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NORTH TABLE MOUNTAIN WATER AND SANITATION DISTRICT
14806 WEST 52ND AVENUE, • GOLDEN, COLORADO 80403-1228

March 9, 2011

Deborah Burrell
Grants Coordinator
Colorado Water Conservation Board
1313 Sherman Street, Room 721
Denver, CO 80203

Dear Ms. Burrell,

Please find attached an updated Water Efficiency Grant Application from North Table Mountain Water and Sanitation District (NTM). We hope you will look favorably upon our application and thank you for this opportunity. As we discuss in our application, a grant this spring from the CWCB would be extremely timely. Among other benefits, it would allow NTM to have landscape regulations in place for three large new developments in the District which are quickly moving forward.

Please let us know if you have questions or if you would like additional information.

Sincerely,

Bart Sperry, P.E.
Acting District Manager and Engineer

electronic cc: Veva Deheza, CWCB
Kevin Reidy, CWCB

North Table Mountain
Water and Sanitation District

Application to the
Colorado Water Conservation Board
For a Water Efficiency Grant

Submitted: March 9, 2011

North Table Mountain Water and Sanitation District
Water Efficiency Grant Application

North Table Mountain Water and Sanitation District ("NTM", "North Table Mountain" or "the District") is a water and sewer provider in the Colorado Front Range area. NTM developed a Water Conservation Plan (Plan) that was approved by the Colorado Water Conservation Board (CWCB) on June 23rd, 2009. The overall goal of the Plan is to significantly reduce current and future per capita water demands through water conservation efforts. To achieve this goal the District proposes a variety of programs ranging from system-wide conservation efforts, regulatory and rebate programs, to public education and outreach.

NTM is a smaller water district with limited funding and resources and is asking CWCB for assistance in initiating several water conservation efforts. NTM is committed to doing their part by dedicating significant material, equipment, staff and other resources. A Water Efficiency Grant from the CWCB will allow NTM the opportunity to demonstrate to their customers and Board of Directors the positive impact the programs in this application can have on water use, increasing their interest and continued support of NTM's conservation program. The impact of the proposed projects will be lasting and compound over time. NTM is a covered entity as defined in the CWCB Guidelines and is eligible to submit the following application.

For ease of review, this grant application is organized according to the outline of the Grant Application Submittal Guidelines revised by the CWCB on November 20, 2008.

1. Name and contact information:

Applicant: North Table Mountain Water and Sanitation District
14806 West 52nd Ave.
Golden, CO 80403-1228

Contact: Wendy Weiman, P.E.,
Project Engineer
wendy@ntmwater.org
303-279-2854 ext 306

Chief Executive: Bart Sperry, P.E.
Acting District Engineer and Manager
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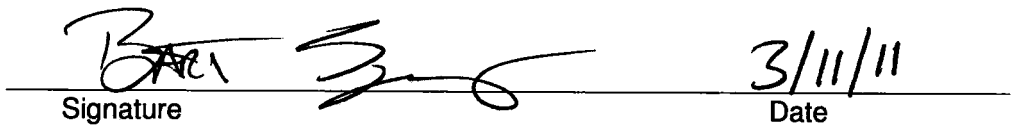

Signature 3/11/11 Date

2. Organization and Individuals to Assist in Implementation of the Plan:

NTM staff will manage the development and implementation of the programs in this application. They will also oversee and coordinate several contractors and consultants. A sonic leak detection firm, most likely Utility Technical Services, Inc. (UTS), will be hired to survey older pipes in NTM's system for undetected leaks and areas in need of repair. The Center for Resource Conservation (CRC) will be hired to work with high water use customers under the Irrigation Audit Pilot Program. Table Mountain Hydrology, LLC (TMH) will develop landscaping regulations and provide overall project assistance, including assisting with grant reporting. Additional details regarding individual staff and contractor/consultant qualifications are provided below. Roles and responsibilities are also discussed under the individual task descriptions in the Project Scope in Section 5.

North Table Mountain Water and Sanitation District

Bart Sperry – Acting District Manager and Engineer
Mr. Sperry received a Civil Engineering degree from California State Polytechnic University in Pomona. He is a Registered Professional Civil Engineer in the State of Colorado. Mr. Sperry has over 16 years of experience in private consulting for water and wastewater industries. His background includes planning, design, and construction management of numerous water and wastewater projects as well as modeling and studies. Mr. Sperry has worked for NTM for more than five years and was recently named Acting District Manager and Engineer.

Project Responsibilities: As NTM's Acting District Manager, Mr. Sperry will have ultimate authority over the implementation of the projects included in this application. He will be responsible for providing guidance, oversight and input during all stages of project implementation. He will also serve as the primary liaison with NTM's Board of Directors.

Wendy Weiman – Project Manager and Engineer
Ms. Weiman has a Bachelor's of Science in Engineering from Colorado School of Mines. She is a Registered Professional Civil Engineer in the State of Colorado. Ms. Weiman has worked in the municipal field for over 10 years. Her background includes working for cities performing planning, design, and construction management duties. She has worked as a Design and Project Engineer at the District for over six years.

