GRANT APPLICATION

Develop and Implement Water Conservation Measures At Major Choctaw and Chickasaw Facilities

Submitted to:

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

Funding Opportunity
Announcement No. R16-FOA-DO-004

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The Choctaw Nation

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TECHNICAL PROPOSAL AND EVALUATION CRITERIA

The Choctaw Nation of Oklahoma is pleased to submit this application for grant funding under the U.S. Department of Interior, Bureau of Reclamation (Reclamation) Water and Energy Efficiency Grants (WEEG) for FY 2016. Consistent with the application content requirements, as specified in Funding Opportunity Announcement (FOA) No. R16-FOA-DO-004, this portion of the application includes an executive summary, background data, technical project description, response to evaluation criteria, and performance measures.

EXECUTIVE SUMMARY

The U.S. Department of the Interior's WaterSMART (Sustain and Manage America's Resources for Tomorrow) Grant Program establishes a framework to provide Federal leadership and assistance for the efficient use of water; integrating water and energy policies to support the sustainable use of all natural resources; forming strong, diverse partnerships with states, tribes, and local entities; and coordinating with other agencies on water conservation activities. The WEEG contributes to the WaterSMART strategy by providing funding to water suppliers to encourage implementation of local solutions to address their water management needs. The purpose of the WEEG is to improve water efficiency, encourage the use of renewable energy and increase water reliability through conservation efforts in the management of local water supplies. Consistent with this purpose, the Choctaw Nation is submitting this application for grant funding to implement water conservation measures at their largest facilities. The application information specified in Reclamation's FOA is below.

Date: January 20, 2016

Applicant Name, City, County, and State:

The Choctaw Nation
City of Durant
Bryan County
State of Oklahoma

Project Summary: Under the leadership of the Choctaw Nation, both the Choctaw and Chickasaw Nations (Nations or Tribes) will work collaboratively to develop and implement water conservation measures at their six (6) largest casino facilities. Both the Choctaw and Chickasaw Nations are Federally recognized Indian Tribes. The Nations' territory covers a 22

county area in the Southeast portion of Oklahoma. The facilities included as part of this study are located as shown in **Figure 1** within the Nation's boundaries. Grant funds will be used to develop and evaluate specific strategies for water conservation and increasing energy efficiency at each identified facility owned and operated by the Tribes. Specific strategies, which may be different at different facilities, will be implemented based on criteria including, but not limited to cost-benefit analysis, ease of implementation, greatest overall impact considering energy efficiency, impacts to water supply systems (water marketing), impacts to the environment, ability to measure performance and overall sustainability. Due to the sheer size of these facilities and the water and energy required to operate them, significant impact can be realized with the implementation of a few focused strategies.

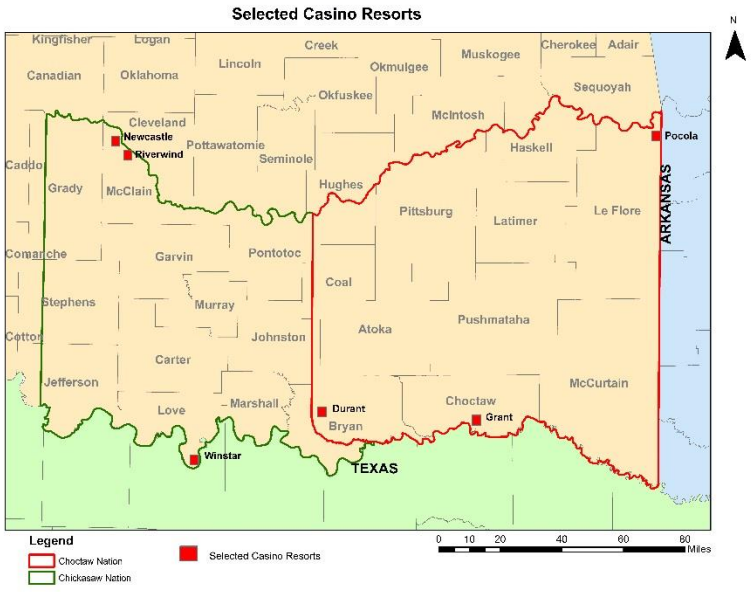


Figure 1 – Project Facility Locations

The Water Conservation Measures Project (Project) will accomplish the goals of this FOA by generating direct water savings, increasing water and energy efficiency and extending regional water supplies. The Project has an estimated duration of 24 months. No portion of the Project is located on Federal facilities.

BACKGROUND DATA

The Nations provide significant economic and social impact to the communities located within their sovereign territory as part of maintaining and promoting their cultural heritage and history. The Nations encourage and support infrastructure for strong business ventures and an advanced tribal economy. This has taken the form of supporting local communities through projects associated with housing, medical centers, casinos and resorts, tourism, roads and water resources.

Commercial and institutional buildings use a large portion of municipally supplied water in the United States.[1] Because these types of facilities are the major users of water and power in their local communities, improvements in water and power efficiency can make significant impact to the long-term viability and sustainability of these resources. Therefore, improvements identified and implemented as part of this project can result is substantial savings for the Tribes and the local communities. Additional benefits result from the water and energy providers being able to serve additional customers with the water and power resources conserved. This is the goal of the project.

