City of Rifle

Water Conservation Plan Implementation

Grant Application

May 2010

Prepared For:
Colorado Water Conservation Board
Office of Water Conservation & Drought Planning
1313 Sherman St., Room 721
Denver, CO 80203

Prepared By:
Schmueser Gordon Meyer, Inc.
Suite 200
118 W. Sixth Street
Glenwood Springs, CO 81601

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For the convenience of the reviewer, we have numbered the major sections of this application to correspond to the numbers of the required submission items listed under Section 4b of CWCB's *Grant Guidelines for Water Conservation Implementation & Public Education and Outreach Projects*.

1. Applicant:

City of Rifle, Colorado
202 Railroad Avenue
Rifle, CO 81650

Contact:
Charles G. Stevens, Utility Director
(970) 625-6272
(970) 625-6268
cstevens@rifleco.org

2. Firm and individuals assisting in this project:

Schmueser Gordon Meyer, Inc. (SGM)
118 West 6th, Suite 200
Glenwood Springs, CO 81601
(970) 945-1004
Attn: Warren Swanson

SGM (www.sgm-inc.com) has worked with the City of Rifle for many years with municipal water and wastewater projects. SGM also helped prepare the City of Rifle *Water Conservation Plan* approved by the Rifle City Council and the Colorado Water Conservation Board (CWCB) in 2008.

Warren Swanson, PE, the proposed project manager, was the primary author of the City of Rifle *Water Conservation Plan*. He is the Water Sector leader at SGM and has 14 years experience in municipal water engineering. He has been supporting the City in its initial steps toward conservation plan implementation, including:

- creation of a citizen advisory board to work with the Rifle Utility Director on conservation implementation plans and issues
- development of a customized water rate analysis spreadsheet tool being used by the Utility Director to evaluate various conservation rate structures
- development of a customized water treatment plant production and water demand tracking spreadsheet used to improve water accounting
- production of water bill inserts on water efficiency tips to build the public knowledge of water efficiency and awareness of the City's program
- preparation of this implementation grant application

Mr. Swanson is also the proposed consultant project manager for the City's implementation of the activities proposed under this grant request.

CivicPlus (www.civicplus.com), which developed the City's existing municipal website and currently hosts it, will provide web page design and hosting services under Task 3 for this project. SGM and City staff will be developing content, and CivicPlus will be

providing programming services and designing web page templates. City staff will be able to use existing an content management system to post new content.

Finally, the City plans to employ the services of Mr. Jared Kerst of Rivendell Distribution & Sod Farm, Inc. of Glenwood Springs. Mr. Kerst will provide valuable residential irrigation audit consulting services. Mr. Kerst is the only Irrigation Association-certified irrigation system auditor in the Rifle area. Mr. Kerst's primary business is growing and distributing turfgrass for the region. However, his professional background includes irrigation systems optimization, turfgrass watering efficiency, and landscaping. He will provide assistance in finalizing the residential irrigation audit scope/checklist for the proposed program. He will provide additional irrigation audit training and technical assistance to the irrigation contractor to be selected and retained by the City at a later date to perform the bulk of the audits. There are at least two competent, but not IA-certified, irrigation and landscaping companies that the City has identified to-date to provide auditing and irrigation controller installation and training services. Both of these firms are led by individuals with an understanding of landscaping and irrigation system water efficiency principles. These specific folks were recommended to the City by local irrigation system suppliers and Mr. Kerst based on their reputation for being out ahead of the local irrigation and landscaping industry in their knowledge and experience in applied water efficiency principles.

The City will also be enlisting the volunteer help of its Water Services Advisory Board (WSAB) members and local and regional Colorado State University Extension Service individuals to provide technical input on a couple of the proposed programs and measures. These individuals include Dr. Curtis Swift from Mesa County and Denis Reich of Garfield County.

3.a Identification of retail water delivery by the City of Rifle for the past five years.

Table 1. Historical Water Production and Delivery

Yr.	Estimated Avg. Annual Potable Water Production[1]			Raw Park Irr.[2]	Total	Estimated Average Annual Potable Water Consumption[3]						
	GMWTP	BCWTP	Total			Comm	Govt	Ind	Spk	Res	Total	
	(MGD)	(MGD)	(MGD)	(MGD)	(Ac-ft/yr)	(MGD)						(Ac-ft/yr)
						No Data Available						
2004	1.23	0.14	1.37	0.23	**1,792**							
2005	1.28	0.05	1.33	0.23	**1,748**							
2006	1.28	0.15	1.43	0.23	**1,860**							
2007	1.34	0.32	1.66	0.23	**1,990**	0.27	0.14	0.08	0.001	0.91	1.4	1,568
2008	1.47	0.28	1.75	0.23	**2,224**	0.37			0.004	1.08		1,966

1. Water production estimated based on raw water intake volume and calculated % production waste. GMWTP = Graham Mesa WTP; BCWTP = Beaver Creek WTP
2. City parks raw water irrigation volumes are estimates based on diversion rights and approximate % diverted as reported by City staff
3. Potable water consumption based on water meter data extracted from existing billing database; 2002-'05 records are not included-they are currently subject to add'l investigation for accuracy.

3.b.i Per capita water use for the last five years

Table 2 contains population and EQR growth projections and associated peak day demand projections, based on the 1,024 gpd/EQR planning value for the "no conservation" condition. Peak day demand, and the opportunity to reduce it, serves as the driver for water conservation planning in Rifle.

Table 2: Per Capita and Per EQR Water Demand

	Units	2004	2005	2006	2007	2008
Population / EQR Data (estimated)						
Population	(cap.)	7,760	8,118	8,706	8,800[3]	9,383
Water System EQRs (includes 700 for CoGen)	(eqr)	n/a	4,225[1]	4,371[2]	4,475[2]	4,557
Water Use / Production Data						
Accounted-for Water Use	(mgd)	1.50	1.35	1.44	1.74	1.59
Residential Water Use	(mgd)	n/a	n/a	0.91	n/a	1.08
Finished Water Production	(mgd)	1.37	1.33	1.43	1.66	1.75
Unit Consumption/Production Metrics (calculated)						
Avg. Per-Capita Water Use	gpcd	193	166	165	198	170
Avg. Residential Per-Capita Water Use	gpcd	n/a	n/a	107	n/a	n/a
Average Finished Water Production per EQR	gpd/eqr	n/a	426	366	398	349

1. City does not actually track total system EQRs. This value is based on annual average metered use of 388 gpd/EQR for group of known 1-EQR residences and total annual system water use.
2. These values are based on 0.88 EQRs per housing unit estimated in 2005 times the number of housing units added by 2006 and 2007.
3. This population value is estimated based on average population per housing unit times the number of housing units added between 2006 and 2007.

3.b.ii Past, current and predicted population

Table 3: Population, EQR, and Peak Day Water Demand Projections for "No Conservation" Condition

Year	Projected Population[2]	Projected Water System EQRs[1]			Projected Peak Day Demand[3]
		CoGen	Non-CoGen	Total	
	(capita)	(EQRs)	(EQRs)	(EQRs)	(mgd)
2007	8,800	700	3,775	4,475	4.6
2008	9,383	700	4,025	4,725	4.8
2009	9,965	700	4,275	4,975	5.1
2010	10,548	700	4,525	5,225	5.4
2011	11,130	700	4,775	5,475	5.6
2012	11,713	700	5,025	5,725	5.9
2013	12,412	700	5,325	6,025	6.2
2014	13,111	700	5,625	6,325	6.5
2015	13,810	700	5,925	6,625	6.8
2016	14,509	700	6,225	6,925	7.1
2017	15,208	700	6,525	7,225	7.4
2018	15,907	700	6,825	7,525	7.7
2019	16,606	700	7,125	7,825	8.0
2020	17,305	700	7,425	8,125	8.3
2021	18,004	700	7,725	8,425	8.6
2022	18,703	700	8,025	8,725	8.9
2023	19,402	700	8,325	9,025	9.2
2024	20,101	700	8,625	9,325	9.6
2025	20,800	700	8,925	9,625	9.9
2026	21,499	700	9,225	9,925	10.2
2027	22,198	700	9,525	10,225	10.5

1. Based on City of Rifle staff projection that 250 EQRs will be added annually through 2012 and 300 EQRs per year thereafter
2.Based on an average of 2.33 capita per EQR added; 2.33 is average of ratios of non-CoGen EQRs to total population for 2005, 2006, and 2007.
3. Based on average of approximately 400 gpd/EQR of average finished water production required per EQR historically times the historical average multiplier of 2.56 for peak day to average day water production, yielding 1,024 gpd/EQR.

3.b.iii Estimated water savings goals for Plan implementation

The role of water conservation in City of Rifle water supply planning primarily is to reduce peak summer water demands to enable the down-sizing/deferment of future water production/treatment infrastructure projects. Quantifiable water conservation program goals are:

- Overall Program
  Reduce peak day treated water production needs (excluding the CoGen plant) from a current baseline planning value of 1,024 gpd/EQR to about 890 gpd/EQR (13%) by 2015.

