used to account for those areas that are actively used by the facility residents and their visitors) at a cost of about \$20,000, the payback for the turf replacement would occur in 4 to 8 years based on the mixture of hardscape and xeriscape selected for implementation and the water budget pricing.

Brookside Inn could also install an ET Controller to serve 14 to 26 zones for about \$3,000. If this equipment is properly programmed and used, Brookside Inn could recover the capital cost for the installation in about one year with the projected water savings under water budget pricing.

DC Jail (account 12760)

Like Brookside Inn, the Douglas County Jail (see Attachment 3) houses a high density of residents and 24 hour/7 day a week staff within a self-contained facility, providing bathroom, laundry and food services to all within its walls. The sinks are all outfitted with automatic shut offs, and the toilets are all low flow. Laundry facilities and the kitchen do not have high efficiency equipment; however, the facility maintains a rigorous leak detection program out of necessity. The facility also houses the county courts and morgue.

Indoor water use is linked to the number of inmates that are resident in the facility at any one time (see Attachment 4). Table 7 presents a comparison of water use to inmate residents for the winter months to help characterize facility water usage.

Outdoor use is substantial for the nearly nine acres of irrigated plantings (see Attachment 5). The cost of outdoor water use for the combined years of 2004 and 2005 was over \$165,000. If the water budget pricing were in place, the additional cost of water for this same period of time would have been over \$450,000, with \$134,000 coming in one month (based on July 2004 water use).

Alternatives and Recommendations

Indoor water use changes are difficult to evaluate given the nature of the water and facility use. Per capita water use is extremely high at the facility, which has been calculated after removing outdoor water use. Typical indoor water use per capita in Colorado ranges from about 70 to 120 gallons per day per person. The per capita water use at the Jail ranges from 4 to 10 times higher than these numbers. Note that the per capita water use calculations did not include any members of the administration and jailhouse security. Inclusion of these individuals would decrease the inmate per capita water use by some unknown factor.

The Jail could substantially reduce its outdoor water use by improving its irrigation methods, the outdoor landscaping, or both. For example, an ET Controller could be purchased to manage up to 66 zones for between \$4,000 and 8,000 including the labor to install and program the unit. Based on past water usage, the Jail could save \$100,000 or more a year just in excess watering costs under current water pricing and substantially more if the water budget pricing is implemented.

The landscaping especially in the southern and western portions of the facility could be replaced with a mixture of hardscape and xeriscape plantings. In more remote locations around the perimeter of the Jail, SDI for small stands of pines or other low water use plantings could be installed for even less cost, by allowing the natural areas to develop without the aid of irrigation water. If all of the high water use areas were replaced, at a cost of \$150,000 to \$250,000, the payback for the Jail would

occur in 2 to 4 years based on mixture of hardscape and xeriscape selected and water budget pricing.

Chili's Restaurant (account 13820)

Chili's Restaurant shown in Attachment 3 has one tap that provides water for all indoor uses and landscape irrigation. The facility is less than 5 years old and is fitted with low flow toilets and urinals, automatic flush fixtures and automatic lavatories. The kitchen was not available for inspection during the site visit.

Average water usage at the facility is linked to customer visits, which were up in 2005 due to the placement of Chili's on the I-25 public service signage advertising the restaurant. The restaurant receives publicity via this vehicle on a rotating basis, one year out of three. Water usage is expected to drop as soon as Chili's is taken off the signage in favor of another local establishment. This advertising explains the upward trend in water use experienced at Chili's over the two year period analyzed (see Attachment 4). Based on the customer visit information made available at the time of the site visit, all of which was for wintertime months, an average customer uses slightly more than 9 gallons of water per visit.

Average wintertime usage at Chili's is about 170,000 gallons per month. Summertime usage is about 30% above average wintertime usage (see Attachment 4). This increase in summertime usage is presumably associated with the irrigation of about 0.5 acres of landscape on the property. As can be seen in Attachment 5, which compares the actual irrigation to eighty percent of the estimated monthly ET for each summer month in the past two years, the irrigation of this landscape was performed more efficiently in 2004 than 2005. The observed irrigation patterns in these two years is indicative of a spray irrigation system augmented with a precipitation sensor, since 2004 was substantially wetter and cooler than 2005.

Nonetheless, irrigation at Chili's substantially exceeded the target of eighty percent of ET. In fact for 3 out of 6 summertime months in 2005 Chili's exceeded its irrigation "budget" by about 110%. For 2004 and 2005, Chili's paid about \$2,700 for irrigation water. If during that same period of time the water budget pricing were in place, Chili's would have paid over \$2,000 more for the same amount of water, or over \$4,700.

During the site visit, the manager of Chili's indicated that the organization is looking to follow suit with other local restaurants that have removed their irrigated landscape in favor of either hardscape or xeriscape. He had no set time by when this change would take place, however it appears that the planned change to the Town's water rates will be one contributing factor.