Choctaw Nation Facilities

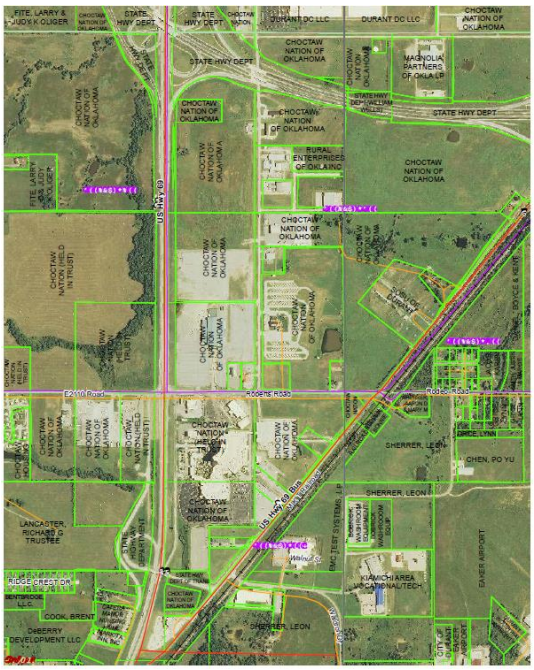
The three (3) facilities owned and operated by the Choctaw Nation include:

- Choctaw Casino Resort – Durant
- Choctaw Casino Hotel – Pocola
- Choctaw Casino Resort – Grant

The specific location of each facility is shown on **Figure 1**. The following subsections provide descriptions of each facility, current water supplies, water usage, power consumption and critical water and power using components.

Choctaw Casino Resort – Durant

The Choctaw Casino Resort is located in Durant, Oklahoma. The Project Facility sits on 50 acres of land and attracts 5,000 to 6,000 patrons weekly, over 300,000 annually. The main gaming area covers over 218,000 square feet and has 726 hotel rooms in two towers. The second tower was opened in 2015. The site also contains two motels; The Choctaw Lodge and Choctaw Inn, with 59 and 101 rooms respectively, an RV Park and the Choctaw Wellness Center which provides nutrition and fitness services to the community. The main facility has seven restaurants and a food court, as well as indoor and outdoor pool facilities. The facility has a significant impact on the local economy and employment.



Choctaw Casino Resort Durant Area Map

[1] "Saving Water in Hotels," Hotels Fact Sheet 508, USEPA, November 2012.

Choctaw Casino Hotel – Pocola

The Choctaw Casino Hotel – Pocola is located the City of Pocola, Oklahoma. The Project Facility provides gaming and entertainment, a guest hotel with 130 rooms, five restaurants and meeting rooms.

Choctaw Casino – Pocola Area Map

Choctaw Casino Resort – Grant

The Choctaw Casino Resort – Grant, Oklahoma sits just north of the Oklahoma / Texas border in Southeast Oklahoma. The Project Facilities include gaming and entertainment facilities, a 60-room hotel with two restaurants.

Choctaw Casino - Grant Area Map

Chickasaw Nation Facilities

The three (3) facilities owned and operated by the Choctaw Nation include:

- WinStar World Casino and Resort – Thackerville
- Riverwind Casino – Norman
- Newcastle Casino – Newcastle

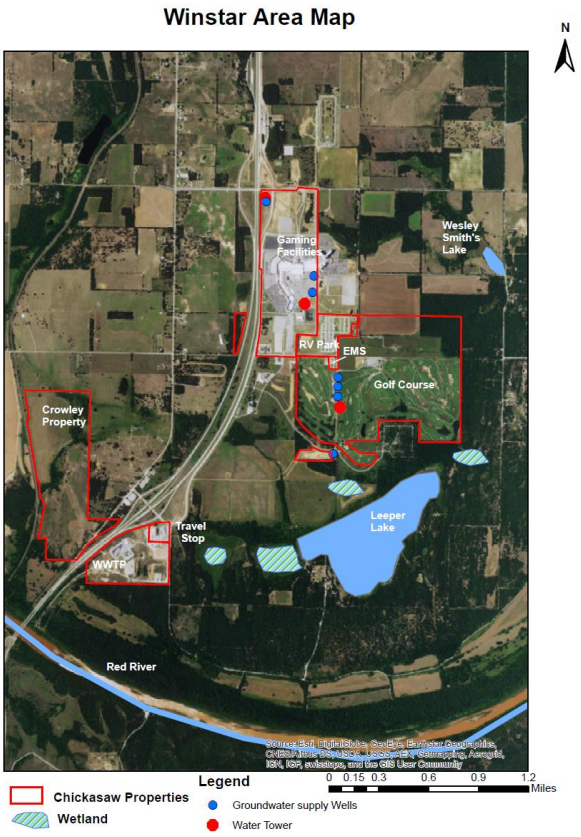
The specific location of each facility was shown on **Figure 1**. The following subsections provide descriptions of each facility, current water supplies, water usage, power consumption and critical water and power using components.

WinStar World Casino and Resort – Thackerville

The WinStar Complex covers an area of approximately 653 acres and consists of Gaming Facilities, Travel Stop, Hotels, Waste Water Treatment Plant, an RV Park, Golf Course, and an EMS facility. The Crowley property on the west side of I-35 is currently undeveloped and consists of approximately 214 acres.