- New Users
  Reduce total peak month metered water use per EQR for new residential and commercial accounts (i.e. those connected after 2008) by 15 to 20% by 2015 as compared to the 2008 value. The 2008 value shall be determined based on measured water use and assignment of EQRs to all existing water accounts.

- Existing Users
  Reduce total peak month metered water use per EQR for existing residential and commercial accounts (i.e. those existing by the close of 2008) by 8 to 10% by 2015 as compared to the 2008 value. The 2008 value shall be the same value as that described above for "New Users."

- Total/Average Annual Use Reduction
  Reduce average annual water production needs by at least 5% system-wide by 2015, from about 400 gpd/EQR to less than 380 gpd/EQR.

3.b.iv Estimates of water savings realized in the past five years through water conservation efforts.

It is not yet possible to measure water savings from the initial implementation of the City's *Water Conservation Plan*. CWCB approved the City's plan in July 2008. The primary reason for measurement difficulty is that the City began implementation in its 2009 budget year with measures whose water conservation effectiveness are difficult to predict and/or would not be expected, in isolation, to produce measurable water savings. These measures are:

- Creating a citizen advisory board to work with the Rifle Utility Director on conservation implementation plans and issues. The group has been meeting over the past year on a monthly basis to refine the City's implementation plan and to reach-out to the community through social networking to help solicit input and build public support (Plan Item #7)

- Developing a customized water rate analysis spreadsheet tool (initial step for Plan Item #1). While the City Utility Director has spent time evaluating various conservation rate structures, such a rate structure has not yet been implemented. As a result of the economic downturn and a recent 105% wastewater rate hike, the City has needed additional time to develop plans for its proposed new water purification facility. The City has been reluctant to implement a new rate structure until this major project's costs were able to be better estimated through conceptual design. Progress in revising water rates is being made - on June 2, 2010 the City Council will hold a work session with the Utility Director to examine an inclining block rate structure with multiple tiers to promote water conservation. The proposed structure accounts for the effect of decreased water demand due to the planned improvements in water use efficiency in the community. A phased rate increase is envisioned. The first step will be a structure that generates approximately 50% of the total revenue needed to support debt financing of the

new water purification facility, increased O&M cost, $50,000 annually for conservation program implementation, and the remaining water utility budget needs. A second step will be approximately one year later so the impact of the initial rate structure modification can be analyzed. The second rate increase will then be designed accordingly.

- Producing water bill inserts on water efficiency tips to build the public knowledge of water efficiency and awareness of the City's program (Plan Item #14). Since the monthly bill insert program was initiated in January 2009 as a component of the City's water utility branding efforts, approximately four inserts have focused on water efficiency. Spring and summer months have been targeted for water efficiency messaging.

- Preparing and submitting this grant application for program implementation funding support from CWCB. In the months following CWCB's approval of the City's *Water Conservation Plan*, the Utility Director budgeted funds to develop this implementation grant application. Before being able to put those funds to use starting in January 2009 to craft the application, CWCB water efficiency grant funds were frozen in late 2008 and remained so for approximately 11 months. Immediately following the notification that the grant funds would once again be available, work on this implementation grant application proceeded.

The City has put its water conservation program into motion by implementing, or beginning to implement, the least costly measures first. This has been primarily a function of its focus on critical and expensive water plant replacement planning and design efforts, the economic downturn, and the freezing of the CWCB water efficiency grant program. The above-noted on-going actions and plans demonstrate the City's commitment to moving its water conservation program forward.

3.b.v Adequacy, stability and reliability of the City of Rifle's water system.

All of the City's potable water is derived from surface sources. The City's primary supply is the Colorado River. All diverted Colorado River water is directed through a large pre-sedimentation pond and pumped up to the Graham Mesa Water Treatment Plant (GMWTP), its main treatment facility. The GMWTP has a process capacity of approximately 4.5 MGD and has historically accounted for 80 to 90% of total potable water production. From the GMWTP, the water is pumped to the "3-MG Tank," the City's main storage facility, which serves also as a disinfection contactor. Water is distributed to various parts of the distribution system from the 3-MG Tank. Process residuals from the GMWTP are recycled, in part, on an intermittent basis. Wasted residuals flow by gravity to unlined settling ponds located on the south end of Graham Mesa where water either percolates and slowly returns to the Colorado River or evaporates. While the raw water pump station was constructed in 2006, the GMWTP is almost 30 years old and is in need of replacement or major upgrades in the near future. The City has invested significantly over the past two years to tackle key planning and permitting issues and develop a conceptual design and cost estimate for a new Rifle Regional Water Purification Facility (RRWPF) to replace the GMWTP.

The City also has a roughly 0.7-MGD treatment facility, the Beaver Creek Water Treatment Plant (BCWTP), located on Taughenbaugh Mesa, south of the City. The

BCWTP is located at an elevation that allows its high-quality treated water to flow by gravity to the distribution system through a 0.5-MG finished water reservoir. While the City operates this plant as much as possible due to these benefits, unreliable Beaver Creek flows in a dry year reduce this source's firm capacity to only 0.15 MGD. The BCWTP is nearly 20 years old and has recently undergone modest improvements.

In sum, the City's current total potable water production capacity is about 5.2 MGD in a normal water year and as low as 4.65 MGD in a dry year. Total treatment process waste volume is estimated to account for about 10% of raw water diversions, a fairly high percentage, but there is significant uncertainty in this estimate.

Potable System Storage & Distribution Facilities

The City's potable water distribution system consists of about 64 miles of transmission and distribution mains. These distribution mains cover five pressure zones, which are separated by two booster pump stations (BPSs) and five pressure reducing valves (PRVs). Roughly 20% of the City's current water use is located in pressure zones requiring booster pumping. This percentage will rise significantly with future development targeting higher-elevation areas. Therefore, water conservation in those areas will achieve energy conservation as a result of both reduced raw water and finished water booster pumping. In addition to the 3-MG Tank and 0.5-MG BCWTP finished water reservoir, the system has 2.6-MG of additional storage split across three tanks in different pressure zones. With the exception of a limited amount of sub-standard non-PVC water mains, the City's distribution system infrastructure meets the City's standards and has many years of remaining useful life. Average distribution system water loss is estimated at about 7% of finished water production, but there is significant uncertainty in this value.

Raw Water System Infrastructure

In addition to supplying potable water to its customers, the City of Rifle also owns and operates raw water delivery facilities to provide irrigation water to Rose Hill Cemetery and Deerfield Regional Park. Both areas are irrigated with Rifle Creek water. Rose Hill Cemetery is supplied from Rifle Creek Canyon Ditch through a diversion located about one-half mile north of CR-293 (N. Graham Rd.); a pair of water tanks at the diversion feed an 8" PVC line that delivers water to the cemetery. Deerfield Park is supplied via the Wisdom Ditch at a diversion point less than 1 mile from the intersection of County Roads 291 and 296. From the Wisdom Ditch, water is diverted via buried 6" PVC pipe to a regulating pond at the west side of Deerfield Park. One of the primary goals of the conservation plan is to reduce the need for future potable system infrastructure. It should be noted, however, that expanding raw water use is also a good means, like conservation, for reducing the need for potable system infrastructure. The City should consider watering parks with raw water. MacIntosh and Davidson Parks have been moved off the potable system, as was recommended in the approved *Water Conservation Plan*. The City is also considering requiring raw water use in new developments.

3.c How the grant funds will be used.

The City's 2008 *Water Conservation Plan* identified 17 programs and measures for implementation to meet Plan conservation goals. As previously discussed, the City has made progress on a handful of these to-date. Should CWCB award the grant funds

requested herein, the City will use them to pursue the following proposed measures and programs from its 2008 *Water Conservation Plan*:

1 - (*Plan* Item #5) *Establish Landscaping & Irrigation Design Requirements for New Development*

2 - (*Plan* Item #6) *Establish High Efficiency Indoor Plumbing Fixture Design Requirements for New Development*

3 - (*Plan* Item #8) *Create a Water Conservation Web Site*

4 - (*Plan* Item #10) *Create a City Facility Water Efficient Plumbing Fixture and Appliance Policy*

5 - (*Plan* Item #4) *Establish a Smart Irrigation Controller Rebate Program* for existing residential customers

6 - (Not in orig. *Plan*) Establish *a High Efficiency Toilet and Clothes Washer Rebate Program* for existing customers

These measures and programs will be explained in greater detail in **Section 4**.

Another high priority measure from the City's *Water Conservation Plan*, #7 – *Create a Water Conservation Task Force*, has already been accomplished through the creation of a Water Services Advisory Board (WSAB). This is a citizen board assisting the City and the Utility Department in an advisory capacity for all water related issues. The WSAB's current focus is ramping-up implementation of the Water *Conservation Plan*. The WSAB is a panel of volunteer citizens with broad backgrounds and interests representing water users throughout the City of Rifle.

The WSAB worked with the City Utility Director to select the six above-noted measures and programs (five are from the *Water Conservation Plan*'s list of 17) to implement next. Generally, they were selected based on relative ease of implementation and the likelihood of water ratepayer support. The WSAB recognized that with the City's goal to reduce outdoor irrigation combined with the lull in economic activity, opportunities exist to establish the water efficiency design requirements for new development and to promote local economic activity through the rebate programs.