Alternatives and Recommendations

Chili's already utilizes the state of the science fixtures to manage indoor water use, therefore their opportunities for improved water use efficiency relate to outdoor water use. Chili's could reduce water use by improving its irrigation technology and/or its outdoor landscaping. For example, Chili's could have saved nearly 40 percent of last summer's outdoor water use if it had an ET Controller properly installed and programmed. The cost of an ET Controller for 14 zones is about \$800 to purchase, install, and program. This investment would have been paid back to Chili's in one irrigation season even without water budget pricing.

In addition, all of the nearly one half acre landscape could be replaced by a combination of hardscape and xeriscape plantings. For a cost of \$13,000 to 17,000, the payback for to Chili's would occur in 4 to 10 years depending on the mixture of materials used and the water budget pricing.

Safeway (account 16987)

The Safeway on Perry Street utilizes water for indoor uses only (see Attachment 3). They were not forthcoming with any information or access regarding their water use within their facility, so much of what is presented herein is based on anecdotal evidence. The Safeway water use demonstrates a seasonal fluctuation in water use consistent with what would appear to be outdoor irrigation practices (see Attachment 4). Since this account does not include irrigation uses, based in part on the understanding that outdoor irrigation at this and neighboring stores is provided by the owner of the strip mall, the summertime increase in water use is likely associated chiefly with their "green center" that stocks plants for Safeway's customers in the summer months. It may also be associated with small increases in interior water use at the bakery, restrooms, and produce areas, but these increases are expected to be small relative to the green center.

Based on the water use pattern, the green center utilizes water equivalent to approximately ½ acre of bluegrass. Since Safeway does not have outdoor water use tied to irrigation of a specific area of bluegrass, a water budget evaluation of Safeway's water use was performed simply by using 2004 as the base case for total annual water use. Using this model, Safeway used about 9 percent more water in 2005 than 2004. Comparing Safeway's month-by-month usage, Safeway's cost of water, based on a water budget model, would have increased by over 60%, caused chiefly on their increased water use from October to December 2005, when they exceeded their "water budget" by an average of about 90% per month. Using the water budget water pricing, Safeway's increased water use from 2004 to 2005 translates into an increase cost of water of about \$9,000 per year (comparing 2004 to 2005).

Alternatives and Recommendations

Safeway's water savings appears to be related to their wintertime needs, as opposed to their summertime usage. Given that Safeway did not choose to participate in the

audit program, it is difficult to determine the source of their increased water use. Common sense would suggest that Safeway should first and foremost inspect their water fixtures, including commodes, sinks, produce sprays, and lavatories to check for leaks, and repair whatever leaks are found. Safeway should also evaluate installing automated shutoff devices on their public use restroom facilities.

Jenny's Market (formerly BP Products) (account 17505)

Jenny's Market, which until recently was the BP Gas Station on Plum Creek Parkway (see Attachment 3), uses a substantial amount of water for a gas station with a car wash. They have indoor water use consistent with most gas stations – they have public use restrooms for both men and women. They also irrigate about 0.4 acres of bluegrass that borders their paved areas both to the east and north.

The cause of the facility's excessive water use is their car wash. This is in part evidenced by the lack of summertime peaks in water use shown in Attachment 4. The equipment that they use has been and continues to malfunction due to excessive water softer backwashing, which discharges 5 to 10 gallons per minute directly into the sanitary water collection system in the base of the car wash. It is estimated that as much as one third to one half of the facility's water use relates to this malfunctioning car wash.

Because the car wash has been in place over the entire period of record, the use of a water budget based on historical wintertime use plus 80% of estimated evapotranspiration for the irrigated area is not an effective means to determine potential cost implications of improvements. Therefore, the true water budget should be based on a correctly operating car wash, which uses roughly one half to two thirds of the water currently being used by the car wash, and the measured number of car washes per month. Unfortunately the audit was not in position to character water use at this facility under more appropriate operating circumstances.

An estimate of the car wash waste is between 70,000 to 120,000 gallons per month, or about 4 acre-feet per year. The cost of this waste using the water budget approach would increase the monthly water bills for Jenny's Market by \$350 to 500 per month, or as much as \$6,000 per year.

Alternatives and Recommendations

The car wash at Jenny's Market is a very inefficient water user wasting perhaps 4 acre-feet of water per year. Repairing this car wash such that its backwash mechanism functions properly could save the majority of the water waste at this location; however, replacing this car wash with one that captures and recycles water would be an even more appropriate remedy. With regard to the malfunctioning car wash, perhaps a simple \$500 plumbing fix could save Jenny's Market \$6,000 per year.

At the next level, it may be possible for Jenny's Market to install a car wash that recycles water based on Vickers (2002), especially rinse water, saving perhaps as much as 75% of what would be used by a correctly functioning car wash at a cost of about \$50,000 creating a savings in water and sewerage costs of as much as the \$18,000 per year. Therefore, this investment would have a pay back within 3 to 4 years.