The Gaming Facility has approximately 500,000 square feet of gaming space (the world's largest casino) with a showplace, numerous restaurants, gift shops, and (3) 12-story hotels with a combined total of 1,400 rooms that are attached to the casino. A new showplace is being added and the old showplace will be converted to additional gaming space. The new showplace will add an additional 66,950 square feet to the facility. An additional motel operated by the Chickasaw Nation has 100 rooms. The tower motels have two outdoor swimming pools. The RV Park consists of approximately 20 acres and can accommodate 159 RVs and campers. The RV Park has one swimming pool and a small laundromat.

The Travel Stop has a small food area and some casino space.



WinStar Area Map

The Chickasaw Nation also built an apartment complex approximately ½ mile north of the casino so their employees would have a place to live. The apartment complex has 252 units and a swimming pool which has an area of approximately 4,400 ft² of surface area. The units include 80 – 1 bedrooms, 152 – 2 bedrooms and 20 – 3 bedroom apartments.

The golf course currently has 27 holes with 165 irrigable acres. An additional 9 holes are under construction which will add 45 additional irrigable acres. The golf course has a clubhouse, golf cart shop, a golf academy and a driving range. The clubhouse includes a restaurant. Water is pumped from two ponds, the one near the entrance and the one near the clubhouse, to augment groundwater supplies for irrigation. In addition, treated wastewater from the treatment plant will be used after May 1, 2016 to also augment the irrigation supply water. The treatment plant treats wastewater from the WinStar facility and Billy Tate's development which is located on the south side of WinStar. The Chickasaw Nation also supplies water to a private developer located just south of the complex. That private development has one 100-room motel, a restaurant and a small shopping center.

Riverwind Casino – Norman

The Riverwind Casino complex includes a gaming area, hotel, two restaurants and a food court. The site complex is shown on the map. The gaming area encompasses 219,000 square-feet. The hotel has 100 rooms with 4 conference rooms.

The site includes a small portion of landscape irrigation, approximately 1.2 acres. There are no swimming pools at the facility. Otherwise, all other water use is indoors.

Riverwind Casino Area Map

Newcastle Casino – Newcastle

The Newcastle Casino is owned and operated by the Chickasaw Nation. The site contains 83,000 square feet of entertainment space and two restaurants. Newcastle gets its water from the City of Newcastle and discharges its wastewater system into Newcastle's collection system. The facility has no hotel units or swimming pools.

The site has approximately ½ acre of landscaping which is irrigated.

The facility has one restaurant and one bar.

Newcastle Casino Area Map

Sources of Water Supply

The following table presents the basics of the water supply to each facility. It also includes a summary back to the ultimate natural water body from which this supply is extracted.

Facility	Water Supplier	Water Source	Annual Volume MG	Annual Volume AF
Choctaw Casino Resort - Durant	City of Durant	Blue River/Arbuckle-Simpson Aquifer	135.2	151,424
Choctaw Casino Hotel - Pocola	City of f Pocola/PVIA	Lake Wister	15.0	16,800
Choctaw Casino Resort - Grant	Choctaw Co. RWD No. 1	Antlers Aquifer & City Of Hugo	13.7	15,344
WinStar World Casino & Resort	Chickasaw Tribal Utility Authority	Antlers Aquifer	279.0	312,480
Riverwind Casino	City of Newcastle	Oklahoma City (multiple sources) [1] Supplemented with GW from Canadian River Alluvium	22.5	25,200
Newcastle Casino	City of Newcastle	Oklahoma City (multiple sources) [1] Supplemented with GW from Canadian River Alluvium	1.0	1,120
		Project Facilities Total	466.4	522,368

[1] Sources include Lake Overholser, Lake Canton, Lake Hefner, Lake Draper, Lake Atoka, McGee Creek Lake and Lake Sardis. **(McGee Creek Lake is a Bureau of Reclamation reservior)**

Water Sources, Rights and Uses

Due to Project Facility locations in different basins throughout the 22 county region, the discussion of water rights and uses is grouped accordingly.

Choctaw Casino Resort – Durant

The Choctaw Casino Resort in Durant purchases water from the City of Durant which utilizes the Blue River as its primary water supply source. Durant serves over 16,000 people and provides treated water to two rural water districts. Approximately 3,920 AFY of water is delivered to customers annually. They have a total water right in the Blue River for 7,842 AFY and additional rights in Lake Durant (4,500 AFY). Lake Durant is only used as a backup supply due to poor water quality, but was used in the 2011 drought when the Blue River went dry.

Choctaw Casino Hotel – Pocola

The Choctaw Casino Hotel is located in Pocola, Oklahoma and purchases water from the City of Pocola. The City purchases wholesale water from the Poteau Valley Improvement Authority (PVIA). PVIA is a regional provider suppling treated drinking water to 16 municipalities and rural water districts, in LeFlore County and adjacent Haskell and Latimer counties. PVIA uses Lake Wister as its sole source of supply and owns 21,000 AFY of water rights. On an annual average basis, PVIA provides over 6,100 AFY of treated drinking water to their customers.