As previously noted, the City is also moving forward with other water conservation items, such as rolling out its conservation rate structure, continuing its water bill insert program, and improving its water accounting procedures, without CWCB funding support.

3.d Monitoring

Monitoring the water saving effectiveness of implemented measures and programs is critical to the long-term success of the utility's conservation program. At a system-wide scale, the City intends to gauge the conservation program's overall effectiveness by tracking several parameters to compare to goals listed in Section 4.2 of its 2008 *Water Conservation Plan*:

- Overall potable unit water production requirements:

    - Average unit production required (gpd/EQR)
    - Peak unit production required (gpd/EQR)
- Peak month unit metered consumption:
    - Existing connections (gpd/EQR)
    - New connections (gpd/EQR)

Actions to monitor the effectiveness of the proposed individual measures and programs are described in the scope discussions for each below. Monitoring, evaluation and auditing procedures will also be developed as a part of the "smart" water controller study to be conducted with CSU Extension Service outlined below.

4. *Not Applicable*

5. Project Description and Scope of Work

As noted above, the City seeks to implement five programs/measures from its 2008 *Water Conservation Plan* (2008). For the purposes of this grant application and overall project management/reporting, implementation of each program/measure is identified as a single Task. Subtasks are identified to provide additional detail. This section presents purpose, scope and implementation responsibilities for each Task.

Task 1.0 Establish Landscaping and Irrigation Design Requirements for New Development

Purpose

To develop City of Rifle requirements for landscaping and irrigation system design for new development; also, to develop an enforcement implementation process and to identify implementation resource needs and costs. The end goal is to reduce the impact of future tap growth on water demands (especially peak day). This should control the costs to all water ratepayers for maintaining expanded infrastructure and water supplies. Deferment of future infrastructure expansions and water supply purchases to meet rising demands is also a critical benefit sought. The City will incorporate the proposed landscaping and irrigation requirements into its Municipal Code.

Discussion

Landscape irrigation is the single largest water use in Rifle and is a logical place to start implementation of the City's *Water Conservation Plan*. This is especially true given that the primary goal of the overall program is to reduce peak day demand to which irrigation water use is a very large contributor – approximately 75% of peak day water demand in Rifle's system is due to outdoor water use (peak day production hovers around 4 MGD, while typical winter production is about 1 MGD). The City of Rifle also has very significant growth potential. It is located at ground zero of Colorado's energy extraction industry, it is growing into a regional commercial hub, it has become the largest municipality in Garfield County and it is surrounded by large tracts of developable land, making it a regional leader in affordable housing opportunities. Therefore, water efficiency programs and measures for new development have great water savings potential in Rifle. Furthermore, from a logistical and political perspective, any regulatory requirements are more easily established for new development.

The City will work with its WSAB, local irrigation and landscape professionals, and members of the development community to establish a framework for outdoor water efficiency requirements for new development.

Time contributions from the City's Utility, Planning, and Building Department staff members and the City Council are envisioned. The City will need to involve its external legal counsel as well in drafting appropriate ordinance resolutions and Code revisions. Regulations will be drawn up by the Utility and Planning Departments, the City Attorney and consultant SGM for approval by the City Council. The City Parks Department Director, who is well-versed in efficient irrigation principles will also be contributing ideas. In the end, the goal is to incorporate requirements in the City Code.

The City will also modify the permitting process for new development, requiring irrigation permits and inspections as a part of its existing Building Permit issuance system. Irrigation design prepared by an irrigation professional following the City's requirements is envisioned to be required for issuance of a permit. Random audits will be conducted after the Certificate of Occupancy is issued to maximize compliance.

The scope of this proposed Task does not include the work and cost required to enforce the new requirements – it focuses exclusively on developing the ordinance and the plan for enforcing it and getting the ordinance adopted.

An annual review of irrigation season water use (metered gpd/EQR) by new development as compared to comparable existing developments in the City will be used to monitor program success and guide its evolution.

Subtasks

1.1 Review and discuss the applicability to Rifle of existing relevant models for landscaping and irrigation design standards. These will include those of other Colorado water providers, EPA *WaterSense* criteria, and *Irrigation and Landscape Specifications* developed by Dr. Curtis Swift of the Colorado State University Extension, Tri-River Area, as updated December 5, 2008. Review also implementation process experiences. [*Lead*: SGM, *Support*: City Staff]

1.2 Identify potential stakeholders. Contact them to solicit their participation in the process of developing the standards. [*Lead*: City Staff]

1.3 Develop a 1st draft of proposed City of Rifle requirements and implementation process (permitting and auditing) [*Lead*: SGM; *Support*: City Staff]

1.4 Distribute 1st draft to stakeholders and City Attorney for review. Stakeholders to include: local irrigation and landscaping professionals and members of the development community. Convene a stakeholders meeting to solicit feedback on the draft and ideas for improving the framework. [*Lead*: City Staff; *Support*: SGM, City Atty.]

1.5 Develop a 2nd draft - this would be in the form of a draft ordinance detailing the proposed requirements and revisions to the City of Rifle Land Use Regulations. Send to stakeholders for additional comments. Hold discussions, as needed, with stakeholders. [*Lead*: City Atty., *Support*: City Staff]

1.6 Revise the draft ordinance and implementation process based on final stakeholder input. [*Lead*: City Atty., *Support*: City Staff]

1.7 Identify implementation resource needs and develop implementation cost estimate. This is critical to future budgeting processes to ensure adequate resources are available for enforcement. [*Lead*: City Staff]

1.8 Submit draft ordinance and implementation resources/costs to City Council for review and hold City Council worksession to solicit feedback. A presentation will be prepared and given to Council on the process used to develop the draft ordinance, the stakeholder input received, and the high points of the proposed ordinance and implementation process. [*Lead*: City Staff, *Support*: City Atty.]

1.9 Develop draft final ordinance and post on City website for public comment. Advertise posting in local newspaper, as required. [*Lead*: City Atty., *Support*: City Staff]

1.10 Produce final proposed ordinance, addressing public comments, and finalize implementation resource needs and implementation cost estimates. [*Lead*: City Atty., *Support*: City Staff]

1.11 Submit final ordinance and implementation resources/costs to City Council for adoption into the City Code at a public meeting. [*Lead*: City Atty., *Support*: City Staff]

Deliverables

- New City ordinance detailing landscape and irrigation requirements for new development
- Program implementation and enforcement plan with resource needs and estimated implementation/enforcement costs for use in future budgeting

Estimated Water Savings

Water savings achieved by this program will be highly dependent upon Rifle's tap growth rate, the level of enforcement, the operation of residential irrigation systems, and the degree to which the well-designed irrigation and landscaping systems initially installed continue to be maintained. The hope is that the new conservation rate structure, which the City plans to roll-out roughly in parallel with initial implementation of the programs and measures proposed in this grant application, will provide existing and new Rifle water customers with the incentive to properly maintain and efficiently operate their irrigation and landscaping systems.

Using the growth and water demand projections included in this application, we estimate that over a 20-year period this program would save approximately 400 MG of water. The amount saved per year will climb over time as new taps are added. The projected savings averages 20 MG/yr (66 ac-ft/yr). In year 20, the annual volume saved would be nearly 130 ac-ft/yr. The basis for the estimate is that the new landscaping and irrigation requirements alone would trim average annual outdoor water use per equivalent residential unit (EQR) in Rifle from current levels (approximately 200 gpd/EQR) by 10%. Greater percentage reductions in irrigation water use due to reduced turf areas, Xeric plantings, and efficient watering systems can be found in water efficiency literature. However, we are hesitant to be overly optimistic in the incremental water savings to be attributed to this program above that likely to be achieved by the City's forthcoming rate structure revisions. The new water rates could cause folks building new homes or moving into new homes to implement efficiency measures even in the absence of regulation.

Task 2.0 Establish High-Efficiency Indoor Plumbing Fixture Design Requirements for New Development

Purpose

To develop City of Rifle design requirements for high-efficiency indoor plumbing fixtures for new residential development. The objective is to reduce the impact of future growth on overall City water demands.

Discussion

This is a companion effort that will be executed in parallel with Task 1.0 for maximum efficiency. Many of the same discussion points apply. The City will establish minimum standards and requirements for fixtures based on the EPA *WaterSense* guidelines. The City of Rifle is currently a registered Partner in the EPA *WaterSense* program. Local architects, bath/kitchen designers, developers, plumbers and plumbing suppliers will be consulted and involved in the process. The resulting standards and requirements will then be incorporated into the City Code. The enforcement process, associated resource requirements, and costs will be developed.

The effectiveness of this program will be monitored and measured similarly to that of the irrigation/landscaping requirements program, except that the focus season will be December through March.