Jenny's Market could also improve the efficiency of its landscape. Fore example, Jenny's Market could install a 14-zone ET Controller for about \$800 and improve the water use efficiency of its outdoor irrigation.

In addition, the 0.4 acres of bluegrass could be replaced with a combination of hardscape and xeriscape, with the water savings paying for the investment in 4 to 5 years, assuming that Jenny's Market does not currently over water its landscape plant material. If the plant material is over watered, then the payback period for the hardscape would be less.

Target (account 21126)

The Target retail store on Founders Parkway (see Attachment 3), which is served by a single tap, has implement fairly aggressive water savings measures and programs over the last few years. To begin with, they have eliminated all indoor watering of plants and they have decommissioned all unnecessary bathrooms. They have not replaced manually operated fixtures with automated ones, however, they maintain only two bathrooms with 5 toilets and one urinal under current operations, which are relatively easy to inspect and maintain in conjunction with normal housekeeping programs.

There is also a small kitchen under roof, which contains a sink for food processing and washing. Most of the food is served on disposable plates and bowls, such that very little dishwashing is needed. Attachment 4 presents the total water use at Target during 2004 and 2005.

The outdoor water use at this facility has changed significantly over the past two years (see Attachment 5). The vast majority of the bluegrass that had been installed and irrigated in 2004 and 2005 was removed and placed early this year in favor of native grasses at a cost of approximately \$70,000. The removal and replacement activities included removing the bluegrass and underlying soils and replacing the soils with a loamy sandy mixture that will allow for better irrigation infiltration, and provide for better plant substrate. Some attempt was made to terrace steep soil slopes as well.

This area is served with a mixture of pop-up and SDI to both establish and maintain the native plant materials. The facility is also looking to experiment with various soil wetting agents to help the soil retain water better.

Note that before Target implemented this turf replacement program they had paid over \$11,500 for irrigation water for the combined years of 2004 and 2005. Water budget pricing for Target would have added another \$3,000 to this two-year water bill.

Alternatives and Recommendations

Target continues to irrigate nearly 2 acres of its property that was not replaced with native grasses including islands and treed areas around the property perimeter. These areas could be replaced with hardscape to eliminate water use and reduce overall maintenance of the facility. The cost of the hardscape would range from \$50,000 to 70,000, with an expected payback off about 6 to 10 years based on the water budget pricing.

Outlets at Castle Rock (account 24985)

The Outlets at Castle Rock is the largest retail shopping center in the Town (see Attachment 3). The facility houses over 120 different retail shops contained within a series of outdoor malls bordered with irrigated landscape. Although the facility has more than one water tap to provide for the indoor and outdoor watering needs of the outlet mall, the “indoor use” tap (tap 24985) uses the most water estimated to be about 2 gallons per vehicle visit in the winter (see Table 6). The indoor water tap (24985) provides water for bathroom and drinking fountains, and the food court, which houses a dozen or so different fast food providers. This indoor tap also appears to provide some limited outdoor water use, most likely associated with irrigation of landscape between the buildings given the observed seasonal fluctuation of water use (see Attachment 4).

Bathrooms and drinking fountains are strategically placed within the food court area, and at locations in each of the outdoor malls. Most of the shops also contain bathrooms for employee use. The bathrooms are all outfitted with low flow toilets but all the bathrooms except those in the food court area are manually operated. Those bathrooms located within the food court are outfitted with automated toilets, urinals and lavatories.

Landscape between the buildings consists of Kentucky bluegrass, scrubs and a limited number of trees. It is estimated that approximately ½ acre of irrigated acreage is serviced by tap 24985.

Based on the summertime use of water associated solely with tap 24985, as illustrated in Attachment 5, the Outlets spent about \$2,700 for outdoor irrigation during 2004 and 2005. If the irrigated area serviced by this tap is about ½ acre,

then under the water budget pricing, the additional cost of water for this same period would have been over \$1,600 for a total of about \$4,300 in two years.

The majority of the outdoor water demand for landscape maintenance is met by the other taps that serve the facility. These taps were not identified as one of the largest water users in the Town since landscape in the islands and around the perimeter of the Outlet Mall are comprised of native grasses and trees. These areas are typically irrigated only once per week utilizing a mixture of pop-ups and subsurface irrigation.

Alternatives and Recommendations

Reduction of water use at the Outlets at Castle Rock, specifically for tap 24985, may be realized with only limited measures and programs. To begin with, a regular leak detection program integrated with the normal housekeeping efforts could be established to include regular inspection, reporting and maintenance of the numerous bathrooms and food court kitchens onsite, to ensure that leaks and malfunctioning fixtures are identified, and repaired or replaced in a timely manner. In addition, the mall could install automated shutoffs for the sinks, toilets and urinals at those bathrooms other than the food court; however the return on this investment based on current water pricing may be as much as 30 years or greater based on expected reduction in flow rates presented in the California Urban Water Conservation Council (2000).