Choctaw Casino Resort – Grant

The Choctaw Casino Resort - Grant is located in Grant, Oklahoma. The Resort purchases water from the Choctaw County Rural Water District No. 1. The rural water district obtains a portion of its supply from groundwater wells located in the Antlers Aquifer and through wholesale purchases from the City of Hugo. The Total groundwater right owned by the RWD is 121 AFY

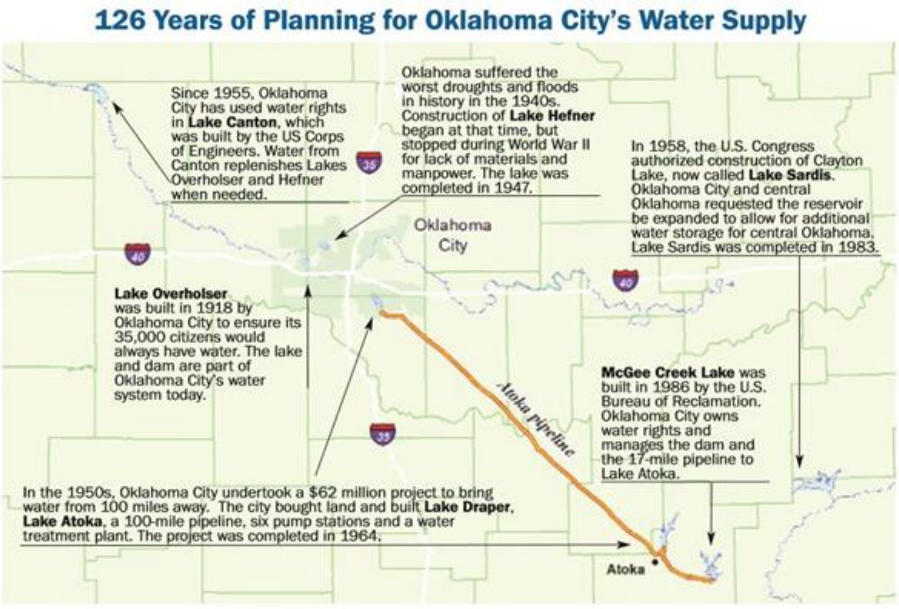
WinStar

The WinStar facilities, including their golf course, are supplied water via 6 wells into the Antlers Aquifer. The wells are approximately 750 feet deep. The Antlers Aquifer is located on both sides of the Red River separating Texas and Oklahoma. The aquifer is referred to as the Trinity Aquifer on the Texas side. The WinStar wells are located in one of the most drawn down portions of the aquifer, particularly on the Texas side.[2] The groundwater also generally flows north to south, from Oklahoma to Texas. Their total water right is 2,638 AFY.

[2] "Development of a Groundwater Model for the Antlers Aquifer in Southeastern Oklahoma," Intera, W. Oliver, et. al., October 2013, Figure 2.1.1.

Riverwind and Newcastle Casinos

Both of these facilities purchase their water from the City of Newcastle. The City of Newcastle receives a majority of its water by purchasing from the Oklahoma City (OKC) water system. The adjacent figure illustrates the many water supply reservoirs across the region which make up the raw water supply for OKC and the numerous regional water systems OKC supplies. The OKC metropolitan area has a population of over 1.3 million people. Significant among these are McGee Creek Lake and Lake Sardis. **McGee Creek Lake is a U.S. Bureau of Reclamation reservoir.** Additionally, Lake Sardis water rights are currently under litigation trying to balance the local regional water needs and those of the OKC metropolitan area.



TECHNICAL PROJECT DESCRIPTION

The facilities included in the project represent significant drivers to the local economic communities, as well as being significant users of water and energy locally. As these operations grow and support other industries and commercial endeavors, the local resources needed for this economic growth will go farther with improved efficiencies implemented as part of this project. This is the overall goal of the project.

Under the Nation's leadership, a team of consultants and contractors will be engaged to perform the tasks set forth below.

TASK 1 – PERFORM SYSTEM AUDIT

At each of the identified project sites, review the current water and power usage. Water use audits will follow the *Water Audits and Loss Control Programs*, American Water Works Association (AWWA) Manual M36, Third Edition, 2009, which includes water audit

methodology jointly developed by AWWA and the International Water Association (IWA). "State and Regional regulatory agencies in the United States now embrace this methodology as … a standardized approach which allows performance comparisons and benchmarking of best practices." [3] This task will also include installation of individual water metering devices to set the baseline for quantifying **Performance Measures** for the entire project.

Power use will be reviewed on an aggregate basis. Individual energy consumption devices may be monitored to establish individual energy usage amounts. Examples of systems to be monitored include water pumping, water heating/boiler, and water reuse systems.

TASK 2 – REVIEW CONSUMER CONSERVATION MEASURES

At each of the identified project sites, review the current technologies used both indoors and outdoors. Indoors includes public bathroom and hotel room water fixtures (toilets, urinals, showerheads and faucets), commercial water using facilities including boilers, cooling towers and laundry washing and dishwashing machines. Outdoor uses include golf course irrigation, landscape irrigation and swimming pools. The pie graph provides insights to how water is typically used between the major categories at a hotel. Additionally, this task will review current methods of conservation education/communication. Thousands of people visit these facilities each week. The goal will be to identify other forms of education/communication which can be implemented to improve water conservation awareness and practices.