Project Responsibilities: In addition to her engineering responsibilities, Ms. Weiman serves as NTM's Conservation Coordinator. She will serve as the manager for the projects in this application and will participate in all phases of implementation. She will be responsible for NTM's staff and resources, scheduling, coordinating and overseeing contractors, reviewing deliverables, and monitoring evaluation data.

Other NTM Staff
Other NTM staff will be involved including the Geographic Information Systems (GIS) Specialist who will help identify and map systems of pipe to be surveyed. He will also develop acreage estimates to help identify high water use customers for participation in the irrigation audit program. Administrative staff and ground crews will be involved in reviewing data, assisting with new regulations, making system repairs, and providing general project support.

Center for Resource Conservation
The Center for Resource Conservation's (CRC) Water Division develops and implements educational programs and services that help residents increase water use efficiency, adhere to best management practices, and reach conservation goals. The CRC will provide irrigation audits to NTM customers through the Slow the Flow Colorado program. The CRC has trained water auditors and experience working with a variety of Colorado water providers. (Source: www.conservationcenter.org)

Utility Technical Services
Utility Technical Services, Inc. (UTS) has provided services to over 1,000 municipal and private water utilities, in addition to engineers, pipeline contractors, property management companies, and private and industrial complexes. Their service technicians have over 50 years of combined experience working within the water industry. They will survey identified sections of NTM's system. (Source: http://www.utsleak.com/company_profile.htm)

Table Mountain Hydrology
Table Mountain Hydrology, LLC (TMH) will be retained to develop landscaping regulations and provide overall project assistance, including assisting with grant reporting. Ms. Belanger, of TMH, has experience developing effective demand reduction programs and worked with NTM to develop their Water Conservation Plan. Ms. Belanger received a Master's degree in Civil Engineering from the University of Colorado at Boulder and is a Registered Professional Civil Engineer in the State of Colorado. She has developed and provided input on several Water Conservation Plans for Colorado water providers.

3a. Recent Retail Water Delivery

The amount of retail water consumed by NTM's customers from 2004 to 2008 is provided in **Table 1**. NTM experienced a great deal of growth during this period and the number of homes increased rapidly; which is reflected in the customer water usage. **Table 2** shows total annual water use by account type (sector) for the 2000 through 2008 period. Because NTM bills customers on a rolling quarterly basis, complete and quality controlled 2009 data was not available for this grant application. Residential users account for the majority of NTM's water use.

Table 1: Total Annual Water Use by All Accounts

Year	Acre-Ft
2004	1693
2005	2018
2006	2555
2007	2394
2008	2819

Data collected from NTM water sales.

Table 2: Total Annual Water Use by Account Type (Acre-Feet)

Year	Residential	Commercial	Industrial	Greenhouse	Parks and HOA	Un-accounted For[1]
2000	1424.3	151.3	275.3	83.8	84.1	140.9
2001	1376.7	120.6	280.2	89.6	101.0	141.2
2002	1440.8	102.8	253.2	86.8	74.3	178.9
2003	1280.6	89.9	247.7	84.4	94.5	50.6
2004	1083.9	88.7	228.9	85.9	96.1	108.9
2005	1381.3	124.9	221.9	80.4	125.2	83.8
2006	1661.2	153.4	257.8	75.5	221.3	186.0
2007	1541.2	172.2	244.9	70.9	205.6	159.0
2008	1635.7	182.4	328.9	59.5	492.7	120.0

[1] NTM installed a recycled water meter in late 2002. 2000 – 2002 Unaccounted For water was calculated using estimates of recycled water for those years.

In addition to water use by metered customers, the designation “Unaccounted For” water is used for the difference between produced water (water leaving the treatment plant) and all metered (customer) water deliveries. “Unaccounted For” water may include both “real” losses (water lost to system leaks or tank overflows) as well as “apparent” losses. Apparent losses may not be an actual loss of water but due to metering, billing, or accounting inaccuracies. Apparent losses also include authorized uses which are not typically metered such as water main flushing, main repairs, fire suppression and construction activities. NTM does meter and bill for construction water use but these uses are small and the data is not entered into the billing database.

NTM’s water source is surface water via a contract with Denver Water.

3b. <u>Background Characterization of Water System and Potential Growth:</u>

The North Table Mountain Water and Sanitation District, located approximately 30 miles northwest of Denver, was formed on November 5, 1958 to provide water service to an area north and east of North Table Mountain as shown in **Figure 1**. NTM is a special district, formed under state statutes with an elected board of directors. Attachment A includes the order and decree that officially formed NTM. The NTM service area is predominantly residential in unincorporated Jefferson County and portions of the Cities of Arvada, Golden and Wheat Ridge. On January 5, 1967 the District's purposes were expanded to include sanitary sewage collection.

Figure 1: Service Area Map

(i) Current and past years per capita water use for the last five years:

North Table Mountain Water and Sanitation District's surface water treatment plant currently treats about 5 to 6 million gallons of water per day during peak season. The service area population, residential use, total annual water use in gallons used per capita per day (gpcd) are shown in **Table 3** for the years 2004 through 2008.

Table 3: Five Year Average Daily Water Use per Person in NTM's Service Area

Daily per Capita Water Use			
Year	Service Population[1]	Residential Use[2] (gpcd)	Total Water Use[3] (gpcd)
2004	8560	113	177
2005	8911	138	202
2006	9353	159	244
2007	9456	146	226
2008	9834	148	256

[1] The service population was estimated by using the average number of residential accounts (owners and renters) in the calendar year and average household number data for 2000 census blocks in and around NTM's service area.
[2] Residential use was calculated by dividing the total billed residential water (Table 2, this document) use by the estimated service population.
[3]Total water use includes billed and unaccounted for water.