In addition, the Outlets at Castle Rock could remove and replace the Kentucky bluegrass located between the buildings to reduce outdoor water use. The landscaping could be replaced with a mixture of hardscape and xeriscape plantings. If the bluegrass and other high water use plants were replaced, at a cost of \$13,000 to 17,000, the payback would occur in 5 to 12 years dependant on the mixture of materials used and future cost of water.

Irrigation Accounts

The large irrigation accounts served by the Town are generally similar. The irrigators utilize water currently for the maintenance of bluegrass – either in streetscapes, multifamily landscapes and/or parks. Water use in these areas may be reduced through improved irrigation methods and practices, and for most areas (except certain portions of parks) revised landscaping.

Unfortunately, most commercial irrigators over water by a substantial amount. As shown in Table 8, nearly every large irrigator over waters its bluegrass and other high water use plant materials, some by as much as 13 times too much, with few exceptions (e.g., Town of Castle Rock Butterfield Park). In addition, only the Town's parks have ET controllers or precipitation sensors linked to their programmable irrigation systems. Some of the irrigators use human sensors to regulate when the sprinkler systems are activated (for example the Pines at Castle

Rock this year has hired an irrigation contractor that resides onsite to manage their irrigation system); however, it appears that this approach is not as efficient as it needs to be.

Many of the Town's large irrigators are in the process of determining their best approach to long term landscape management. Most are looking to replace the bluegrass turf and other high water use plant material with native grasses and other xeriscape plantings mixed with hardscape alternatives; however the cost of these efforts is substantial given that many of the large irrigators maintain many water taps and sprinkler systems. For example, Founder's Village maintains and operates over 5,000 sprinklers using 24 taps to irrigation over 800,000 square feet of plant material. They have reported spent nearly \$100,000 just to map there irrigation system and inventory the taps, sprinkler heads, application rates and programmable equipment. They expect to be looking at turf replacement programs as the next phase of their studies.

Alternatives and Recommendations

Given the similarity of the various irrigator landscapes, and therefore water uses, the alternatives and recommendations for each are similar, varying only in there respective payback periods, since the amount of practiced over watering varies from account to account.

First, the commercial irrigators should look at installing properly programmed ET Controllers. When linked to a programmable irrigation system, water use efficiency can be increased, and for some of the biggest irrigation water users, the savings can be substantial.

For example, for the four smallest irrigation accounts (Escavera, Castlewood Ranch, Metzler, and the Founder Village HOA (that the Town pays for), a 14 zone ET controller can be purchased, installed and programmed for about \$1200 including tamper proof housing. The reduced cost of water associated with the installation of the ET controller for these accounts is less than one irrigation season under current water prices, and less than one month using the water budget pricing.

For the next set of accounts, including Founders Village (paid for by the Town), Pines at Castle Rock and Common Grounds, a more complex ET controller is required, costing between \$5,000 and 10,000 to purchase, install and program. For these accounts, the pay back for this investment under current pricing will likely occur in 1 to 2 irrigation seasons, although for some accounts the pay back under water budget pricing may be less than one month.

If just the over watering of streetscapes, multifamily areas and parks associated with these ten accounts in 2005 occurred, the Town would have saved over 80 acre-feet of potable water.

Table 9 summarizes the cost for retrofitting the various irrigation landscapes with a mixture of hardscape and xeriscape materials, and the expected payback period, based on the average cost of water for 2004 and 2005 using the water budget model.

Based on this analysis, the majority of the irrigators could pay for installing more efficient landscape in less than one year. Even if the costs for working in the median strips and along the various roadways proved to be 3 to 4 times as expensive as indicated by Target and the YARDX research, the payback period for most locations would be less than 2 years. Only Butterfield, which has already implemented a turf replacement program and Meadows Parkway have payback periods of ten years or more.

Also note that in locations such as Butterfield Park, complete turf replacement with xeriscape and other water efficient planting since this material is not suitable for all public play areas and athletic fields. The Town may want to install synthetic turf in some of the athletic fields as an alternative (noting that Douglas County already has more than a half dozen of the synthetic turf fields installed in parks).

The Town's 10 largest irrigation accounts studied in this project used nearly 100 acre-feet in 2004, and over 136 acre-feet of water in 2005 irrigating nearly 1.9 million square feet of turf. Using a price for new water as \$10,000 per acre-foot, the water savings afforded by the turf replacement program represents over \$1,000,000 in replacement water costs, which is about the cost of the turf replacement programs for all ten accounts.

Section 4 References

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Northern Colorado Water Conservancy District, 2004, “Turfgrass Irrigation Management Program”, www.ncwcd.org/ims/scheduler.asp, Loveland, Colorado.