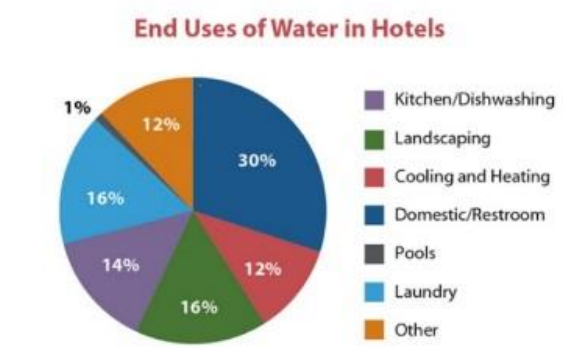


Figure 5 - End Uses of Water in Hotels

Indoor Uses

Initial opportunities identified to produce the largest water conservation and energy savings include:

- Domestic/restroom fixtures – a total of 3,018 toilets, 3,253 faucets, and 2,872 showers are contained in the project facilities using an estimated 40.1 MG water annually.
- Laundry – the project facilities use approximately 44.8 MG per year for laundry.
- Kitchen/dishwashing – the project facilities use approximately 38.2 MGY for kitchen/dishwashing uses annually.

[3] "Water Conservation for Small- and Medium-Sized Utilities," AWWA, Maddaus and Green, 2010, pg. 17-18.

Outdoor uses

The likely major water and energy savings from outdoor water use include:

- Landscape irrigation and golf course irrigation – summing the water used for irrigation on landscape and golf courses for these facilities is estimated to be 150 MGY.
- Water heating – boilers consume a considerable amount of energy to supply all the hot water needs of the hotel guests, laundry and dishwashing.
- Swimming pools – the project facilities have over 5,000 square feet of surface area in their pools. Studies have shown that pool covers can reduce the amount of make-up water by 30-50% and reduce chemical consumption by 35-60%.[4]

Savings computed in later sections indicates that at least 10% of the total water use can be conserved through the methods proposed and would result in an overall annual savings of 63 MGY (193 AFY). This roughly equates to a water savings capable of supplying 386 average households water without any additional water supply or major infrastructure additions.

TASK 3 – IMPLEMENTATION STRATEGIES

At each identified project site, review the technologies identified in Task 1 for both indoors and outdoors. Coordinate data gathered monitoring individual system uses with the appurtenances and practices currently employed at each site. Compare various water management strategies to determine water conservation and energy savings. Develop a cost-benefit analysis of the various strategies. The goal is to capture the most, long-term water savings strategies.

Based on multiple factors, including but not limited to, the following parameters will be considered in the ranking of water conservation measures:

- Cost-benefit savings (both water, sewer and energy),
- Ease of implementation,
- Environmental impact,
- Water marketing, and
- Sustainability.

The highest ranked strategies will be selected for the implementation phase.

[4] "How Much Water Does a Swimming Pool Use?" Proceedings from WaterSMART Innovations Conference and Exposition, Las Vegas, NV, R. Horner, 2009.

Task 4 – Project Implementation

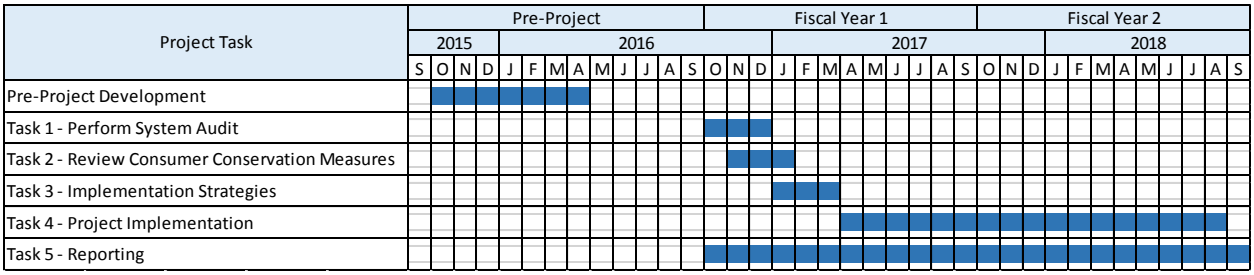
Funds will go to the purchase of fixtures, infrastructure and equipment to implement water conservation and energy strategies. Each Tribe has internal utility staff which will direct the efforts to install fixtures and equipment as necessary. Additional funding may be used in this task to increase the number of monitoring devices and locations to better assess the performance improvements obtained by each strategy.

Task 5 – Reporting

The consultant team will perform all reporting tasks as needed. These will include the required financial report (Form SF-425) and evaluation report on a semi-annual basis, as well as an annual sufficiency report to demonstrate the Project has made sufficient progress to receive a second year of funding. The preparation of the final report which demonstrates and documents the successful completion of the tasks described above will also be developed.

Plan of Action and Schedule for Proposed Work

Completion of the tasks described above is estimated to take 24 months. The anticipated schedule for each task is shown below. The duration of the Project Implementation task will require the greatest flexibility due to the likely need of time allowances for ordering and shipment of materials and supplies.



Project Implementation Plan Schedule

One important note regarding schedule: the approach to performance measurement through monitoring will be an on-going data collection system which will continue long after the project is completed. This system of active measurement will allow the Tribes to continuously monitor their water and energy consumption related to this project as well as provide a centralized source of data to help improve their water and energy conservation efforts at other similar facilities.

EVALUATION CRITERIA

A response to each of the eight evaluation criteria (A through H), by sub-criteria, identified in the FOA is provided below.

