Statement of Work

WATER ACTIVITY NAME - DCWRA Rotary Sprinkler Nozzle Retrofit

GRANT RECIPIENT – Douglas County Water Resource Authority

FUNDING SOURCE - Statewide Account, Plus 35% in Local Matching Funds

INTRODUCTION AND BACKGROUND
Provide a brief description of the project. (Please limit to no more than 200 words; this will be used to inform reviewers and the public about your proposal)

OBJECTIVES
a) Install (retrofit) +/- 20,000 rotary sprinkler nozzles in 1,000 yards. b) Outreach to the public to create excitement about the jobs available to high school students, and the water and money saved by retrofitting rotary sprinkler nozzles in the region so as to promote a groundswell of voluntary retrofits over and above the program. c) Collect impact metrics to affirm the reduction in water demands attributed to the retrofit project. d) Share this information with other water entities around the State of Colorado.

TASKS
Provide a detailed description of each task using the following format

TASK 1 – Plan Project, recruit student installers, recruit supervisors of students, recruit 1,000 yards, secure 20,000 rotary sprinkler nozzles at advantageous pricing.

Description of Task - Identify high school students who will work over their summer break to retrofit rotary sprinkler nozzles, as well as supervisors who will direct the effort of each high school crew, advertize the availability of the program to 1,000 yards that may be interested in the water activity, and competitively bid out +/- 20,000 rotary sprinkler nozzles form various manufacturers and distributors.

Method/Procedure -

Task 2.a. **Select and hire students to conduct work:** Announce the opportunity for summer jobs to high school students through the DCWRA Water Ambassador program and associated E-mail lists, by placing posters printed with DCWRA wide format printer in the halls of the high schools, using DCWRA's FaceBook page, as well as www.DCWater.org. After informational meetings are held, applications will be accepted and screened. Interviews will follow. Hiring will be based upon interest and willingness to commit to the program, as well as ability to meet transportation requirements.

Task 2.b. **Select contractor to supervise and train students:** Consult with the Center for Resource Conservation, and other similar organizations to assess their interest in training students and securing crews to supervise the students work, and to reset the irrigation controllers.

Task 2.c. **Select supplier of sprinkler heads:** Solicit bids from manufacturers to supply the rotary sprinkler nozzles for the program, in association with local distributors or retailers (Ewing, Home Depot, Lowe's, etc.)

Task 2.d. **Select participating DCWRA members and homeowners:**

a. DCWRA will demonstrate specific support by its members in the way of letters of interest prior to allowing any such member to participate in the program. Participants will pledge to share data with DCWRA that will be used in measuring results of the retrofit program. Failure to pledge to share this data will cause any such entity to be excluded from the project. For the pilot program five of DCWRA members participated. While others did express interest, it was not thought efficient to ask any entity to gear up to only participate in four or five retrofits. DCWRA members did fund 1,750 television ads in 2010 geomarketed into the project area. Print ads and on-line ads further touted available rebates. There are 109,000 target yards in the project area.

b. Homes will be selected on a first come, first serve basis for each provider. This is done with the following criteria: Participating DCWRA member entities will publish the opportunity in their existing communications framework at the same time, a few days ahead of the opportunity being made available. DCWRA communications channels will also be mobilized. At date and time certain, E-mails and telephone calls from interested citizens will begin to be logged in the order received. An autoreply E-mail or voice mail will advise citizens there will be a follow-up contact to schedule the retrofit. Such contacts will be made in a rigorous and orderly fashion. This process will be repeated if necessary to schedule all retrofits.

NOTE: While all members of DCWRA will be encouraged to participate, if only one small member participates we would not have any trouble finding 1,000 yards to retrofit. We are looking to include less than 1% of the yards in the region in the retrofit project. The retrofits in the pilot sold out literally within minutes, so we are confident that we will have excellent participation not just from members, but from the public. The Xeriscape DVD project DCWRA partnered with CWCB to distribute set a real tone for water conservation in the project area that continues to this day. 48% of the population watched that DVD and expressed a desire to implement water saving strategies in their own yards. We are excited to now have this opportunity to take next steps with CWCB.