US Department of Commerce, National Oceanic & Atmospheric Administration, “Castle Rock, Colorado Station 051401/999999, Annual Climatological Summary for 2004 and 2005”, Asheville, North Carolina.

Vickers, Amy, 2002, “Handbook of Water Use and Conservation”, Waterplow Press, Amherst, Massachusetts.

**Table 1
Summary of Audited Water Accounts**

| Commercial Users | | | | |
|-----------------------------------|-----------------------------------|---|---------------------------|----------------------------|
| Account Number^a | Entity | Location | Use | Meter Size (inches) |
| 4457 | Western Mobile Pre-Mix | 309 S. Gilbert Street | Concrete Batch Plant | 2 |
| 5677 | Players Club Villas HOA | 185 Apricot Way | Swimming Pool | 1.5 |
| 11912 | Brookside Inn | 1297 S. Perry Street | Assisted Care Living | 2 |
| 12760 | County Jail | 4000 Justice Way | Jail | 6 |
| 13820 | Chili's | 800 New Memphis Court | Restaurant | 1.5 |
| 16987 | Safeway | 880 Perry Street | Grocery Store | 2 |
| 17505 | Jenny's Market/BP Products | 80 Plum Creek Parkway | Gas Station/Car Wash | 1.5 |
| 21126 | Target | 5010 Founders Parkway | Retail Store | 2 |
| 24985 | Outlets at Castle Rock | 5050 Factory Shops Blvd. | Outlet Shopping Mall | 3 |
| | | | | |
| Irrigation Users | | | | |
| Account Number* | Entity | Location | Use | Meter Size (inches) |
| 3420 | Town of Castle Rock | Butterfield Park | Park | 4 |
| 3782 | Town of Castle Rock | Gilbert Park | Streetscape and park | 1.5 |
| 3812 | Founders Village HOA ^b | Founders Village 8 Irr Founders Parkway | Streetscape | 3 |
| 11790 | Pines at Castle Rock | 2220 Castlegate | Common area of Apartments | 1.5 |
| 13657 | Founders Village HOA ^b | Founders Village 200 Mikelson | Streetscape | 2 |
| 15858 | Metzler HOA | 3800 Woodlands Blvd. | Streetscape | 2 |
| 20075 | Castlewood Ranch HOA | 6401 Milbridge Ave. | Streetscape | 1.5 |
| 27054 | Escavera | 1724 Wild Star Way | Streetscape | 2 |
| 27767 | The Meadows | 3492 Meadows Parkway | Streetscape | 3 |
| 30424 | Common Grounds Properties | 4110 Painthorse Drive | Streetscape | 2 |

^a account number = tap number

^b Town of Castle Rock pays for HOA water use of these accounts

Table 2
Estimated Monthly Evapotranspiration^a 2004 and 2005

| Month | Average Maximum Temperature ^b (degrees F) | Average Minimum Temperature ^b (degrees F) | Estimated ET (inches per month) |
|-------------|---|---|------------------------------------|
| 2004 | | | |
| April | 58.0 | 33.1 | 3.60 |
| May | 72.0 | 40.3 | 5.89 |
| June | 75.7 | 46.3 | 6.30 |
| July | 81.3 | 50.8 | 6.82 |
| August | 78.5 | 48.6 | 5.89 |
| September | 75.8 | 43.5 | 4.50 |
| October | 63.7 | 34.8 | 2.79 |
| 2005 | | | |
| April | 57.5 | 29.6 | 3.60 |
| May | 68.4 | 40.2 | 5.27 |
| June | 78.5 | 48.4 | 6.60 |
| July | 88.9 | 56.6 | 8.06 |
| August | 80.6 | 52.3 | 6.20 |
| September | 78.1 | 48.0 | 4.80 |
| October | 63.8 | 36.4 | 2.79 |

^a based on Northern Colorado Water Conservancy District Turfgrass Management Program (2004)

^b Castle Rock climatological data is provided in Attachment 2 for 2004 and 2005

Table 3
Proposed Inclining Block Rate Structure for Commercial and Irrigation Accounts

| Cost of Water Used (per 1000 gallons) | Percent of Water Budget Used (monthly) |
|--|---|
| \$ 4.13 | < 100% |
| \$ 6.20 | 100 – 120% |
| \$ 9.30 | 120 – 140 % |
| \$ 13.65 | > 140% |

Table 4
Single Family Equivalents for Various Tap Sizes

| Commercial Tap Size (inches) | Equivalent Number of Single Family Equivalents (SFE) | Calculated Base Rate* |
|---|---|------------------------------|
| 1 | 2 | \$ 24.60 |
| 1.5 | 4 | \$ 49.20 |
| 2 | 8 | \$ 98.40 |
| 3 | 18 | \$ 221.40 |
| 4 | 36 | \$ 442.80 |
| 6 | 94 | \$ 1,156.20 |