EVALUATION CRITERION A: WATER CONSERVATION (28 POINTS)

The project to Develop and Implement Water Conservation Measures at Major Choctaw and Chickasaw Facilities provides a multifaceted approach to achieving water conservation goals at the project facilities. There will be direct offsets to water used as well as the corresponding reduction of treatment, distribution and sewage treatment needs. Better yet, these reductions will continue long after this project is completed, set the mechanisms in place for additional water savings and provide a data collection system to monitor water and energy use, and provide benchmarking information for application at other facilities.

Subcriterion No. A.1: Quantifiable Water Savings

Describe the amount of water saved:

The total water usage between all six (6) of the project facilities is shown on Figure 7.

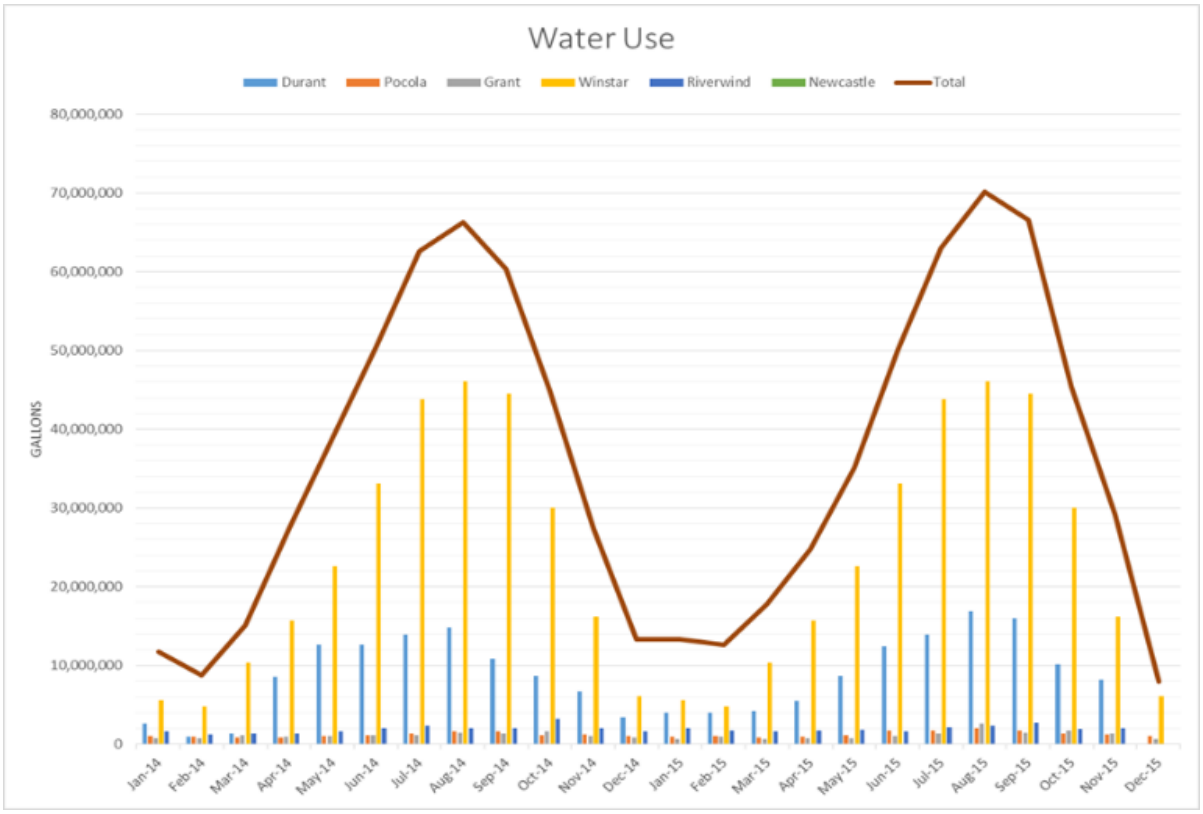


Figure 7 - Total Water Use by Month for each Project Facility

The table below provides a summary of the total annual water use by Project Facility.

Project Facility	Total Average Annual Water Use (MGY)	Portion Used for Landscape Irrigation MGY
Choctaw – Durant	100.7	13.0
Choctaw – Pocola	15.0	1.4
Choctaw – Grant	13.8	1.3
WinStar	279.0	136.9
Riverwind	22.5	3.6
Newcastle	0.9	0.1
Total	**431.9**	**156.3**

Because water savings in this project will be achieved through several different water conservation strategies, these are described separately below and then summarized at the end of this section.

(1) Canal Lining/Piping:

Not applicable

(2) Municipal Metering:

Not applicable

(3) Irrigation Flow Measurement:

Not applicable

(4) SCADA and Automation:

Please see discussion in Smart Irrigation Controllers and High-Efficiency Nozzles below.

(5) Groundwater Recharge:

Not applicable

(6) Landscape Irrigation Measures:

Most landscape irrigation at each of the Project Facilities includes small areas of trees, shrubs and ground cover, mostly turf. Additionally, makeup water for water features and fountains is included in this landscape irrigation demand. The only facility with significant irrigation volumes is WinStar with its golf course. WinStar recently prepared a Best Management Practices for Pollution Prevention (BMP) that contains a section on Golf Course BMPs for

Water Conservation and Water Quality. Because the golf course is substantially different from other landscaping demands at each Project Facility, the water conservation measures are discussed in a separate subsection below.