(ii) Past, current and predicted population served by the District:

Population for the past 5 years (see footnote 1) is included in **Table 3** above. 10 year Population estimates for NTM for the years 2008 through 2018 are provided in **Table 4**. In December of 2006 NTM completed an evaluation of growth potential in and around its existing service area. Using landownership information, satellite imagery, topographic data, and density assumptions, an estimate of developable surface area was made. In 2006, within NTM's current service area approximately 77% of the area was developed with an estimated 1,338 acres of developable land remaining. In addition the majority of land west of highway 93, which is not currently in NTM's service area, could be developed. This area encompasses approximately 1,176 acres. Assuming a density of three houses per acre, if all this land in NTM's service area and west of highway 93 were developed at three houses per acre NTM's service population could triple to include an additional 7,500 residences.

There is a great deal of uncertainty in predicting the timing and amount of future water demands as the majority of land is in unincorporated Jefferson County and development depends on the interests of buyers and sellers. Based upon historical development rates, NTM estimates population growth to average 4% per year, for the 2000 through 2006 period the average annual growth rate was nearly 4%. Using NTM's 2007 service area population as the baseline and assuming a 4% annual growth rate, NTM would reach it's build out population of just over 29,000 in 2036.

Table 4: NTM Service Area Population Projections

Year	Service Population Estimate
2009	10,227
2010	10,636
2011	11,062
2012	11,504
2013	11,965
2014	12,443
2015	12,941
2016	13,459
2017	13,997
2018	14,557
2019	15,139

(iii) Estimated water savings goals to be achieved through implementation of the Plan:

As Colorado's population continues to increase, NTM is committed to ensuring that water is used efficiently and wisely by its service area population. With less than half of its potential service area developed, NTM recognizes that its water supply may prove inadequate. Implementation of the developed water conservation plan will be used to manage current demands and plan for future development.

NTM has a water conservation goal of decreasing average total annual use by a sustainable 18% from 2000 pre-conservation levels, or 678 acre-feet/yr, by 2015. This will be accomplished by reducing average total water use from 259 gpcd in the year 2000 to 213 gpcd by 2015. As the District's population increases with time, the quantity of water saved becomes more significant. It should also be noted that many of the programs in the Plan, as well as in this grant application, are pilot programs. As such, savings resulting from these programs were only estimated for the initial piloting period. If programs are implemented on an ongoing basis, as NTM would like, water savings will be higher than those estimated here.

In addition to the gpcd water savings goal above, the following are qualitative water savings goals:

- To ensure that water is being used efficiently by all customers through educational information and outdoor watering restrictions; and
- To identify and work with high water use accounts (most often home owner associations) to decrease water use.

(iv) Estimates of water savings realized in the past 5 years through water conservation efforts implemented by NTM:

North Table Mountain Water and Sanitation District is required through its contract with Denver Water to implement water conservation measures at least as restrictive as those required by Denver Water. Historically NTM has imposed more stringent water use restrictions.

Water conservation savings in the District can be understood by comparing 2000 – or pre-conservation – water use to more recent periods. **Table 5** shows gpcd and water savings for the period since 2000. NTM implemented several initial water conservation programs (as described in NTM's Water Conservation Plan) during the 2002 drought. These programs have not changed significantly since that time, so no additional savings would be expected in the past 5 years. Water use can be seen to decrease significantly in the years following the drought. This is a reflection of customers' understanding of the importance of conservation, water conservation program enforcement and climatic conditions. As frequently happens, once drought memory begins to fade water use creeps back up. Additionally 2008 was a dry year and customers increased their outdoor water use. 2000 water use was 259 gpcd compared to the average daily use of 221 gpcd for 2004-2008 after the District began actively promoting water conservation. This is a savings of 38 gpcd or 15%.

Table 5: NTM Water Savings from Conservation Measures

Year	Total Water Use[1] (gpcd)	Water Savings[2]	
		(gpcd)	(AF/yr)
2000	259	NA	NA
2001	241	18	158
2002	240	19	169
2003	203	56	510
2004	177	82	787
2005	202	57	569
2006	244	15	157
2007	226	33	350
2008	256	3	33

[1] Total annual use includes billed and unaccounted for water
[2] Savings is water use compared to the year 2000, prior to the District implementing water conservation efforts.

The District has illustrated that it can save significant volumes of water with limited conservation efforts. The District will use grant monies to implement more aggressive water conservation practices and to more consistently educate customers about and enforce its water conservation program to further reduce water consumption in the up-coming years.

(v) Adequacy, stability and reliability of the entity's water system:

Current Supplies, Treatment and Storage

North Table Mountain Water and Sanitation District has a contract, originally signed in 1961, with Denver Water which entitles it to up to 6,000 acre-feet (AF) of raw water annually. NTM is limited to an instantaneous rate of 11,100 gallons per minute which is based on 16.0 million gallons per day. The term of the contract is until it is mutually terminated by both parties or in the case that NTM violates certain terms of the agreement. The contract also stipulates that "...such leases shall provide for limitation of delivery of water to whatever extent may be necessary to enable the Board to provide an adequate supply of water to the people of Denver...." In severe drought conditions NTM is required to share water with Denver and Arvada, primarily.