* base rate per SFU is \$49.00

Table 6
Water Use per Vehicle Visit at the Outlets of Castle Rock

| Month | Total Water Used (1000 gallons) | Cars Visits | Gallons of Water Per Car* |
|--------------|--|--------------------|--------------------------------------|
| Apr-04 | 384 | 135102 | 2.84 |
| May-04 | 249 | 115317 | 1.95 |
| Jun-04 | 291 | 142175 | 1.06 |
| Jul-04 | 408 | 132931 | 2.34 |
| Aug-04 | 364 | 154065 | 1.80 |
| Sep-04 | 354 | 153218 | 1.82 |
| Oct-04 | 343 | 133437 | 2.44 |
| Nov-04 | 285 | 137005 | 2.08 |
| Dec-04 | 258 | 119345 | 2.16 |
| Jan-05 | 314 | 175551 | 1.79 |
| Feb-05 | 184 | 104212 | 1.77 |
| Mar-05 | 196 | 99865 | 1.96 |
| Apr-05 | 230 | 127388 | 1.81 |
| May-05 | 212 | 121686 | 1.74 |
| Jun-05 | 246 | 134955 | 1.79 |
| Jul-05 | 272 | 135505 | 1.24 |
| Aug-05 | 371 | 153937 | 1.69 |
| Sep-05 | 378 | 142937 | 2.42 |
| Oct-05 | 299 | 128246 | 1.91 |
| Nov-05 | 321 | 138878 | 2.31 |
| Dec-05 | 300 | 134672 | 2.23 |
| Jan-06 | 316 | 180999 | 1.75 |
| Feb-06 | 222 | 117259 | 1.89 |

* Summer month water use was adjusted for estimated outdoor water use

Table 7
Water Use per Inmate at the Douglas County Jail

| Month | Water Usage (1000 gallons) | Inmates | Gallons per inmate per day* |
|----------|-------------------------------|---------|--------------------------------|
| Apr-04 | 5150 | 256 | 648.94 |
| May-04 | 3875 | 246 | 586.04 |
| Jun-04 | 4375 | 235 | 531.91 |
| Jul-04 | 5450 | 241 | 729.60 |
| Aug-04** | 5000 | 252 | (545.63) |
| Sep-04 | 13950 | 274 | 1,450.73 |
| Oct-04 | 6850 | 275 | 618.18 |
| Nov-04 | 6575 | 278 | 762.94 |
| Dec-04 | 3975 | 279 | 459.59 |
| Jan-05 | 4325 | 262 | 532.50 |
| Feb-05 | 5075 | 300 | 545.70 |
| Mar-05 | 5225 | 314 | 536.78 |
| Apr-05 | 5225 | 321 | 525.07 |
| May-05 | 7425 | 302 | 793.10 |
| Jun-05 | 9550 | 304 | 515.35 |
| Jul-05 | 9675 | 320 | 438.80 |
| Aug-05 | 10287.5 | 320 | 502.60 |
| Sep-05 | 10287.5 | 328 | 689.79 |
| Oct-05 | 8325 | 324 | 735.60 |
| Nov-05 | 6000 | 334 | 579.49 |
| Dec-05 | 5125 | 333 | 496.46 |
| Jan-06 | 5075 | 322 | 508.42 |
| Feb-06 | 4250 | 313 | 438.01 |

* Summer month water use was adjusted for estimated outdoor water use

** Note that the reading for August 2004 was not made until September 2004. Therefore the September 2004 reading represents two months.