Subtasks

2.1 Review and discuss the applicability to Rifle of EPA *WaterSense* criteria for indoor water efficiency [*Lead*: SGM, *Support*: City Staff]

2.2 Identify potential stakeholders. Contact them to solicit their participation in the process of developing the standards. [*Lead*: City Staff]

2.3 Develop a 1st draft of proposed City of Rifle requirements and implementation process (permitting and auditing) [*Lead*: SGM, *Support*: City Staff]

2.4 Distribute 1st draft to stakeholders and City Attorney for review. Convene a stakeholders meeting to solicit feedback on the draft and ideas for improving the framework. [*Lead*: City Staff, *Support*: City Atty., SGM]

2.5 Develop a 2nd draft - this would be in the form of a draft ordinance detailing the proposed requirements and revisions to the City's Municipal Code. Send to stakeholders for additional comments. Hold discussions, as needed, with stakeholders. [*Lead*: City Atty., *Support*: City Staff]

2.6 Revise the draft ordinance and implementation process based on final stakeholder input. [*Lead*: City Atty., *Support*: City Staff]

2.7 Identify implementation resource needs and develop implementation cost estimate. This is critical to future budgeting processes to ensure adequate resources are available for enforcement. [*Lead*: City Staff]

2.8 Submit draft ordinance and implementation resources/costs to City Council for review and hold City Council worksession to solicit feedback. A presentation will be prepared and given to Council on the process used to develop the draft ordinance, the stakeholder input received, and the high points of the proposed ordinance and implementation process. [*Lead*: City Atty., *Support*: City Staff]

2.9 Develop draft final ordinance and post on City website for public comment. Advertise posting in local newspaper, as required. [*Lead*: SGM, *Support*: City Staff]

2.10 Produce final proposed ordinance, addressing public comments, and finalize implementation resource needs and implementation cost estimates. [*Lead*: City Atty., *Support*: City Staff]

2.11 Submit final ordinance and implementation resources/costs to City Council for adoption into the City Code at a public meeting. [*Lead*: City Atty., *Support*: City Staff]

Deliverables

- New City ordinance detailing indoor water efficiency requirements for new residential development
- Program implementation and enforcement process, resource needs, and estimated implementation/enforcement costs

Estimated Water Savings

Water savings achieved by this program will be highly dependent upon Rifle's tap growth rate, the level of enforcement, and the extent to which the water-efficient fixtures and appliances in new homes are replaced by homeowners with less efficient models. The hope is that the new conservation rate structure, which the City plans to roll-out roughly in parallel with initial implementation of the programs and measures proposed in this grant application, will provide new Rifle water customers with the incentive to keep the high-efficiency fixtures and appliances installed in their homes with new construction.

Analysis of winter 2006-07 Rifle residential water billing data indicates an average per capita residential indoor water use rate of approximately 66 gpcd. This is very close to national average value of 69 gpcd reported in Amy Vickers' *Handbook of Water Use and Conservation* (2001) for non-conserving homes. Vickers reports that the average indoor water use in a water-conserving home is roughly 45 gpcd, roughly 35% less than the non-conserving home. EPA's goal for *WaterSense*-labeled homes is a 20% average water use reduction. We believe a 20% value represents a more reasonable basis for estimated indoor water use savings in new homes due to implementation of this program. Since indoor water use equates to roughly one-half of total water use in Rifle, this equates to a roughly 10% savings in average annual water use per future residential tap.

Using the growth and water demand projections included in this application, we estimate that over a 20-year period this program would save approximately 800 MG of water. The amount saved per year will climb over time as new taps are added. The projected savings averages 40 MG/yr (132 ac-ft/yr). In year 20, the annual volume saved would be nearly 260 ac-ft/yr.

Task 3.0 Create a Water Efficiency Web Site

Purpose

Develop a web-based community water efficiency information hub that provides the City with a central location for making information about its water conservation programs available to the public. The site will also provide resources, especially local/regional ones, for community members interested in improving their own water use efficiency. The goal is to take the first step in developing water efficiency education programming by giving the citizens of Rifle some tools and guidance to help them better adapt to new water rates and water conservation requirements.

Discussion

Communications with the citizens and water rate payers of the City of Rifle is essential for the success of the *Water Conservation Plan* implementation efforts. The City and the Utility Department envision this web site evolving into the community's water efficiency information hub. The webpage development process will begin with a review of existing western water utility water conservation web pages. It is envisioned that the end product will contain the following key content features:

- Information and links to key *community-based* water efficiency resources, such as:
  - Suppliers of water-efficient products
  - Water-wise landscaping and irrigation system professionals
  - Local parks/golf course staff irrigation experts
  - Local CSU extension service
- Links to the Codes and regulatory measures developed and described above
- Local ET requirements for common landscapes (especially, KBG)
- Monthly/annual water bill calculator based on up-to-date rate schedule and various user-selected irrigation water use scenarios
- A location where customer questions and concerns can be addressed
- A Water Conservation "Blog" may also be established through which citizens can share their experiences, tips and ideas for increased water use efficiency.
- Water efficiency tips and seasonal updates
- Links to other web-based water efficiency resources.

In keeping with the goal of reducing peak summer water demand, the City will emphasize outdoor water use efficiency resources on its water efficiency web page.

The City of Rifle homepage will have a prominent link to the proposed Utility Department water efficiency web site. The new site also will be advertised periodically in the City's monthly water bill inserts

This web site will be monitored based on the number of hits received. The City will also periodically interview customers regarding the value of the website. Updated format and ideas will be used to keep the website current and increase its usefulness to the citizens of Rifle.

Subtasks

3.1 Review water conservation web pages of other western water utilities [*Lead*: SGM, *Support*: City Staff]

3.2 Review other web-based water efficiency resources [*Lead*: SGM, *Support*: City Staff]

3.3 Identify local and regional water efficiency resources to be identified on page [*Lead*: SGM, *Support*: City Staff]

3.4 Develop, evaluate, and select ideas for other webpage features and uses, such as the water bill calculator, the Q&A and blog features, the water efficiency tips section, etc. [*Lead*: SGM, CivicPlus *Support*: City Staff]

3.5 Create an outline/template for the website's design; meet to review/discuss [*Lead*: CivicPlus, *Support*: City Staff]

3.6 Develop a beta version of the website, creating initial content [*Lead*: CivicPlus, *Support*: SGM, City Staff]

3.7 Review and test the beta version; meet to discuss comments [*Lead*: CivicPlus, *Support*: SGM, City Staff]
3.8 Develop the final website and launch [*Lead*: CivicPlus, *Support*: SGM, City Staff]
3.9 Advertise the website's launch using water bill inserts [*Lead*: SGM, *Support*: City Staff]

Deliverables
- New City water efficiency website

Estimated Water Savings
Expected water savings of this water efficiency public education effort cannot be estimated with any meaningful precision.

Task 4.0 Create a City Facility Water Efficient Plumbing Fixture and Appliance Policy

Purpose
The City feels that it should take the lead in water conservation in Rifle and set an example by making new water efficiency and conservation standards apply to itself from the beginning. The City of Rifle will establish a policy and requirements for the purchase and installation of new plumbing fixtures and appliances using the EPA *WaterSense* standards. This policy will be based upon the indoor water efficiency requirements for new development established as part of Task 2.0 above.

The City of Rifle Utility and Planning Departments, along with consultant SGM and the City Attorney will draft a policy resolution for consideration and adoption by the Rifle City Council.

The City will keep track of the new initializations as they occur and monitor the new levels of water use in comparison with the pre-initialization levels.

Subtasks
4.1 Draft purchasing policy [*Lead*: City Staff]
4.2 Identify and meet with internal stakeholders to review the draft policy and solicit feedback [*Lead*: City Staff]
4.3 Revise the draft policy resolution and provide to City Council members for review [*Lead*: City Atty., *Support*: City Staff]
4.4 Meet with City Council in a worksession to review the draft policy resolution [*Lead*: City Atty., *Support*: City Staff]
4.5 Gain Council approval at a public meeting [*Lead*: City Atty., *Support*: City Staff]

Deliverables
- New City purchasing policy as approved Council resolution

Estimated Water Savings
Developing the policy does not, in and of itself, achieve water savings; however, it lays the groundwork for future savings as the City replaces existing fixtures/appliances, remodels its facilities, and constructs new ones. Based on a fixture count for existing facilities and consideration of new future City facilities, the *Water Conservation Plan* estimated total water savings of approximately 23 MG (70 ac-ft) over 20 years due to the high-efficiency fixtures to be selected for installation as a result of this policy.

Task 5.0 Launch a "Smart" Irrigation Controller Rebate Program for Existing Residential Water Customers

Purpose

This proposed program's goal is to reduce outdoor irrigation water use by existing Rifle Utility Department residential water customers. The program also will help existing water customers acquire tools to help them control their water bills in the face of a future planned inclined block rate structure. Outdoor water use comprises roughly 50% of all annual water use in Rifle, so the potential for meaningful water savings through more efficient irrigation is significant.