NTM also has rights to a modest amount of Denver Basin aquifer ground water under its service area, which is estimated at 6,000 AF. Using the 1/100th rule, NTM's annual yield for this water would be 60 AF. Given drilling and pumping costs and the limited yield, NTM currently has no plans to develop this water.

NTM's surface water supply is diverted from Ralston Reservoir in Jefferson County, which was built in 1936 by the City of Denver, by two gravity lines (18" and 24"). Raw water is delivered to NTM's water treatment plant which is located at 19250 West 68th Avenue in unincorporated Jefferson County. NTM recently installed a mixed-oxidant generator which eliminates the potential hazards of using chlorine gas disinfection. NTM's treatment plant is designed to easily expand to 11 million gallons per day (MGD). During the District's busiest periods, current use does not exceed 6 MGD. Five treated water storage tanks are located throughout the service area, ranging in size from 0.5 to 2.5 million gallons.

NTM's Water Conservation Plan estimates that at 100% build out (all developable acreage at 3 houses per acre and 2.62 people per household) total annual water demand could reach 9,000 AF per year. Assuming full use of the 6,000 AF from Denver, this would require an additional 3,000 AF from other water supplies. As the number of residents in Colorado and along the Front Range grows, new water supplies are increasingly difficult and expensive to acquire. NTM recognizes that it must include water conservation as an essential tool in managing current and future demands.

Wastewater Treatment and Storage

NTM contracts with Metro Wastewater for all wastewater treatment. NTM is responsible for wastewater lines and pump stations required to deliver waste to Metro's system. As NTM's service area continues to grow, so will the need for new and expanded wastewater conveyance lines.

3c. Grant Program Monies and Water Savings:

NTM selected three programs for inclusion in this grant application which have the potential to result in significant long-term water savings. Annual water savings at the end of the grant period are estimated at 4.8 million gallons (14.7 AF). At build out savings are estimated to compound to 154.7 million gallons (474.8 AF) annually. Savings shown for the sonic leak detection and irrigation audit pilot programs are only those resulting from the sections of pipe surveyed and irrigation audits completed with the assistance of the Water Efficiency Grant. Additional savings will be realized by these programs over time as additional sections of pipe are surveyed and additional irrigation audits are performed. Savings for landscaping regulations compound over time as new development occurs. NTM is requesting a Water Efficiency Grant of $25,370 towards the total project cost of $64,564, which includes NTM materials, equipment, staff and attorney costs. Water savings estimates are shown in **Table 7**. **Table 8** summarizes grant and NTM project contributions.

3d. Monitoring of Water Savings:

The District's monitoring plan (data to be collected) is outlined for each task in the Project Scope in Section 5.

4a. Identification of Entities Included in Education and Outreach:

Education and outreach for the various programs are described for each task in the Project Scope in Section 5.

4b. Identification of Project Goal and Target Audience:

One of NTM's goals is to reach all customer types during the implementation phase of the Water Conservation Plan. Specific goals and the target audience for the projects in this grant application are outlined for each task in the Project Scope in Section 5.

4c. Activities and tasks to be funded:

The specific activities and tasks to be funded are described in detail in the Project Scope in Section 5.

5. Project Scope:

PROJECT PURPOSE

In 2009 NTM developed a Water Conservation Plan to help manage current demands while ensuring the long-term reliability of its water supplies. NTM's Plan was designed to decrease total per capita water use (all treated water use in the District, not just residential) by an estimated 18% from the 2000 (pre-conservation) average of 259.5 gallons per capita per day (gpcd) to a sustainable 212.7 gpcd by 2015. This is a savings of 46.8 gpcd which, for a projected population of 12,941, equates to a total savings of 678 AF of water annually by 2015.

When selecting conservation programs and measures to include in the Plan, feasibility of implementation, costs, water savings potential, educational benefits, and best practices were all considered. The purpose of this grant application is to request financial support to enable NTM to initiate the implementation of three Water Conservation Plan components. Landscaping Regulations were selected for the one-time ability to have a lasting impact. The Sonic Leak Detection Program and Irrigation Audit Pilot Program were selected to enable the District to collect information to evaluate the programs and request ongoing support for them from NTM's Board of Directors. **The District estimates that the project components included in this grant application will result in approximate 14.7 acre-feet of conservation savings at the end of the grant period and 474.8 acre-feet in savings by build out around the year 2036. Additionally, as pilot programs are adopted as ongoing programs, which is NTM's hope, savings will increase substantially.** In addition to the items included in this grant application, NTM is also implementing other programs and measures in their Water Conservation Plan. NTM has also dedicated one staff member to implementing the Plan one day per week. Additionally, NTM bills all customers, with the exception of large volume users, on a quarterly basis. In 2011 NTM is initiating a pilot program to read all customer meters on a monthly basis. The purpose is to gather better baseline water use data and determine the staff time commitment required to read meters on a monthly rather than quarterly basis. Depending on findings, NTM may continue reading meters more frequently.