Table 8
Summary of Town's Largest Irrigation Accounts
Town of Castle Rock

| Account | | Irrigated Area (acres) | Actual Total Summertime Outdoor Use (1,000 gallons) | | Actual Summertime Outdoor Use as a % of Water Budget Goal | | Actual Total Summertime Outdoor Water Cost | | Potential Total Summertime Outdoor Water Cost Using Water Budget Model | | % of Actual Total Summertime Outdoor Water Cost Using Water Budget Model | |
|---|---|------------------------|---|-------|---|-------|--|-----------|--|-----------|--|------|
| | | | 2004 | 2005 | 2004 | 2005 | 2004 | 2005 | 2004 | 2005 | 2004 | 2005 |
| Town of Castle Rock | Butterfield Park | 12.0 | 6,277 | 5,387 | 67% | 55% | \$ 29,036 | \$ 25,360 | \$ 29,036 | \$ 25,360 | 100% | 100% |
| Town of Castle Rock | Gilbert Park | 0.8 | 2,943 | 5,063 | 473% | 781% | \$ 12,693 | \$ 21,448 | \$ 35,342 | \$ 63,854 | 278% | 298% |
| Town of Castle Rock (pays for District use) | Founders Village 8 Irr Founders Parkway | 4.5 | 9,100 | 9,830 | 259% | 268% | \$ 39,133 | \$ 42,148 | \$ 86,571 | \$ 96,148 | 221% | 228% |
| Pines at Castle Rock | 2220 Castlegate | 1.3 | 2,373 | 4,820 | 228% | 444% | \$ 10,483 | \$ 20,590 | \$ 22,312 | \$ 55,239 | 213% | 268% |
| Town of Castle Rock (pays for District use) | Founders Village 200 Mikelson | 0.2 | 2,042 | 2,713 | 1094% | 1394% | \$ 9,122 | \$ 11,893 | \$ 26,879 | \$ 36,320 | 295% | 305% |
| Metzler HOA | 3800 Woodlands Blvd. | 0.3 | 1,132 | 2,943 | 469% | 1170% | \$ 5,364 | \$ 12,843 | \$ 13,818 | \$ 38,651 | 257% | 300% |
| Castlewood Ranch HOA | 6401 Milbridge Ave. | 0.3 | 1,614 | 1,969 | 649% | 759% | \$ 7,460 | \$ 8,926 | \$ 20,250 | \$ 25,315 | 271% | 284% |
| Escavera | 1724 Wild Star Way | 0.5 | 2,205 | 2,673 | 580% | 674% | \$ 10,113 | \$ 12,046 | \$ 27,579 | \$ 33,898 | 272% | 281% |
| The Meadows | 3492 Meadows Parkway | 21.9 | 3,238 | 5,186 | 60% | 89% | \$ 16,116 | \$ 24,161 | \$ 16,116 | \$ 73,247 | 100% | 303% |
| Common Grounds Properties | 4110 Painthorse Drive | 1.2 | 323 | 3,806 | 36% | 405% | \$ 3,299 | \$ 17,684 | \$ 7,616 | \$ 43,749 | 230% | 247% |

Table 5
Summary of Town's Largest Commercial Accounts
Town of Castle Rock

| Account | | Irrigated Area (acres) | Actual Total Summertime Outdoor Use (1,000 gallons) | | Actual Summertime Outdoor Use as a % of Water Budget Goal | | Actual Total Water Cost | | Potential Total Water Cost Using Water Budget Model | | % of Actual Total Water Cost Using Water Budget Model | |
|----------------------------|--------------------------|------------------------|---|--------|---|------|-------------------------|------------|---|------------|---|------|
| | | | 2004 | 2005 | 2004 | 2005 | 2004 | 2005 | 2004 | 2005 | 2004 | 2005 |
| Western Mobile Pre-Mix | 309 S. Gilbert Street | - | n/a | n/a | n/a | n/a | \$ 8,730 | \$ 10,543 | n/a | n/a | n/a | n/a |
| Apricot Pool | 185 Apricot Way | 1.3 | 1,188 | 856 | 122% | 85% | \$ 5,812 | \$ 4,441 | \$ 9,983 | \$ 4,888 | 172% | 110% |
| Brookside Inn | 1297 S. Perry Street | 1.3 | 334 | 1,396 | 33% | 133% | \$ 14,656 | \$ 19,042 | \$ 14,671 | \$ 23,209 | 100% | 121% |
| County Jail | 4000 Justice Way | 8.8 | 12,300 | 27,775 | 181% | 391% | \$ 198,383 | \$ 262,295 | \$ 294,212 | \$ 447,694 | 148% | 171% |
| Chili's | 800 New Memphis Court | 0.5 | 88 | 546 | 23% | 138% | \$ 5,643 | \$ 7,535 | \$ 5,716 | \$ 9,357 | 101% | 124% |
| Safeway | 880 Perry Street | 0.5 | 424 | 375 | 119% | 101% | \$ 9,174 | \$ 8,972 | \$ 10,645 | \$ 10,630 | 116% | 118% |
| Jenny's Market/BP Products | 80 Plum Creek Parkway | 0.4 | - | 32 | 0% | 10% | \$ 7,068 | \$ 7,692 | \$ 7,068 | \$ 7,755 | 100% | 101% |
| Target | 5010 Founders Parkway | 4.1 | 1,188 | 1,616 | 75% | 97% | \$ 6,826 | \$ 8,594 | \$ 6,865 | \$ 10,241 | 101% | 119% |
| Outlets at Castle Rock | 5050 Factory Shops Blvd. | 0.5 | 424 | 229 | 119% | 62% | \$ 11,024 | \$ 10,218 | \$ 12,072 | \$ 10,805 | 110% | 106% |

Table 9
Summary of Cost Benefits for Large Irrigator Turf Replacement
Town of Castle Rock