While this program was conceived initially in the City's *Water Conservation Plan* as only a rebate program for "smart" irrigation controllers, the City believes that irrigation audits need to be incorporated. Audits will maximize the likelihood that advanced control technology will be applied to properly functioning irrigation systems. Furthermore, because there are very limited data on the effectiveness of smart controllers and irrigation audits in residential applications on Colorado's Western Slope (especially in smaller, rural communities) the City is structuring the program to provide it with some comparative results - i.e. there is a bit of a "study" aspect included. The effectiveness of the following will be compared:

- free audits with limited rebates for audit-identified general irrigation system improvements
- free audits with limited rebates for audit-identified general irrigation system improvements plus rebates for modern timers capable of cycle-and-soak programming but without weather stations included
- free audits with limited rebates for audit-identified general irrigation system improvements plus rebates for weather-based "smart" controllers

This proposed program's results are intended to provide the City with data to support future informed decisions on the most effective ways for it to invest its water efficiency dollars. These results will likely be useful to other communities in the region for the same purpose. Finally, the City believes this program will play an important role in building the community's water efficiency capacity. The expertise of the only IA-certified irrigation auditor and that of regional CSU Extension folks will be spread to local irrigation contractors and rebate program participants.

Discussion

"Smart" irrigation controllers adjust the amount of water applied to landscaping during any given water cycle based on site-specific weather conditions, such as temperature, humidity, and solar radiation. According to some studies, smart irrigation controllers with adequate sensors can save as much as 30% of outdoor irrigation water used at a "typical" single family residence. Other studies dispute these claims. USEPA's *WaterSense* program is in the process of developing certifications for weather-based irrigation controllers. They estimate smart controllers can reduce irrigation water use by 20% over timer-driven systems.

In preparing this grant application, the City has held discussions with local irrigation contractors, regional irrigation and xeriscaping expert Dr. Curtis Swift of CSU Extension (Mesa County), and the area's only IA-certified irrigation system auditor, Mr. Jared Kerst. Feedback from these individuals indicates that there are likely a good number of Rifle residents who could benefit simply from having an irrigation controller capable of multiple

start times per watering day ("cycle-and-soak" functionality) and knowing how to program it to improve outdoor water use efficiency. In addition, there are many who could benefit from having an irrigation system audit to identify and exploit opportunities for water savings through other physical and operational system improvements. For these reasons, this proposed program will require an irrigation audit for any irrigation controller rebate recipient and will include a limited rebate toward correction of audit-identified system deficiencies.

Audit and rebate program applicants will be selected for participation and sorted into one of three groups based on their current irrigation controller type and other factors influencing potential water savings and fit with program goals (amount of turf, estimate of current outdoor water use through water bill reviews, how long the customer has been at the current address and plans to remain there, etc.). Only Rifle single-family residential water customers with existing automatic irrigation systems will be eligible. The three groups are:

- *Group #1:* Twenty (20) participants to be selected independent of controller type. This is a "control" group in which each participant would receive:
    - a free irrigation audit
    - a rebate of 50% of the total cost (up to a maximum of $100) to make any audit-recommended physical system improvements

  Water savings achieved in this group will help the City understand the potential effectiveness of a broader audit-only program.
- *Group #2:* Twenty (20) participants currently with older model irrigation timers incapable of cycle-and-soak functionality (i.e. limited number of start times per watering day). These participants would receive:
    - a free irrigation audit
    - a rebate of 50% of the total cost (up to a maximum of $100) to make any audit-recommended physical system improvements
    - a rebate of $100 toward the supply, installation, startup, and training for a new irrigation controller with cycle-and-soak functionality, but without a weather station
- *Group #3*: Twenty (20) participants currently without weather-based controllers. Applicants with older model timers incapable of cycle-and-soak functionality (never mind weather-based control) would be given participation preference in order to maximize program water savings achievement. Customers with timers incapable of weather-based control would be second in line. Customers with compatible timers capable of weather-based control, but without the weather station modules would be the lowest preference. Participants in this group woud receive:
    - a free irrigation audits
    - a rebate of 50% of the total cost (up to a maximum of $100) to make any audit-recommended physical system improvements
    - a rebate of $200 toward the supply, installation, startup, and training for a new weather-based irrigation controller. If the customer has a compatible controller and only needs the weather station module, this rebate will be reduced to $100 and the number of rebates offered increased accordingly.

Implementation Logistics

- rebate program participants will be required to pay the cost of all irrigation system improvements and controllers not covered under City rebates; in some cases, this may include non-low-voltage electrical improvements to support controller installation
- to control program quality and obtain results to support future conservation programming decisions, the City will require audit/rebate program participants to use the services of a single Irrigation Contractor pre-selected by the City
    - the City has identified at least two local firms as potential program contractors; they have significant irrigation and landscape water efficiency experience
    - to ensure price competitiveness, the City plans to solicit bids from at least these two contractors prior to the 2011 irrigation season when the work will be completed; the City solicited and received budgetary pricing and hourly rates from these firms and is using them to support the budget contained in this grant application
    - the City will acquire lump sum bids for the irrigation audit and controller supply/installation/startup/training services
    - the City will also negotiate maximum hourly rates and equipment/material markups to cover rebate program work that will not be able to be hard-bid; this includes completing miscellaneous audit-identified improvements or extra work for controller installation to cover special circumstances outside the scope of a “typical” installation (to be defined in the bidding process)
    - the City will work with SGM and Jared Kerst, the local IA-certified irrigation auditor to finalize, prior to bidding, the residential irrigation audit scope; a draft audit checklist is included under Appendix A of this application
- the City will hire Mr. Kerst to provide the selected irrigation contractor’s identified personnel with training on formal irrigation system auditing and controller to maximize water use efficiency; he will accompany the contractor on the first day or two of auditing and also serve as a resource for technical support during bulk execution of the audits
- the City plans to limit the irrigation controller rebates to one or two models:
    - *Hunter PRO-C* with/without *Solar Sync* weather station
    - *WeatherMatic SmartLine (SL)1600* with/without *SLW10* weather station

  These were pre-selected based on discussions with the above-referenced local irrigation experts. The City wishes to make a final decision regarding controllers during the Irrigation Contractor bidding/selection process. The two listed units were pre-selected based on consideration of performance, operational simplicity, and local availability/familiarity/prevalence.
- the City will draft an audit/rebate program application and will advertise the program through water bill inserts, postings at City Hall and local retail irrigation supply outlets, and the City’s web site
- the selected Irrigation Contractor will be required to submit audit completion forms and invoices to the City for all completed work

- the City will conduct a follow-up survey to ask participants for feedback on their experiences with the program and its water-savings effectiveness
- the City will calculate annual outdoor water use for each program participant for up to three years before (i.e. back to summer 2008) participation and for at least one full year afterwards
- water savings per unit cost will be calculated for each of the three groups and used to guide selection of future City irrigation audit and rebate programs
- the total amount of rebates offered in 2011 through the program will be $12,000
- in addition to labor and materials for City staff, SGM, and Mr. Kerst, the project budget includes $8,400 for the selected Irrigation Contractor to perform the 60 residential irrigation audits to be provided free-of-charge to customers; all additional costs for controllers and irrigation system improvements will be born by the program participants.

Subtasks

5.1 Finalize irrigation audit scope and accompanying audit completion form [*Lead*: SGM, J. Kerst; *Support*: City staff]

5.2 Develop Irrigation Contractor bid documents, execute bidding process, and select contractor [*Lead*: SGM; *Support*: City staff, J. Kerst]

5.3 Select rebate-eligible irrigation controller equipment [*Lead*: SGM/Irr. Contractor; *Support*: City staff]

5.4 Develop audit/rebate program participant applications, finalizing eligibility criteria and program details [*Lead*: SGM; *Support*: City staff]

5.5 Advertise the rebate program and criteria in water bill inserts, postings at City Hall and local retail irrigation supply outlets, and the City's website [*Lead*: City staff]

5.6 Collect and screen applications, evaluating past water billing records to estimate outdoor water usage. Select and inform program participants and Irrigation Contractor. [*Lead*: SGM; *Support*: City staff]

5.7 Coordinate and perform all audits, system improvements, and controller installation/startup/training events; submit audit completion forms and invoices for review/approval by the City [*Lead*: Irr. Contractor; *Support*: SGM/City]

5.8 Dispense rebates [Lead: City Staff]

5.9 Develop followup survey to get feedback on homeowner experiences with smart controllers and irrigation audits. [*Lead*: SGM; *Support*: City staff, Irr. Auditor]

5.10 Distribute survey and collect responses, following-up with folks not returning them. [*Lead*: City Staff]

5.11 Review and analyze billed water use data for one 12-month period following irrigation audits and smart controller installations. Compare pre- to post-audit/controller installation outdoor water usage for each Group and that for all other comparable residential accounts. Also, compare water usage data trends to trends in survey responses. [*Lead*: SGM, *Support*: City staff]

5.12 Compile a technical memorandum summarizing results and making recommendations regarding future use of irrigation audits and smart controllers to reduce outdoor water use in Rifle. [*Lead*: SGM; *Support*: City staff]

Deliverables

- Technical memorandum summarizing results of rebate/audit evaluation and making recommendations for future implementation

Estimated Water Savings

Table 2-1 of the City's approved *Water Conservation Plan* indicates that in 2006 the average annual metered water use for a single family residential customer was 286 gpd/tap. Assuming that customers most likely to be interested in the smart controller rebate will have higher-than-average water use, a round number of 350 gpd/tap is selected. Other data analyses indicate that roughly 50% of water use occurs outside the home in Rifle. We are estimating the average outdoor irrigation water savings achieved in audit/rebate Groups #1, #2, and #3 to be: 15%, 25%, and 35%, respectively. This equates to a projected annual water savings of roughly 780,000 gallons.