Task 2.e. **Train students to conduct work:** The training will mirror the program followed in the pilot program, and include a job skills session, an in-room session on objectives of water efficiency planning, and on-site efforts with experienced professionals. After a job skills session, students will receive classroom training on water efficiency and the thrust of this program. After the class room session students will be trained on-site by experienced professionals in how to retrofit the nozzles, and how to communicate with homeowners on proper operation of the irrigation system.

Task 2.f. **Continue Marketing Program:** DCWRA is likely a leader in the state in working with high school students on water issues through its Water Ambassador program. This program was piloted in one high school three years ago. It grew to four high schools the second year. It expanded to every high school in the project area in the third year. DCWRA has authorized the program to continue in every high school in the project area in 2011. DCWRA has funded 100% of this work. The program calls for the high school students to go into elementary schools to teach fourth graders about water and conservation. We're always looking for ways to add value

to the experience of the high school students. By the summer of 2011, approximately 1,000 students will have participated in the DCWRA Water Ambassador program at the high school level, and we're looking to hire as many as sixty students to participate in the rotary sprinkler nozzle program, or 6% of these students. We'll likely open up the opportunity to all high school students, so we're looking for 60 students out of 10,000. We do have liability insurance in place, and like the liability insurance, we can purchase Workers Compensation insurance through the Special District Association of Colorado if necessary. For the pilot program the students were employees of Arapahoe Douglas Works!, and thereby of Arapahoe County. A/D Works! provided the insurance coverage for the students in the pilot program. We have flexibility on this issue. The partnership with A/D Works! grew out of the "Get In To Water" efforts that came out of the American Waterworks Association, and consultant Melanie Fahrenbruch. We would like to support students to become interested in careers in water, including working in water plants and jobs in water works. The summer rotary sprinkler nozzle retrofit program can be a first step in piquing such career interest amongst Douglas County High School students. We currently are using a Facebook page to try to market directly to the high school students. We feature banners with our Facebook address in the outfield of their baseball diamonds. Our partners at the school district have offered to allow us to post our banners in all the schools at no cost. The opportunity for summer jobs will be of interest to these high school students, and we want to alert them early so that we can line up students who are best fits for this type of work. Part of our thrust of outreach is to communicate the message that water efficiency can be easy. We're meeting with the Girls Scouts to put on a program where we remind them to turn the water off while they brush their teeth. We have a YouTube video of a fourth grader changing out a leaky flapper on a toilet. She looks in the camera and says, "If I can do it, you can do it too!" And if high school students can retrofit rotary sprinkler nozzles, "you can do it too!"

Deliverables and Outcomes:

1. Advertising materials alerting students of the summer jobs,
2. Letters describing indications of interest from the supervisory entities and selection of appropriate vendor(s)
3. Notices of RFQ or RFP to supply the rotary nozzles and selection of appropriate vendor(s),
4. Cadre of approximately sixty high school students and college-aged supervisors ready to be trained and conduct retrofits.
5. Training, consisting of jobs skills session, classroom session on water efficiency and thrust of program, on-site retrofit training, and communications with homeowners.

TASK 2 – Retrofit Rotary Sprinkler Nozzles in 1,000 yards in project area

Description of Task - Crews of high school students will assemble at a yard to be retrofitted, perform the retrofit, adjust sprinkler nozzles, and reset the irrigation controller. The crews will be supervised by trainers selected in Task 1. The first consideration in determining correct-sized sprinkler is to review designs as they vary by manufacturer. DCWRA will bid out the nozzles. That being said, most all models of nozzles vary the throw of the stream of water, that is how far the water streams out from the nozzle. That setting is adjusted on location with a screw driver once the nozzle is in the