(a) Turf Removal:

No turf removal is anticipated as part of this project.

(b) Smart Irrigation Controllers and High-Efficiency Nozzles:

(i) How have average annual water savings estimates been determined?

Technology advances have promulgated the development of Computer Controlled Irrigation Systems (CCIS) in order to achieve maximum water efficiency for irrigation. CCIS are designed to prevent overwatering, flooding, pooling, evaporation and run-off, by preventing the application of water at a rate exceeding the soil holding capacity. Computer control in combination with high-efficiency spray nozzles have shown to produce significant water savings. A Texas Water Development Board report indicated that while water savings are difficult to estimate, 15% to 25% savings can be achieved with implementation of such systems.[5]

For the purposes of this proposal, we have conservatively estimated that an average of 10% water savings can be achieved by implementing smart irrigation controllers and high-efficiency nozzles at each Project Facility. The following table shows the estimated landscape irrigation annually for each site with the anticipated amount of water use reductions based on these modifications.

Project Facility	Annual Irrigation Use	Annual Water Conserved
Choctaw Casino Resort - Durant	13.0	1.3
Choctaw Casino Hotel - Pocola	2.4	0.24
Choctaw Casino Resort - Grant	2.2	0.22
WinStar World Casino and Resort	136.9	13.7
Riverwind Casino	3.6	0.36
Newcastle Casino	0.1	0.0
Total	**158.2**	**15.8**

[5] TWDB Report 362, *Golf Course Irrigation*, Section 5.2.

(ii) Was historical water consumption data evaluated to estimate the percent reduction in water demand per unit area of irrigated landscape? If so, did the evaluation include a weather component?

Irrigation demands were taken from monthly water demand amounts for the last two years. Most of the sites separately meter irrigation systems, so those numbers were used. If not metered separately, an estimate using unit area of landscape was applied. With respect to a weather adjustment, rain shut-off devices are anticipated to be part of the CCIS system to be installed as part of this project.

(iii) What types (manufacturer and model) of devices will be installed and what quantity of each?

The final system determination has not been made at this time. Based on the variety of irrigation requirements at each site, a determination of the best system for that site will be made for each Project Facility. Current systems in use include sensors manufactured by Stevens and the overall system utilizes Rainbird.

(iv) Will the devices be installed through a rebate or direct-install program?

Because the facilities are tribally owned, the equipment, sensors, nozzles and CCIS will be purchased and installed by utility staff assigned to the respective Project Facility.

(v) Will site audits be performed before or after installation?

As described in the project tasks, water audits will be one of the first things accomplished. This will identify the specific conditions and efficiencies components already installed and identify the appropriate modifications for each Project Facility.

(vi) How will actual water savings be verified upon completion of the project?

Verification, as discussed more in the performance measurement section and sustainability section. As part of the water audit task, electronic sensors will be placed on irrigation meters to determine current water use patterns and total volumes. These sensors will remain in-place for the duration of this project and are anticipated to be ***collecting data many years after the project*** is complete to verify the water conservation actually achieved by this project.

WinStar Golf Course BMP Implementation:

Because irrigation at the WinStar golf course includes such a high volume of water demand compared to the other Project Facilities and because golf courses offer different actions to be taken to save water, the golf course is broken out as a separate discussion. As stated earlier, a BMP report was developed for the WinStar Golf Course. The applicable BMPs are listed below.

- Irrigation timing should allow for proper infiltration and reduce evapotranspiration.
- Irrigate turf on an as-needed basis and not on a planned schedule. Optimize the irrigation controller technology to ensure efficient irrigation patterns.
- Direct as much surface water runoff as possible to catch basins or ponds that recycle the water back to the irrigation holding ponds.
- Avoid irrigation during windy conditions if feasible so as to reduce irrigation pattern distortion and reduce un-necessary evaporation of water.
- Use properly calibrated flow meters, soil moisture sensors, rain shut-off devices and/or other automated methods to manage irrigation.
- Irrigation rates should not exceed the infiltration rate or ability of the soil to absorb and hold the water applied in any one application.
- Irrigation quantities should not be larger than the available moisture storage in the root zone and achieved with soil moisture sensors and smart irrigation controllers.
- Use soil moisture sensing devices, rain gauges and the visual observation of irrigation runoff or puddles to prevent over irrigation.
- When possible, the irrigation schedule should coincide with other events such as the application of fertilizer, herbicides or other chemicals.
- When fertilizing, irrigate with ¼ inch following fertilization to avoid the loss of nitrogen and increase uptake efficiency.
- Proper mowing practices should be followed to promote healthy, deep root development and reduce irrigation requirements.
- Water pumped from ponds should be taken from the upper 1/3 of the water column to improve water quality of the irrigation water being delivered to the turf grass area and it will aid in reducing silt deposition on putting greens.

- Avoid overwatering except as part of a previously planned putting greens soluble salt leaching program. This will prevent water and nutrients from seeping below the root zone and keep excess water from running off the surface into drains and surface water bodies. Overwatering may increase insect populations, weeds, and turf diseases and can lead to root system decline. Conversely, other pests thrive under extremely dry conditions and compete with desirable plants. A proper balance is necessary to keep the landscape strong and healthy.