Task 6.0 Launch a Rebate Program for High-Efficiency Toilets and Clothes Washers for Existing Water Customers.

Purpose

This program element seeks to achieve water savings by providing incentives (rebates) to existing water customers to upgrade the water efficiency of two of the largest indoor water-consuming devices in the home – toilets and clothes washers. This program also seeks to familiarize Rifle's citizens with the *WaterSense* label and to provide interested existing customers with another tool to manage their water bills in response to the planned new water rate structure.

Discussion

The City will rebate up to $125, and no more than 50% of the purchase price, per *WaterSense* toilet and *Energy Star* washer. Eligible washers will be limited to those with a water factor no greater than 6.0 gallons per cycle per cubic foot of capacity, which is the water efficiency performance criterion established in USEPA's specification for *WaterSense*-labeled single family homes. To receive the rebate, it is envisioned that applicants will be required to provide a receipt and allow for a site inspection by City staff to verify installation. The City will issue 100 rebates on a first-come, first-serve basis. Sixty (60) toilet rebates and forty (40) washer rebates will be available. One hundred rebates (assuming one per tap) equates to about 3% of the City Utility Department's current water customer accounts. To simplify implementation and control costs, the City does not anticipate requiring rebate applicants to provide verification that the rebate is being used to fund replacement of an old, inefficient toilet or washer.

Sub-tasks

6.1 Identify lists of toilets and washers to be eligible for rebate and finalize program implementation details [*Lead*: SGM; *Support*: City staff]

6.2 Make lists and rebate program details available on City website. Advertise the rebate program in water bill inserts, at City Hall, and at local appliance retail outlets. [*Lead*: City staff; *Support*: SGM]

6.3 Develop rebate application forms [*Lead*: SGM]

6.4 Receive rebate application forms and receipts and compile first-come, first-served applicant list for new toilet/washer rebates. Randomly select, schedule and conduct visits to 20% of rebate applicant homes to verify installation and eligibility. [*Lead*: City staff]

6.5 Dispense rebate payments [*Lead*: City staff]

Deliverables

- Rebate process requirements

- List of eligible toilets and washers
- Eligible rebate recipient criteria and

Estimated Water Savings

Vickers (2001) reports the following values for average U.S. water use by toilets and clothes washers in "non-conserving" vs. "conserving" homes:

	"Non-Cons."	"Conserving"	Difference
Toilets:	18.5 gpcd	8.2 gpcd	10.3 gpcd
Clothes washers:	15.0 gpcd	10.0 gpcd	5.0 gpcd

Rifle averages about 2.6 capita per single family equivalent residence. So, the anticipated savings achieved by the rebate program, assuming that the new high efficiency toilets and appliances are being used to replace old, inefficient ("non-conserving") versions is:

Toilets: 60 homes x 1 toilet out of 1.5 toilets (avg.) in the home x 10.3 gpcd x 2.6 cap/home x 365 days/year =
390,000 gallons/year

Washers: 40 homes x 1 washer per home x 5.0 gpcd x 2.6 cap/home x 365 days/year =
560,000 gallons/year

5. Schedule

A proposed project schedule showing timelines for all subtasks is included under **Appendix B**.

6. Project Budget and Funding Sources

A detailed breakdown of labor hours and expenses is included in a number of tables in **Appendix C**. **Table 4** provides a summary overview.

Table 4. Project Budget Overview

#	Task Description	Project Costs			Project Funding Sources		
		Labor	Expenses	Total	City In-kind Labor	City Budget Allocs.	CWCB Grant Request
01	Irr./Lndscp Req.- New Dev.	$7,381	$195	$7,576	$2,556	$195	$5,020
02	Plumbin Req. – New Dev.	$6,839	$195	$7,034	$2,014	$195	$5,020
03	Website	$4,504	$3,170	$7,674	$1,744	$0	$5,930
04	Purchasing Policy	$2,210	$35	$2,245	$915	$35	$1,330
05	Smart Rebates	$24,914	$20,400	$45,314	$2,089	$20,400	$22,825
06	Toilet/Washer Rebates	$3,788	$12,500	$16,288	$2,348	$12,500	$1,440
07	Proj. Mgmt.	$6,799	$0	$6,799	$1,279	$0	$5,520
	Total	**$56,434**	**$36,495**	**$92,929**	**$12,944**	**$33,325**	**$47,085**
	Funding Contribution Summary:		**City:**	$46,269	**49.8%**		
			CWCB:	$47,085	**50.2%**		

7. Authorized Representative's Signature

The City of Rifle is committed to reducing its water consumption through conservation and efficiency. The implementation program outlined in this grant application will be a significant step toward these goals.

Charles G. Stevens
Utility Director
City of Rifle, Colorado

5/26/10
Date

Appendix A

Irrigation Audit
Preliminary Outline

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City of Rifle
2011 Residential Landscape Irrigation Audits and Controller Rebate Program

Preliminary Scope of Work:
Single Family Residential Irrigation Audit

General
The objective of the irrigation audit is to identify the most significant sources of residential landscape water use inefficiency at a given site. It is intended that the audit require *no more than one to two hours* of on-site time to complete. A key outcome is the development of a prioritized short list (5 to 10 items) of recommended physical and operational improvements yielding the greatest water savings return on investment. The primary focus is to be placed on automatic irrigation system design and operation in order to optimize water application to the existing landscaping. However, targeted, manageable landscaping modifications with the greatest water savings potential and a reasonable implementation cost also should be identified. Irrigation auditors will need to be well-versed in not only efficient landscape irrigation system design and operation, but also basic principles of water-efficient landscaping design.

Audit Elements

- Estimate overall landscape irrigation water use per month

- Check for irrigation system leaks
    - wet spots in landscape
    - leaky/broken sprinkler heads, hose bibbs, drip system elements
    - predicted total zone nozzle output vs. observed water meter flow rate check if significant buried irrigation line leak/break suspected

- Check irrigation system operating pressure
    - don't want too high (misting/atomizing) or too low (dribbling)

- Check sprinkler head(s) orientation and condition
    - want parallel with lawn slope and high enough to not be blocked by nearby turf
    - are nozzles or spray heads damaged?
    - are nozzles or filters plugged?
    - do spray head caps leak?
    - do down-slope spray heads drain when system shut-off?

- Check sprinkler spacing/coverage uniformity
    - dry or soggy turf spots
    - head spacing measurements versus observed spray radii
    - observations of watering coverage
    - spray nozzle check - conformity in zones (i.e. matched precip rates)
    - catchment test for each zone, if time allows

- Check sprinkler overspray
    - check for irrigation of hardscape or overspray into separately irrigated areas
    - check for spray blocking by trees, fences, etc.

- Check drip system elements
    - pinched/broken tubing
    - disconnected emitters/emitter tubing
    - incorrect emitter spacing
    - clogged, missing, broken emitters

- Check irrigation system operations and controller programming
    - irrigation volumes versus plant requirements
    - use of cycle and soak
    - time of day of water application
    - use of monthly/seasonal adjustments
    - consideration of soil types, slopes, and shade

- Review basic landscaping water-efficiency
    - identification of impractical turf areas
        - steep slopes, thin strips, irregularly-shaped areas, heavy shade areas, areas abutting structures
    - use of mulching, soil amendments, and turf aeration
    - presence/use of water features (if pools, recommend pool covers)
    - grass mow height (too low increases water requirements)
    - grouping of plants with similar water needs
    - appropriateness of plantings based on:
        - shading
        - slope
        - soil type
        - wear/traffic patterns

- Identification of priority improvements
    - irrigation system design/physical modifications
    - irrigation system control
        - actually re-program the controller if permitted by homeowner
        - provide training/instruction on control/programming rationale
    - landscape water use efficiency modifications

- Provide a rough estimate of monthly water volume savings and approximate water bill savings for the set of recommended improvements with rough percentages attributed to each improvement

- Provide a rough estimate of cost to implement each improvement

- Complete an audit record form and provide a copy to homeowner and City of Rifle

Appendix B

Proposed Schedule

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Project: City of Rifle Water Conservation Plan Implementation
Project Manager: Warren Swanson, SGM