ground and water is streaming out. With old designs, such as impact rotor heads, it was desirable to design for head to head spacing to provide for overlaps. This is no longer deemed necessary design with the rotary nozzles. Water pressures will vary from yard to yard. The rotary sprinkler nozzles are designed to function within a rather wide tolerance of working pressures. If the homes where the retrofits occur have pressure reducing devices installed in compliance with prevailing building codes, the water pressure at the nozzle is adequate to the irrigation task at hand. Virtually every location in the project area is subject to these building codes, and pressure reducing devices are installed in all locations. How much water is projected from the rotary sprinkler nozzles, as well as how far the water streams out, will vary with water pressure. Length of watering cycles may be adjusted for these differences in working pressures, and all clocks and controllers are readjusted by the students and their supervisors to appropriate parameters for rotary nozzles. Some models of nozzles have ranges that shoot further than others, a small/medium/large type of offering. In the project area most nozzle requirements are in the small range with a few medium size heads. Further, some manufacturer provide for variation in the arc of the stream, while others are manufactured in certain patterns, such as 45 degrees, 90 degrees, etc. It is important to not mix and match models from various manufacturers, or new and old designs, as product have specific application rates. Uniform application rates should be used across zones, if not entire projects. The students arrive on location with tackle boxes filled with nozzle parts. They select the parts needed to perform the retrofit on the specific yard, with assistance from the college aged supervisors, who are experienced in auditing water efficiency. It is important to note these are retrofits and not initial pristine installations. Even with pristine installations, audits that report efficiencies over 70% are deemed excellent. If a potential customer expects to receive a brand new sprinkler system for free, we politely inform them the needs for their yards are beyond the scope of retrofit, thank them for their time, leave them some educational resource material, and move on the next location. The moments for educational content with all homeowners is well spent.

Method/Procedure:

Task 2.a. Assess needs of yard: Upon arriving yard, crew looks for biggest issues first, and identifies any disqualifying factors (such as grossly dilapidated system). Crew is then deployed to begin efficient retrofit process**.**

Task 2.b. Complete Sprinkler Retrofit: Students will physically remove existing sprinkler heads and replace those heads with rotary sprinkler nozzles. Sprinkler timers will be adjusted to meet the needs of the newly installed sprinkler heads.

Task 2.c. Complete necessary paperwork: Students will fill out forms detailing the work performed. The adults will complete the forms to confirm that the work was done. The completed paperwork will be turned in.

Task 2.d. Educate homeowner: Each homeowner will receive valuable training on what has occurred, and specifically how to best operate the irrigation system on a go-forward basis to achieve efficient operation of the retrofitted system. This will include setting expectations for how much water will be used with the rotary nozzles, and how to adjust the clock with changing weather conditions so as to properly irrigate the turf without overwatering. We appreciate these few minutes with the homeowner are critical education opportunities.

Deliverable - Reports summarizing works performed will be submitted to CWCB for reimbursement on a weekly basis. We will need to be able to facilitate this funding so that the workers are paid on time.

TASK 3 – Assemble and Report Impact Metrics of Retrofit Project

Description of Task - Collate the reports of installation and distribute them to the respective water providers in the project area. Ask the water providers to report the changes in water demand in those homes receiving the retrofits, as compared with a control group that does not receive the retrofits. (This will help factor our changes in cool wet summer vs hot dry summer conditions that may occur during the project horizon.) DCWRA will pursue a robust evaluation plan. Water savings will be evaluated by comparing year over year (yr/yr) water use in the yards included in the retrofit project, adjusted for observed ET within the project area. 2011 will be the year for retrofit of the rotary sprinkler nozzles. Data for comparison of water savings purposes will be collected in October 2012 for water meter reads coming closest to the irrigation season from May 1st 2012 to September 30th 2012. A report can be pulled together and distributed in the +/- November 2012 time frame. The 2012 irrigation season water use will be compared with prior years data to produce yr/yr comparisons. Participants will be asked if they have recently installed some other water efficiency product, such as toilets or washing machines. We will not ask personal questions, such as if their uncle died recently, or if they feel they use the bathroom less often than they used to. While some participants could answer dishonestly, with 1,000 retrofits such outlying results will be smoothed to illustrate prevailing trends. Partners in the project, or participants, will be required to share their monthly meter reads. Such data is commonly collected electronically and results made available in electronic form, frequently to users by way of websites. Several weather stations now exist in the area, and those stations record ET. In this way Yr/Yr ET data can be utilized to produce "apples to apples" water use comparisons, adjusting for cool wet summer/hot dry summer conditions. Further, neighboring yards, as well as yards located across the street from participants in the retrofit project, can be sampled to further A/B compare water use, and to adjust for any anomalies caused by microclimates within the project area. A sample of neighboring yards, as a "control group", can be measured to see how much water usage varied yr/yr within the control group without the benefit of retrofits. These findings can be used to further glean the water savings produced by the rotary nozzle retrofit project. This size data set and this type of data is missing from many conservation efforts, and we are excited to partner with CWCB to be able to measure and share these results.