PROJECT

The following tasks, broken out by program, include sections describing goals and target audience, program description, work to be performed, responsible parties, deliverables and data to be collected for monitoring and evaluation purposes. A project schedule is provided in **Table 6**. Water savings estimates are provided in **Table 7** with water savings calculations and assumptions provided in **Attachment A**. **Table 9** provides a detailed budget by task including NTM materials, equipment, in-kind, and other contributions, which are also summarize in **Table 8**.

Task 1. Implement Sonic Leak Detection Program

Goal and Target Audience
The goal of this program is to initiate an ongoing sonic leak detection system for NTM's distribution system, designed to identify and fix system leaks, decreasing water losses. This program has the potential to result in significant water savings.

Description
A grant from the CWCB will be used to kick-off an ongoing leak detection system by testing approximately half of the oldest, cast-iron sections in the system. Currently NTM promptly repairs leaks in its system that it identifies visually. Other less obvious leaks may go unnoticed which can add up to significant water loss. NTM currently estimates "Unaccounted For" water, which includes leaks, to be about 6% of total water distributed annually. The Sonic Leak Detection Program will help the District better assess its system, identify problem areas, and determine how much loss is "real" rather than "apparent" (due to accounting and meter inaccuracies). NTM will hire a leak detection firm to test their system, starting with the oldest sections of its system that are most prone to breaks. NTM staff will repair any identified leaks. Results from this initial system survey will be used to develop an ongoing leak detection program schedule. If leaks are substantial, NTM anticipates surveying approximately 20% of their system annually. If leaks in the oldest sections of its system are minimal, NTM may decide to evaluate system sections slightly less frequently. NTM is also installing meters at their water treatment plant, including new manholes and SCADA communication. The District currently does not meter produced water but must calculate this value using several other metered values. The installation of the new meters will be important in helping NTM better quantify "Unaccounted For" water, some of which may be lost through leaks.

Work to be Performed, Responsible Parties and Budget Narrative
Sonic leak detection requires specific expertise and equipment. North Table Mountain's Acting District Engineer, Project Engineer and GIS Specialist will assess their system to identify the oldest sections of pipe to be surveyed. Survey sections will be reviewed and signed off on by the Acting District Engineer. This information will be provided to the sonic leak detection firm, which will survey the sections, with on the ground oversight by the Acting District and Project Engineers. NTM will likely hire Utility Technical Services, Inc. (UTS), which has experience working with other Colorado utilities, to complete the survey. Current estimates for the initial survey work, based upon similar work completed for other Front Range utilities is $10,700. UTS requires that a member of NTM's ground crew be present for the entire survey which is expected to take two weeks. The firm's report will be reviewed by NTM staff. Using survey results, NTM ground crews, under the supervision of NTM's engineering staff, will complete necessary repairs to sections of NTM's system where leaks are identified. NTM estimates the cost of repair materials to be $5,000, though the actual value of repairs will be adjusted based upon survey results. The cost to install two new meters to measure water leaving the treatment plant, including meters, manholes and SCADA communication is $5,000 per meter. UTS will also provide information regarding leaks on customer lines. NTM staff will contact customers and provide guidance on identifying and repairing leaks (at the customers cost). NTM staff will then develop an ongoing leak detection program schedule. Table Mountain Hydrology will provide assistance to NTM regarding grant reporting for this task.

Project Deliverables

- New water treatment plant meters
- Sonic leak detection survey report to NTM
- NTM documentation of repairs made
- Ongoing leak detection program schedule

Monitoring and Data Collection to Evaluate Program and Estimate Actual Water Savings
NTM will collect and evaluate the following data/information:

- Program costs and staff time;
- Sonic leak detection survey report;
- Maintenance/repairs made as a result; and
- Water savings estimates.

Task 2. Develop New Landscape Regulations

Goal and Target Audience
Regulations will apply to new Commercial, Industrial, Parks and HOA and larger Residential (greater than 4 homes) developments. The goal of these regulations is to improve irrigation water efficiency and reduce outdoor water use.

Description
NTM is developing two separate landscape regulations to reduce outdoor water use: a Soil Amendment Regulation and a New Development Common Area Landscape Regulation. *A grant from the CWCB would enable NTM to develop its landscaping regulations this spring. This would be extremely timely as it should allow NTM to enforce the regulations for three large new developments which are moving forward. According to the developers utility plans for each will be submitted to the District by this coming summer (2011).*

The District will draft a soil amendment regulation for new development similar to regulations which have been developed by several other Front Range water providers. Amending soil with organic matter helps soil take in and retain moisture in the plant root zone and provides needed nutrients in addition to other benefits. This can lead to a significant reduction in supplemental irrigation requirements but must be done prior to planting or seeding. The regulation will apply to new commercial, industrial, parks, HOA and larger residential (greater than 4 homes) developments. Typical soil amendment requirements range from 3 to 5 cubic yards of organic material per 1,000 square feet of landscaped area. Developers will likely be required to provide proof of purchase and delivery of soil amendment (including data indicating site volume requirements) to NTM prior to meter installation. The District will not install meters until this requirement has been met and staff have inspected sites for compliance.