Month - Year

No.	Task	Oct. 2010	Nov. 2010	Dec. 2010	Jan. 2011	Feb. 2011	Mar. 2011	Apr. 2011	May. 2011	Jun. 2011	Jul. 2011	Aug. 2011	Sep. 2011	Oct. 2011	Nov. 2011	Dec. 2011	Break	Oct. 2012	Nov. 2012	Dec. 2012
	CWCB Grant Approval/Notice to Proceed (assumed by Oct. 15, 2010)	■																		
01	**Establish Landscaping & Irrigation Design Requirements for New Dev.**		■																	
1.1	Review landscape and irrigation design requirements and implementation models; hold mtg to discuss		■																	
1.2	Identify and contact potential stakeholders		■	■																
1.3	Develop 1st draft of requirements and implementation process			■																
1.4	Distribute 1st draft; convene stakeholder meeting; have City Att'y review			■	■															
1.5	Develop 2nd draft in form of draft ordinance; send to , and discuss with, stakeholders				■															
1.6	Revise draft ordinance based on stakeholder input				■	■														
1.7	Identify implementation resource needs and costs					■														
1.8	Submit draft ordinance to City Council; planning, prep., execution of Council worksession					■	■													
1.9	Develop final draft ordinance for public comment; post on web; advertise in paper						■	■	■											
1.10	Incorporate comments into final draft ordinance; finalize resource/implementation needs								■	■										
1.11	Submit final doc for Council review/vote; hold public mtg. for resolution adoptions									■										
02	**Establish High Efficiency Indoor Plumbing Requirements for New Dev.**																			
2.1	Review and discuss potential criteria and implementation models; hold mtg to discuss		■																	
2.2	Identify and contact potential stakeholders		■																	
2.3	Develop 1st draft of requirements and implementation process		■	■																
2.4	Distribute 1st draft; convene stakeholder meeting; have City Att'y review			■																
2.5	Develop 2nd draft in form of draft ordinance; send to , and discuss with, stakeholders			■	■															
2.6	Revise draft ordinance based on stakeholder input				■															
2.7	Identify implementation resource needs and costs				■	■														
2.8	Submit draft ordinance to City Council; planning, prep., execution of Council worksession					■														
2.9	Develop final draft ordinance for public comment; post on web; advertise in paper						■	■												
2.10	Incorporate comments into final draft ordinance; finalize resource/implementation needs								■											
2.11	Submit final doc for Council review/vote; hold public mtg. for resolution adoptions								■	■										
03	**Create Water Conservation Web Site**																			
3.1	Rewiew water conservation web pages								■											
3.2	Review other web-based water efficiency resources								■											
3.3	Identify local and regional water efficiency resources								■	■										
3.4	Develop, evaluate & select ideas for other webpage features/uses									■	■									
3.5	Create an outline/template for the website design; meet to review/discuss										■	■								
3.6	Develop beta version of website											■	■							
3.7	Review and test beta version; meet to discuss													■						
3.8	Develop final website and launch													■	■					
3.9	Advertise website launch using water bill inserts														■	■				
04	**Create City Facility Water Efficient Plumbing Fixture & Appliance Policy**																			
4.1	Draft purchasing policy					■														
4.2	Identify and meet with internal stakeholders to review draft						■													
4.3	Revise draft policy resolution; provide to Council for review						■	■												
4.4	Meet with City Council in worksession to review draft policy resolution								■											
4.5	Gain Council approval of resolution at public meeting								■	■										
05	**Launch Rebate Program for Smart Irr. Controllers for Exist. Customers**																			
5.1	Finalize audit scope and audit form			■																
5.2	Develop Irr. Contractor bid docs; bid the work; select contractor			■	■															
5.3	Select rebate-eligible irrigation controller equipment			■	■															
5.4	Develop audit/rebate program participant applications; finalize critieria and program details				■	■														
5.5	Advertise rebate program					■	■													
5.6	Collect and screen applications; select participants						■	■												
5.7	Coordinate and perform all audits and system improvements							■	■	■	■	■	■							
5.8	Dispense rebates								■	■	■	■	■	■						
5.9	Develop followup survey and distribute										■	■	■	■	■					
5.10	Collect and review survey responses											■	■	■	■	■				
5.11	Review and analyze billed water usage for 12 months after audit/improvements																	■		
5.12	Compile technical memorandum																	■	■	■
06	**Launch Rebate Program for Hi-Efficiency Toilets & Washers for Exist. Cust.**																			
6.1	Identify eligible toilets and washers and finalize implementation details			■																
6.2	Develop rebate application forms			■	■															
6.3	Make lists and program details available on website; advertise program w/bill inserts, City Hall, retailers				■	■	■													
6.4	Receive/process application forms; schedule and conduct verification visits					■	■	■	■	■										
6.5	Dispense rebate payments						■	■	■	■	■									
07	**Project Management & Reporting**																			
7.1	Revise schedule and submit to CWCB (based on timing of Notice to Proceed)	■																		
7.2	Team coordination	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■	■
7.3	Coordination with CWCB and submission of grant payment requests	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■	■
7.4	Preparation of Progress Report #1 (50%)							■	Submit 50% Report by Apr. 31, 2011											
7.5	Preparation of Progress Report #2 (75%)												■	Submit 75% Report by Sep. 30, 2011						
7.6	Preparation of Final Report															Submit Final Report by Dec. 31, 2012			■	■

Appendix C

Supporting Project Budget Tables

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Detailed Project Cost and Funding Table

Project: City of Rifle Water Conservation Plan Implementation — **LABOR BREAKDOWN** — **Date: 5/24/2010**

Project Manager: Warren Swanson, SGM

Task #	TASK DESCRIPTION	Utility Director	Planner	City Staff Utility Admin.	Water Staff	Billing Clerk	Parks Dir.	City Mgr.	Subconsultants City Atty.	SGM PM	SGM Engr	J. Kerst Irr. Auditor	Total Labor Hours	Total Labor Costs	LABOR COST & FUNDING BREAKDOWN Labor Costs: City Staff Labor	Consul-tant Labor	Funding of Labor Costs: City In-Kind Labor	City Budget Allocs.	Grant Funding Request
	Hourly Rates-->	$53	$34	$23	$34	$27	$45	$61	$185	$120	$100	$80							
01	**Establish Landscaping & Irrigation Design Requirements for New Dev.**																		
1.1	Review landscape and irrigation design requirements and implementation models; hold mtg to discuss	2	2				2			6			12	$984	$264	$720			
1.2	Identify and contact potential stakeholders		3										3	$102	$102	$0			
1.3	Develop 1st draft of requirements and implementation process	2	2				2			6			12	$984	$264	$720			
1.4	Distribute 1st draft; convene stakeholder meeting; have City Att'y review	2	3				2		3	2			12	$1,094	$299	$795			
1.5	Develop 2nd draft in form of draft ordinance; send to , and discuss with, stakeholders	1	4				1	1	6				13	$1,405	$295	$1,110			
1.6	Revise draft ordinance based on stakeholder input	1	2						2				5	$491	$121	$370			
1.7	Identify implementation resource needs and costs	2	8				4						14	$559	$559	$0			
1.8	Submit draft ordinance to City Council; planning, prep., execution of Council worksession	2	4					1	3				10	$858	$303	$555			
1.9	Develop final draft ordinance for public comment; post on web; advertise in paper		1						1				2	$219	$34	$185			
1.10	Incorporate comments into final draft ordinance; finalize resource/implementation needs	1	2				1		1				5	$351	$166	$185			
1.11	Submit final doc for Council review/vote; hold public mtg. for resolution adoptions	1	1					1	1				4	$333	$148	$185			
	Subtotals	**14**	**32**	**0**	**0**	**0**	**12**	**3**	**17**	**14**	**0**	**0**	**92**	**$7,381**	**$2,556**	**$4,825**	**$2,556**	**$0**	**$4,825**
02	**Establish High Efficiency Indoor Plumbing Requirements for New Dev.**																		
2.1	Review and discuss potential criteria and implementation models; hold mtg to discuss	2	2							6			10	$894	$174	$720			
2.2	Identify and contact potential stakeholders		3										3	$102	$102	$0			
2.3	Develop 1st draft of requirements and implementation process	2	2							6			10	$894	$174	$720			
2.4	Distribute 1st draft; convene stakeholder meeting; have City Att'y review	2	3						3	2			10	$1,003	$208	$795			
2.5	Develop 2nd draft in form of draft ordinance; send to , and discuss with, stakeholders	1	4					1	6				12	$1,360	$250	$1,110			
2.6	Revise draft ordinance based on stakeholder input	1	2						2				5	$491	$121	$370			
2.7	Identify implementation resource needs and costs	2	8										10	$379	$379	$0			
2.8	Submit draft ordinance to City Council; planning, prep., execution of Council worksession	2	4					1	3				10	$858	$303	$555			
2.9	Develop final draft ordinance for public comment; post on web; advertise in paper		1						1				2	$219	$34	$185			
2.10	Incorporate comments into final draft ordinance; finalize resource/implementation needs	1	2						1				4	$306	$121	$185			
2.11	Submit final doc for Council review/vote; hold public mtg. for resolution adoptions	1	1					1	1				4	$333	$148	$185			
	Subtotals	**14**	**32**	**0**	**0**	**0**	**0**	**3**	**17**	**14**	**0**	**0**	**80**	**$6,839**	**$2,014**	**$4,825**	**$2,014**	**$0**	**$4,825**
03	**Create Water Conservation Web Site**																		
3.1	Rewiew water conservation web pages	1	1				1			2			5	$372	$132	$240			
3.2	Review other web-based water efficiency resources	1	1				1			2			5	$372	$132	$240			
3.3	Identify local and regional water efficiency resources	1	3				4			2			10	$576	$336	$240			
3.4	Develop, evaluate & select ideas for other webpage features/uses	1	1				1			2			5	$372	$132	$240			
3.5	Create an outline/template for the website design; meet to review/discuss	3	3	2			3			2			13	$682	$442	$240			
3.6	Develop beta version of website			1						8			9	$983	$23	$960			
3.7	Review and test beta version; meet to discuss	3	3	2						2			10	$546	$306	$240			
3.8	Develop final website and launch	1		4						2			7	$383	$143	$240			
3.9	Advertise website launch using water bill inserts	1		2						1			4	$218	$98	$120			
	Subtotals	**12**	**12**	**11**	**0**	**0**	**10**	**0**	**0**	**23**	**0**	**0**	**68**	**$4,504**	**$1,744**	**$2,760**	**$1,744**	**$0**	**$2,760**
04	**Create City Facility Water Efficient Plumbing Fixture & Appliance Policy**																		
4.1	Draft purchasing policy	4											4	$212	$212	$0			
4.2	Identify and meet with internal stakeholders to review draft	2	2				2	2					8	$385	$385	$0			
4.3	Revise draft policy resolution; provide to Council for review	3							4				7	$899	$159	$740			
4.4	Meet with City Council in worksession to review draft policy resolution	2							2				4	$476	$106	$370			
4.5	Gain Council approval of resolution at public meeting	1							1				2	$238	$53	$185			
	Subtotals	**12**	**2**	**0**	**0**	**0**	**2**	**2**	**7**	**0**	**0**	**0**	**25**	**$2,210**	**$915**	**$1,295**	**$915**	**$0**	**$1,295**
05	**Launch Rebate Program for Smart Irrigation Controllers for Exist. Customers**																		
5.1	Finalize irrigation audit scope and audit completion form	1					1			1	4	3	10	$858	$98	$760			
5.2	Execute Irrigation Contractor bidding/selection process	2									4		6	$506	$106	$400			
5.3	Select rebate-eligible irrigation controllers	1					1			2		1	9	$718	$98	$620			
5.4	Develop participant applications; finalize criteria/details	2								1	4		7	$626	$106	$520			
5.5	Advertise program	2		8									10	$286	$286	$0			
5.6	Collect and evaluate applications; select participants	2		2		6				2	6		34	$2,356	$316	$2,040			
5.7	Coordinate and conduct audits/improvements/controller installs ; review completed audit forms	1									6	20	177	$13,503	$53	$13,450			
5.8	Dispense rebates					12							12	$329	$329	$0			
5.9	Develop survey	2								2	6		11	$1,021	$106	$915			
5.10	Distribute and collect survey	1		8									9	$233	$233	$0			
5.11	Analyze water usage data and survey results	1				4				2	14		21	$1,803	$163	$1,640			
5.12	Compile technical memorandum	2					2			4	20		28	$2,676	$196	$2,480			
	Subtotals	**17**	**0**	**18**	**0**	**22**	**4**	**0**	**0**	**14**	**64**	**24**	**334**	**$24,914**	**$2,089**	**$22,825**	**$2,089**	**$0**	**$22,825**