Method/Procedure - Water providers will be asked to agree to share such information on their customers before being included into the project. Property owners benefitting from the retrofits will sign a statement authorizing the water provider to share this data for purposes of DCWRA data collection and reporting. Water providers will share this data with DCWRA in the five months of May to September, in 2011 and 2012.

Deliverable - DCWRA will supply annual summaries (11/11, 11/12, and final report 6/13) to CWCB.

REPORTING AND FINAL DELIVERABLE

Reporting: DCWRA shall provide the CWCB a progress report every 6 months, beginning from the date of the executed contract. The progress report shall describe the completion or partial completion of the tasks identified in the statement of work including a description of any major issues that have occurred and any corrective action taken to address these issues. DCWRA will share with CWCB staff what lessons gleaned from the 50-home pilot will be utilized in the 1,000 yard retrofit project for 2011. DCWRA will share copies of customer satisfaction reports and/or other meaningful impact metrics once those documents are compiled and made available to DCWRA by its pilot project vendor. We look forward to a good working relationship with CWCB in developing a robust program. It's really great that we're getting to partner and work together on this project! DCWRA will share with CWCB staff the training program that will be designed for high school students. DCWRA would love to hear CWCB staff suggestions for how to improve the program! DCWRA will exercise equal or better care than was evidenced in the design of the training program used in the pilot program. The pilot program featured jobs training from the staff at Arapahoe/Douglas Works! job center so that students learned what was expected of them in this job, and what types of behavior were acceptable and unacceptable. After that generic jobs training, a professional landscape designer with a specialization in water efficiency educated students in a classroom setting about appropriate irrigation system design principles. Explanations included the fact that every installation is imperfect, and how the biggest problems areas can be quickly identified for every irrigation project. Representatives from the rotary nozzle manufacturers then explained to the students the water efficiencies produced by nozzles over traditional designs, and elements of appropriate installation of their products so as to achieve optimum efficiencies. Water conservation professionals working in the project area then described to the students why water conservation is important in the project area, though only one element of a sustainable water future. These professionals then all assembled on-site to perform the initial hands-on installations with the students in participant yards. Every student demonstrated the ability to understand and perform the training in the field at a yard. College age supervisors with experience with auditing irrigation systems then further assisted the students with the lessons of this training, and with carrying out the retrofits throughout the pilot program. DCWRA represents to CWCB that this training is fully and comprehensively adequate to the task at hand.

Final Deliverable: At completion of the project, DCWRA shall provide the CWCB a final report that summarizes the project and documents how the project was completed. This report may contain photographs, summaries of meetings and engineering reports/designs.

BUDGET

Provide a detailed budget by task including number of hours and rates for labor and unit costs for other direct costs (i.e. mileage, $/unit of material for construction, etc.). A detailed and perfectly balanced budget that shows all costs is required for the State's contracting and purchase order processes. Sample budget tables are provided below. Please note that these budget tables are examples and will need to be adapted to fit each individual application. Tasks should correspond to the tasks described above.