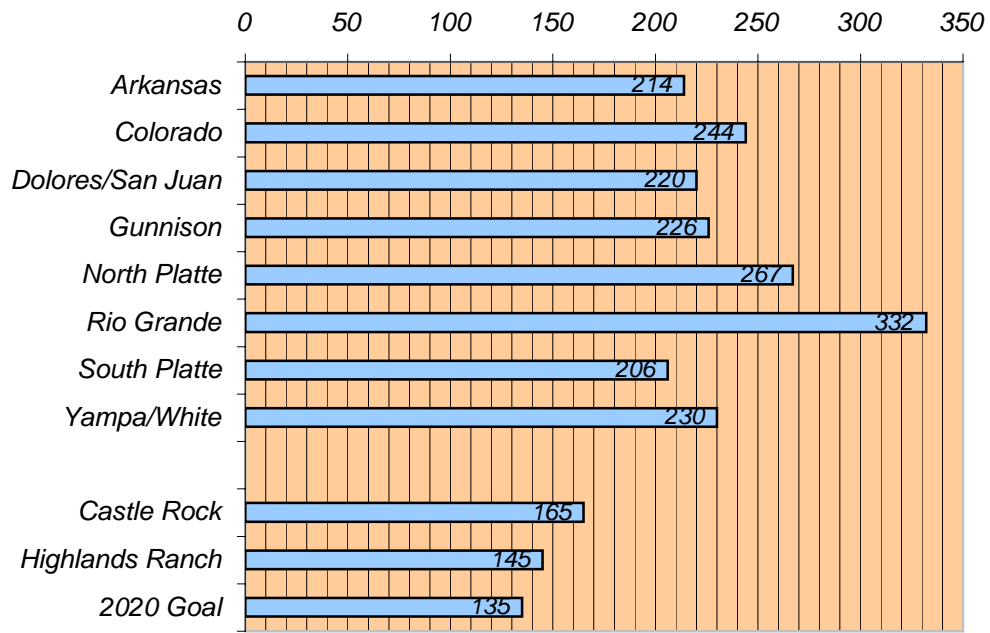
| Location | Irrigated Area (acres) | Cost to Retrofit Irrigated Acres | | Payback Period (years) |
|--|------------------------|----------------------------------|------------|------------------------|
| | | Hardscape | Xeriscape | |
| <i>Butterfield Park</i> | 12.0 | \$ 313,632 | \$ 418,176 | 11.53 |
| <i>Gilbert Park</i> | 0.8 | \$ 20,909 | \$ 27,878 | 0.42 |
| <i>Founders Village 8 Irr Founders Parkway</i> | 4.5 | \$ 118,135 | \$ 157,513 | 1.29 |
| <i>2220 Castlegate</i> | 1.3 | \$ 35,022 | \$ 46,696 | 0.90 |
| <i>Founders Village 200 Mikelson</i> | 0.2 | \$ 6,273 | \$ 8,364 | 0.20 |
| <i>3800 Woodlands Blvd.</i> | 0.3 | \$ 8,102 | \$ 10,803 | 0.31 |
| <i>6401 Milbridge Ave.</i> | 0.3 | \$ 8,364 | \$ 11,151 | 0.37 |
| <i>1724 Wild Star Way</i> | 0.5 | \$ 12,807 | \$ 17,076 | 0.42 |
| <i>3492 Meadows Parkway</i> | 21.9 | \$ 571,072 | \$ 761,429 | 12.78 |
| <i>4110 Painthorse Drive</i> | 1.2 | \$ 30,318 | \$ 40,424 | 1.18 |

Attachment 1

Map of Study Area and Location of Water Accounts

| Tap Number | Entity |
|----------------------------|-----------------------------------|
| Commercial Accounts | |
| 4457 | Western Mobile Pre-Mix |
| 5677 | Players Club Villas HOA |
| 11912 | Brookside Inn |
| 12760 | County Jail |
| 13820 | Chili's |
| 16987 | Safeway |
| 17505 | Jenny's Market/BP Products |
| 21126 | Target |
| 24985 | Outlets at Castle Rock |
| Irrigation Accounts | |
| 3420 | Town of Castle Rock |
| 3782 | Town of Castle Rock |
| 3812 | Founders Village HOA |
| 11790 | Pines at Castle Rock |
| 13657 | Founders Village HOA |
| 15858 | Metzler HOA |
| 20075 | Castlewood Ranch HOA |
| 27054 | Escavera |
| 27767 | The Meadows |
| 30424 | Common Grounds Properties |

Per Capita M&I Water Use (gpd)*



* Source Data : Statewide Water Supply Initiative, CWCB

Attachment 2
Castle Rock Climatological Data 2004 and 2005

Attachment 3
Aerial Photograph of Each Audited Water Account

Attachment 4
2004 and 2005 Water Use by Account

Attachment 5
Summertime Outdoor Water Use by Account versus
Outdoor Watering Goal for 2004 and 2005

(does not include Western Mobile Pre-Mix or Jenny's Market Graphics)

Only Original Provided to the State Contained Map