In addition to the new Soil Amendment Regulation, NTM will develop common area landscape regulations for new developments. Regulations will require that landscape and irrigation systems for common areas are designed by certified, licensed or similarly qualified landscaping and irrigation professionals. A list of approved qualifications will be developed. The regulation will also establish annual supplemental irrigation (in excess of natural precipitation) specifications designed to provide developers with the flexibility to include higher water use turf areas by offsetting them with more water wise landscaping in other areas. Irrigation systems will need to be hydrozoned and have

smart controllers which meet required specifications (to be developed). Water for irrigation will need to be metered separately from other uses. The District will not install meters until landscaping and irrigation plans meeting specifications have been provided.

Work to be Performed, Responsible Parties and Budget Narrative
NTM will hire TMH to draft Soil Amendment and New Development Common Area Regulations. TMH will rely on best practices and similar regulations which have been implemented by other Front Range water providers. In addition to the regulations, TMH will develop corresponding informational materials explaining the purpose and development of the various components of the regulations. NTM's Acting District and Project Engineers will review and provide input on draft and final regulations, meeting with TMH as necessary. NTM's attorney will provide a review of the final regulations prior to NTM staff soliciting Board of Director's approval. Regulations will be added to NTM's Rules and Regulations and builder/developer specifications and packets. NTM's Project Engineer will develop materials with assistance from Administrative staff. TMH will also assist NTM in grant reporting for this task.

Project Deliverables
- New Soil Amendment Regulation incorporated into NTM's Rules and Regulations
- New Development Common Area Landscape Regulations incorporated in NTM's Rules and Regulations
- Supplemental Informational Materials for Builders and Developers

Monitoring and Data Collection to Evaluate Program and Estimate Actual Water Savings
NTM will collect and evaluate the following data/information:
- Program costs and staff time;
- For each development: soil amended acreage, common area acreage, number of residences, and residential irrigated area totals;
- Copies of approved landscape and irrigation plans;
- Developer/builder feedback;
- Visual site inspection data: date, location, non-compliance issues, follow-up; and
- Metered water use and savings estimates.

Due to timing, underlined data will be collected outside of the grant reporting period. As a result, NTM will report on landscape regulation water savings in their 2016 Water Conservation Plan update.

Task 3. Implement Irrigation Audit Pilot Program (2 year pilot)

Goal and Target Audience
This program will be aimed at customers with high outdoor water use, including Residential, Commercial, Parks and HOA customers. The goal of the program is to work with customers who have high water outdoor water use, educating them, and providing technical resources to help decrease irrigation water use.

Description
NTM knows that some of its customers use significantly more water outdoors than is necessary to maintain their landscaping. To address this they will contract with the Center for Resource Conservation (CRC) to provide irrigation audits through the Slow the Flow Colorado program. The CRC contracts with municipalities and water utilities to

provide outdoor audits to customers, assessing irrigation system efficiency, developing watering schedules, and reviewing maintenance needs. NTM will develop a voluntary two year (2011 - 2012) pilot program targeted at specific users with high outdoor water use, including residential, commercial, parks and HOA customers. It is anticipated that five residential and five large audits will be completed over the pilot program period

Work to be Performed, Responsible Parties and Budget Narrative
NTM will contract with the CRC to provide a total of five residential and five large irrigation audits in 2011 and 2012. NTM's Project Engineer and GIS Specialist, with assistance from administrative (billing/records) staff, will evaluate Residential, Commercial, Parks, and HOA customer accounts for high outdoor water use. Accounts with high use will be compared to GIS coverage of irrigated areas to select five residential and five large area customers with high water use to be audited. NTM's Acting District Engineer will review and sign off on customer selection. NTM's Project Engineer will then work with CRC staff to contact selected customers and offer them free audits and required customer commitments (present during audit, willing to make irrigation modifications, etc). The CRC's 2011 costs for residential audits are $107 each and large area audit average $1,440 each. Because some audits are anticipated to be completed in 2012, to cover likely cost increases, $110 per residential and $1,480 per large area audit is assumed in the budget. Once customers have been selected for participation in the program, the CRC will work with them to complete the audits. The CRC will provide a report with recommendations to each customer and NTM. NTM's Project Engineer will oversee some of the audits, review reports and work with customers to encourage modifications (at customers' cost). NTM's Project Engineer, with assistance from administrative (billing/records) staff, will monitor customer water use to determine changes in water use. TMH will develop a list of recommended landscaping and irrigation professionals/certifications which NTM will provide to project participants. TMH will also assist NTM in grant reporting for this task.

Project Deliverables
- Five residential and five large area audits
- CRC final report
- List of recommended landscaping and irrigation professionals/certifications

Monitoring and Data Collection to Evaluate Program and Estimate Actual Water Savings
NTM will collect and evaluate the following data/information:
- Program costs and NTM staff time;
- Number and type of audits;
- Report from CRC including findings and recommended modifications;
- Customer response and feedback;
- Metered water use; and
- Water savings estimates.

Underlined data will begin to be collected during the grant period, with additional data and data analysis occurring outside the grant reporting period. Baseline data collection will occur prior to and during the grant reporting period but additional time will be needed for customers to make modifications and for NTM to collect sufficient data to evaluate water savings. NTM will report on actual irrigation audit water savings in their 2016 Water Conservation Plan update.