DCWRA 2011 Rotary Sprinkler Nozzle Retrofit

	Total Costs ($)				
	Labor	Other Direct Costs	DCWRA Matching Funds (cash and In-kind)	WSRA Funds	Total Project Costs
Task 1 - Plan Project	15833	727	25000 ($5k cash)	16560	41560
Task 2 - Retrofit Nozzles	167245	49631	40000 (all cash)	216876	256876
Task 3 - Report Project Results	15836	728	22500 ($5k cash)	16564	39064
Total Costs:	198914	51086	87500	250000	337500

Job Titles

Example Project Personnel:	Project Manager	High School Installers	Supervisors	Outreach	Admin		Total Costs
Hourly Rate:	175	7.28	20	125	65		
Task 1 -Plan	6666	500	2000	7333	30166		46665
Task 2 -Install	6666	81536	56000	7333	5166		156701
Task 3 - Report	6668	13877	3485	7334	5168		36532
Total Hours:	114	13174	3074	176	623		
Cost:	20000	95913	61485	22000	40500		239898

Other Direct Costs						
Item:	Nozzles	Parts	Supplies	Transportation Vouchers		Total
Units:	20000	1	1	448		
Unit Cost:	4	11500	1622	10		
Task 1 - Plan			541			541
Task 2 - Install	80000	11500	541	4480		96521
Task 3 - Report			540			540
Total Units:	20000	1	1	448		
Total Cost:	80000	11500	1622	4480		97602

In-Kind Contributions (Included in Match)				
Project Personnel: Hourly Rate:				Total
Task 1 - Project Mgr	57	$175		$10,000
Task 2 -Collate Data	500	$25		$12,500
Total Hours:	557			
Total Cost:	$22,500			

Notes:

High School Students installer costs are 56 students, twenty-five hours per, eight weeks, $7.28 per hour.
Supervisor costs are 14 supervisors, twenty-five hours per week, eight weeks, $20 per hour.
Nozzles sells for $4.72 at retail. Estimated price is $4 if 100,000 nozzles purchased in bulk.
$4480 for gasoline vouchers is for high school students, $10 per week, 8 weeks
Administration includes $3500 legal, $5500 accounting and general administration, $7,000 insurance
Outreach is $10,000 television, $8,000 print and on-line, $4,000 for posters, FaceBook, and local media
$11,500 spare parts is fittings to connect sprinkler nozzles, repair breaks caused by installation
In-kind time reports water use vs control group twice, once in 2011 and once in 2012, 15 minutes per yard

SCHEDULE

Provide a project schedule including key milestones for each task and the completion dates or time period from the Notice to Proceed (NTP). This dating method allows flexibility in the event of potential delays from the procurement process. Sample schedules are provided below. Please note that these schedules are examples and will need to be adapted to fit each individual application.

Example 1

Task	Start Date	Finish Date
1a - Planning	NTP = 11/15/2010	2/15/2011
1b - Contracting	2/16/2011	5/15/2011
2 - Install	6/1/2011	8/15/2011
3a - Collate Data	6/8/2011	10/15/2011
3b - Report 11	10/15/2011	11/15/2011
3c - Report 12	10/15/2012	11/15/2012
3d- Final Report	10/15/2012	06/30/2013

Note: Most work performed in 2011, save for collating water usage data at end of 2012 irrigation season.

PAYMENT

Payment will be made based on actual expenditures and invoicing by the applicant. Invoices from any other entity (i.e. subcontractors) cannot be processed by the State. The request for payment must include a description of the work accomplished by major task, and estimate of the percent completion for individual tasks and the entire water activity in relation to the percentage of budget spent, identification of any major issues and proposed or implemented corrective actions. The last 5 percent of the entire water activity budget will be withheld until final project/water activity documentation is completed. All products, data and information developed as a result of this grant must be provided to the CWCB in hard copy and electronic format as part of the project documentation. This information will in turn be made widely available to Basin Roundtables and the general public and help promote the development of a common technical platform.

The above statements are true to the best of my knowledge:

Signature of Applicant:

Print Applicant's Name: Douglas County Water Resource Authority

Project Title: DCWRA Rotary Sprinkler Nozzle Retrofit

Return this application to:

Mr. Todd Doherty
Intrastate Water Management and Development Section
COLORADO WATER CONSERVATION BOARD
1580 Logan Street, Suite 200
Denver, CO 80203

To submit applications by Email, send to: todd.doherty@state.co.us