Task #	TASK DESCRIPTION			City Staff					Subconsultants						Labor Costs		Funding of Labor Costs		
		Utility Director	Planner	Utility Admin.	Water Staff	Billing Clerk	Parks Dir.	City Mgr.	City Atty.	SGM PM	SGM Engr	J. Kerst Irr. Auditor	Total Labor Hours	Total Labor Costs	City Staff Labor	Consul-tant Labor	City In-Kind Labor	City Budget Allocs.	Grant Funding Request
	Hourly Rates-->	$53	$34	$23	$34	$27	$45	$61	$185	$120	$100	$80							
06	**Launch Rebate Program for Hi-Efficiency Toilets & Washers for Exist. Cust.**																		
6.1	Identify eligible toilets and washers and finalize implementation details	2			2	2				8			14	$1,189	$229	$960			
6.2	Make lists and program details available on website; advertise program w/bill inserts, City Hall, retailers	6								1			7	$438	$318	$120			
6.3	Develop rebate application forms	1			1					3			5	$447	$87	$360			
6.4	Receive/process application forms; schedule and conduct verification visits				30								30	$1,028	$1,028	$0			
6.5	Dispense rebate payments					25							25	$686	$686	$0			
	Subtotals	**9**	**0**	**0**	**33**	**27**	**0**	**0**	**0**	**12**	**0**	**0**	**81**	**$3,788**	**$2,348**	**$1,440**	**$2,348**	**$0**	**$1,440**
07	**Project Management & Reporting**																		
7.1	Revise schedule and submit to CWCB (based on timing of Notice to Proceed)	1								2			3	$293	$53	$240			
7.2	Team coordination	8								8			16	$1,384	$424	$960			
7.3	Coordination with CWCB and submission of grant payment requests	4				8				4			16	$911	$431	$480			
7.4	Preparation of Progress Report #1 (50%)	2								8			10	$1,066	$106	$960			
7.5	Preparation of Progress Report #2 (75%)	2								8			10	$1,066	$106	$960			
7.6	Preparation of Final Report	3								16			19	$2,079	$159	$1,920			
	Subtotals	**20**	**0**	**0**	**0**	**8**	**0**	**0**	**0**	**46**	**0**	**0**	**74**	**$6,799**	**$1,279**	**$5,520**	**$1,279**	**$0**	**$5,520**
	TOTAL LABOR HOURS	**98**	**78**	**29**	**33**	**57**	**28**	**8**	**41**	**123**	**64**	**24**	**754**		**$12,944**	**$43,490**	**$12,944**	**$0**	**$43,490**
	TOTAL LABOR COST CONTRIBUTION	**$5,189**	**$2,660**	**$653**	**$1,130**	**$1,564**	**$1,264**	**$484**	**$7,585**	**$14,760**	**$6,400**	**$1,920**		**$56,434**					

EXPENSES BREAKDOWN		COSTS								FUNDING SOURCES	
		City Expenses			Consultant Exp. & Contractor Fees				Totals	City-Funded	Grant Request
		Printing	Adv.	Appliance Rebates	SGM (travel)	Civic Plus	Irr. Conractor (audits)	(rebates)			
01	**Establish Landscaping & Irrigation Design Requirements for New Dev.**	$25	$100		$70				$195	$195	$195
02	**Establish High Efficiency Indoor Plumbing Requirements for New Dev.**	$25	$100		$70				$195	$195	$195
03	**Create Water Conservation Web Site**				$70	$3,100			$3,170	$0	$3,170
04	**Create City Facility Water Efficient Plumbing Fixture & Appliance Policy**				$35				$35	$35	$35
05	**Launch Rebate Program for Smart Irr. Controllers for Exist. Customers**						$8,400	$12,000	$20,400	$20,400	
06	**Launch Rebate Program for Hi-Eff. Toilets & Washers for Exist. Cust.**			$12,500					$12,500	$12,500	
07	**Project Management & Reporting**								$0	$0	$0
	TOTAL REIMBURSABLES	**$50**	**$200**	**$12,500**	**$245**	**$3,100**	**$8,400**	**$12,000**	**$36,495**	**$33,325**	**$3,595**

Task 5.7 - Irrigation Contractor Labor and Equipment/Materials Budget Breakdown													
	Labor					**Equipment & Materials**						**Totals**
	Conduct Irr. Sys. Audits	Audit Admin. Support	Perform Audit-Gen. Improvements	Install Irr. Sys. Controllers	Install Admin. Support	Misc. Mat'ls	Hunter PRO-Cs	WeatherMatic Smartline 1600s	Hunter Solar Syncs	Weather-Matic SLW10s	Installl Mat'ls	
Labor Hourly Rate or $/Installation -->	$ 60	$ 50	$ 65	$ 65	$ 50	$ 70	$ 137.50	$ 138.60	$ 73.70	$ 143.00	$35	
	(table entries are labor hours)					(table entries are number of installations)						
Group 1: Audits Only	45	10	40	0	0	20	0	0	0	0	0	**$ 7,200**
Group 2: Audits and New Controller without weather station	35	10	40	75	10	20	10	10	0	0	20	**$ 15,436**
Group 3: Audits and New Controller with weather station	35	10	40	105	20	20	10	10	10	10	20	**$ 20,053**
Totals	**$ 6,900**	**$ 1,500**	**$ 7,800**	**$ 11,700**	**$ 1,500**	**$ 4,200**	**$ 2,750**	**$ 2,772**	**$ 737**	**$ 1,430**	**$ 1,400**	**$ 42,689**
Sub-total: audits												**$ 8,400**
Sub-total: audit-generated improvements												**$ 12,000**
Sub-total: controller installations												**$ 26,489**

**Note that for project budgeting purposes, the only project expenses will be for the free irrigation audits ($8,400), plus rebates ($12,000 - not shown above); all other costs shown in this table will be born by program participants*