Table 6: Project Schedule by Task

Task #	Task Description[1]	2011												2012											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.	Implement Sonic Leak Detection Program																								
2.	Develop and Implement New Landscape Regulations																								
3.	Implement Irrigation Audit Pilot Program (2 year pilot)																								
	50% Progress Report																								
	75% Progress Report																								
	Final Report																								

Table 7: Estimated Annual Water Savings by Task

Task	Estimated Annual Water Savings			
	As a Result of Grant Activities		Compounded at Build Out[1]	
	(gal/yr)	(AF/yr)	(gal/yr)	(AF/yr)
1. Implement Sonic Leak Detection Program	562,275	1.7	562,275	1.7
2. Develop Landscape Regulations	3,535,297	10.8	153,448,538	470.9
3. Implement Irrigation Audit Pilot Program	704,401	2.2	704,401	2.2
TOTAL	4,801,973	14.7	154,715,213	474.8

[1] Water savings estimates are based only on the number of units identified in this grant application. For example, estimated savings from the sonic leak detection program are only for the initial survey funded by the grant. Irrigation Audit savings are only for the 5 residential and 5 large area audits included in this application. Additional savings beyond the scope of this grant, which are not included in the table above, will be realized as more sections of NTM's system are surveyed and repaired and as additional irrigation audits are offered. Savings resulting from the new Landscape Regulations will continue to compound benefits over time as the regulations are enforced.

6. Project Budget and Funding sources:

Table 8 summarizes the total project budget, grant request and NTM's contribution. A detailed project budget, broken down by tasks, identifying costs associated with each project including labor hours and costs (in-kind and cash) is provided in **Table 9**.

The total project budget, including NTM staff time is estimated at $64,564. NTM's contribution is $39,194 which is a 61% match. $15,730 of NTM's contribution is in the form of materials, equipment, attorney fees and printing. The total value of NTM's in-kind staff time contribution is $23,464. We are requesting a grant from the CWCB for $25,370 to cover the remainder of the project budget.

Table 8: NTM Water Conservation Plan Project Funding Sources

Total Project Budget	$64,564
Total NTM Contribution	$39,194
Percentage of Total Project Budget	61%
CWCB Grant Requested	$25,370

Table 9: Water Efficiency Grant Project Budget Including NTM Cash and In-Kind Contributions

Task #	Task Description	Contractor/Consultant			North Table Mountain Water and Sanitation District Project Contributions								TOTAL Task Cost[2] ($)	GRANT REQUEST	NTM's Total Contrib. (cash and in-kind)
					Cash (Materials Equip & Atty Fees)[3]	NTM In-Kind[4]									
		Cnslt[1]	Hours	Total Fee[2]		Acting District Mgr/Eng ($125/hr)	Proj Mgr/Eng ($125/hr)	GIS Spec ($75/hr)	Ground Crew ($45/hr)	Admin Staff ($45/hr)	Brd of Dir[5]	TOTAL In-Kind Value			
1	Sonic Leak Detection Program	UTS		$10,700	$15,000	6	30	12	200			$14,400	$40,340	$10,940	$29,400
		TMH	2 @ $120	$240											
2	Landscaping Regulations	TMN	50 @ $120	$6,000	$730	12	25			8	10	$4,689	$11,419	$6,000	$5,419
3	Irrigation Audit Pilot Program	CRC		$7,950	$0	6	20	12		5		$4,375	$12,805	$8,430	$4,375
		TMH	4 @ $120	$480											
												TOTALS	**$64,564**	**$25,370**	**$39,194**
												NTM Contribution (% of Total Costs)			**61%**

[1] UTS = Utility Technical Services, TMH = Table Mountain Hydrology, CRC = Center for Resource Conservation
[2] The CRC's 2011 costs for residential audits are $107 each and large area audit average $1,440 each. Because some audits are anticipated to be completed in 2012, to cover likely cost increases, $110 per residential and $1,480 per large area audit his used in this budget.
[3] Task 1 includes two new meters installed at the water treatment plant (meters, manholes and SCADA communication @ $5,000 per meter) and materials and equipment to repair leaks identified during the sonic leak detection survey (estimated at $5,000). Task 2 includes 4 hours of attorney fees and printing.
[4] NTM staff billing rates are from the District's Rules and Regulations and are based on the true cost of employees including benefits.
[5] Time is total for five board members. No monetary value is included in cost estimate for board members' time.

Summary

Recent dry periods combined with Colorado's growing population stress the importance of efficient water use in the State. North Table Mountain Water and Sanitation District is committed to the efficient use of water within its service area. The District currently has several conservation measures in place and is in the process of implementing others. NTM is a smaller water District with limited funding and resources and is asking CWCB for assistance in initiating their water conservation efforts. NTM is committed to doing their part by dedicating materials, equipment, staff and other resources. NTM will use the requested grant funding to execute the projects outlined in this application which are from their comprehensive Water Conservation Plan submitted to and approved by CWCB's Office of Water Conservation and Drought Planning.

7. SIGNATURE BLOCK

Provided on page 1.

Attachments

Attachment A – Water Conservation Savings Details

Attachment A
Water Conservation Program Savings Details

This attachment provides a narrative of how water savings were calculated for the programs in NTM's Water Efficiency Grant Application. Water savings are estimates based upon available data, specific to NTM's service area and customers where possible. Many of the water savings estimates below are preliminary. Based upon the assumptions used, the District believes the savings it has estimated are realistic and may be on the conservative (low) side. As programs are implemented, the District will collect data to better quantify water savings. Annual savings described below are those associated with one year once the program component has been fully implemented and also at build out. The average number of people per household in NTM's service area is estimated to be 2.62. Population projections and average NTM-specific customer water use are taken from NTM's Water Conservation Plan.

Task 1. Initiate Sonic Leak Detection Program

It is difficult to quantify water savings resulting from this program at this time. Additional data collection will help with this in the future. Utilities surveyed for a CWCB funded review of water loss practices and requirements (Aquacraft, 2009) reported losses (or non-revenue water) of between 2 and 12%. According to the State of California's Department of Water Resources (California DWR, 2009) "A detailed water audit and leak detection program of 47 California water utilities found an average loss of 10 percent and a range of 30 percent to less than 5 percent of the total water supplied by the utilities." In the United Kingdom (UK) (which has been on the forefront of collecting leak detection and repair data) for the 2002 through 2003 period, leakage was estimated at an average of 23 percent of total water produced (AWWA, 2006). Because NTM has historically repaired only obvious leaks, potential savings for a proactive leak detection program are unknown. For preliminary estimates, if it is assumed that NTM detecting and repairing leaks will decrease annual Unaccounted For water (using the 2006 – 2007 average of 66,227,476 gallons) by 1%, this program will result in an annual savings of approximately 562,275 gallons. It may be a conservative estimate as it is much lower than average percent of water lost to leaks and is based on Unaccounted For water only rather than total water distributed. Also NTM is starting with the oldest section of their system where leaks are more likely to exist.

Task 2. New Landscape Regulations

Two different landscape regulations will be developed, a Soil Amendment Regulation and a New Development Common Area Regulation. Water savings calculations for each are described below.

<u>Soil Amendment Regulation</u>

Properly amended soil is considered an extremely important component to ensuring healthy landscapes and decreasing irrigation water needs. GreenCO's Executive Director has stated that soil amendments are key to outdoor water conservation (GreenCO, personal communication). However water savings resulting from soil amendments have not been well established. According to Denver Water (Denver Water, 2008), soil amendments applied in conjunction with applying low-water plants and trees and customer education, can decrease outdoor water use by 30 to 40 percent. According to the CSU Extension Service (CSU, 2007) "Proper irrigation practices can lead to a 30 to 80 percent water savings around the home grounds." This grant application estimates a 20% decrease in outdoor residential use for new development resulting from the Soil Amendment Regulation. This would be an average savings of 16,617.26 gal/yr/residence. Applying this to the 162 new residential accounts expected in 2011, would result in a total annual savings of 2,695,548 gallons. Assuming an additional 7,041 homes at build out, this would result in an annual savings of 116,999,450 gallons. New Development Common Area savings resulting from soil amendments are included under "New Development Common Area Landscape Regulations" below so are not included in the savings presented here. These calculations only consider residential lots.

New Development Common Area Landscaping Regulations

Jefferson County Land Development Regulations require that 10.5 acres be set aside for parks – including HOA common areas - for every 1,000 people (Jeffco, 2005). If it is assumed that 60% of park areas are irrigated, this results in a requirement of 6.3 acres of irrigated park area for every 1,000 people. An analysis of water use for several existing HOAs in NTM's service area found that average water use is 23.2 gal/ft2/yr for irrigated public areas. While NTM will develop the specifics of landscaping regulations under this grant, the preliminary concept entails limiting supplemental (in additional to natural precipitation) irrigation requirements to a maximum of 16 gal/ft2/yr. This would result in a savings of 7.2 gal/ft2/yr. Assuming an additional 4.5 acres of parks by the end of 2011, 2.7 acres (or 116,632 ft2) of which would be irrigated (assuming 60% of park area is irrigated). Applying a savings of 7.2 gal/ft2 to this area would result in an annual savings of 839,750 gallons. Assuming 116 acres (or 5,062,373 ft2) of new irrigated park at build out would result in an annual savings of 36,449,088 gallons.

Total annual savings for landscape regulations (soil amendments and new development common area regulations) are estimated at 3,535,297 gallons/yr at the end of the initial implementation period and at 153,448,538 gallons/yr at build out.

Task 3. Implement Irrigation Audit Pilot Program (2 year pilot)

Five residential and five large (most likely HOA) audits will be completed. According to the CSU Extension Service (CSU, 2007) "Proper irrigation practices can lead to a 30 to 80 percent water savings around the home grounds." If each audited residence decreases their outdoor water use (from the 2006 -2007 average of 83,086 gal) by 10% that will result in an annual savings of 8,309 gal/household. For five participants, this totals 41,543 gal/year water savings. Actual residential savings may be higher because customers using the most outdoor use will be targeted for audits. On average HOA irrigation accounts in NTM's service area use 1,325,715 gallons/account/year (2006 – 2007 average). If audited accounts decrease their total water use by 10%, this would result in an annual savings of 132,572 gallons. For five audits, the total savings would be 662,858 gallons. NTM believes this is a reasonable estimate knowing that several HOAs have been concerned about their water use and are interested in improving their systems. Total annual savings for the rebate pilot program are estimated at 704,401gallons.

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