- Storm water run-off from the golf course will be collected and analyzed following storm events. Auto samplers will be placed at strategic places to collect the samples. The auto samplers will collect samples every hour during a 24-hour period following the storm event. A composite sample will then be prepared by mixing the 24 samples to get a representative sample during that 24-hour period. The samples will be analyzed for nitrates, phosphorous, Total Kjeldahl Nitrogen (TKN), and Total Suspended Solids (TSS). The analytical results will be tracked and if needed, adjustments will be made to the nutrient management plan to reduce nutrients and TSS to acceptable levels.

It should be specifically noted that WinStar is currently in the final construction phase of implementing a wastewater reuse system with a scheduled start-up date of May 2016. While the reuse system is not part of this proposal, this

Chickasaw Tribal Utility Authority WinStar Reuse System

The Chickasaw Tribal Utility Authority (CTUA) provides utility services for Chickasaw owned facilities throughout their jurisdictional boundary. Phase I of the reuse system includes the wastewater treatment facility associated with the WinStar Casino located near Thackerville, Oklahoma. CTUA has begun implementation of their reuse system scheduled to begin operation in May 2016.

Treated effluent from the WWTP is currently discharged of by land application or discharge to the Red River. The reuse project will produce a Category 2 effluent, satisfactory for public access landscapes, public use area/sports complexes and golf courses. It is projected that the reuse project will provide 63,873,000 gallons per year, with a peak of 350,000 gallons per day during the summer months, for irrigation of the WinStar Golf Course.

The new infrastructure components of the reuse system include the following major facilities:

- 400 gpm submersible pump in existing equalization basin
- Chlorine analyzer and chlorine feed pumps to maintain residual disinfection levels
- 16,300 LF of 8 inch diameter pipeline from WWTP to golf course
- New 5 MG lagoon, lined with HDPE
- Level controls in lagoon
- Control valve to delineate distribution of the effluent
- Water meter to measure effluent discharge, irrigated or stored.

reuse component in association with implementing the BMP will save significant water. The reuse system is summarized in the adjacent column.

Based on implementation measures to address the BMP, the following table was developed to estimate the potential water savings at the WinStar Golf Course. The water savings estimated as part of this project are calculated in excess of the water savings realized by the WinStar reuse system. This detailed breakdown also confirms the previous assumption that 10% is a good number to calculate anticipated water savings.

Estimated Water Savings from BMP at WinStar

Golf Course BMP	Strategy Implementation	Estimated Savings as Percent of Total Irrigation Demand	Estimated Water Conserved (MGY)
Proper infiltration & reduce evapotranspiration	Soil sensors, tie into irrigation controller	2%	2.7
Optimze controller for efficient irrigation patterns	Computer Controlled Irrigation System	1%	1.4
Surface water runoff to irrigation ponds[1]	Site drainage modifications	5%	6.7
Proper mowing techniques	Develop techniques & train staff	1%	1.4
Chemical analysis for nutrient management	Prepare plan and adjust irrigation	1%	1.5
		Total	13.6

[1] Volume estimated to capture 5% of the total annual average rainfall (30"/yr) within golf course.

(7) High-Efficiency Indoor Appliances and Fixtures:

a) How have average annual water savings estimates been determined? Please provide all relevant calculations, assumptions, and supporting data.

Average annual water savings were determined by estimating the percent reduction of each water use type that can be accomplished through the installation of high-efficiency indoor appliances and fixtures at each of the six Choctaw and Chickasaw Casino/Hotel Facilities.

The water use for each use type is calculated as a percentage of the total annual water use for each facility using the percentages from the table below:

Use Type	Relative Percentage *
Kitchen/Dishwashing	14%
Landscaping	16%
Cooling and Heating	12%
Domestic/Restroom*	30%
Pools	1%
Laundry*	16%
Other	12%

**Source: Saving Water in Hotels, EPA Water Sense, Publication EPA-832-F12-032, November 2012*

For example, the total Annual Water Use of the WinStar Resort is 278,961,998 gallons per year.

WinStar Domestic/Restroom Water Use = 278,961,998 gallons/year x 30%

WinStar Domestic/Restroom Water Use = 83,688,599 gallons/year

Assuming total water savings from installation of low flow toilets, low flow showerheads and faucet aerators can save 31% of Domestic/Restroom water use then

WinStar Domestic/Restroom Water Use Savings = 83,688,599 gallons/year x 31%

WinStar Domestic/Restroom Water Use Savings = 25,943,466 gallons/year

Keeping with previous estimates, for the purposes of this study we have conservatively calculated that 50% of the projected water savings based on industry standards can be achieved by this project. Resulting in our estimated water savings of 12,971,733 gallons per year.

The same calculation can be made for each water use type in each facility. The total annual water use savings that can be accomplished is determined by summing the savings for all water use types.

b) What types (clothes washers, shower heads, etc.) of appliances and fixtures will be installed and what quantity of each?

The table below lists the types of appliances and fixtures that will be installed at each facility and the quantity of each.

Project Facility	Low Flow Toilets	Low Flow Urinals	Low Flow Shower Heads	Faucet Aerators	Commercial Laundry Recycling Systems
WinStar	1,769	N/A	1,550	1,856	1
Riverwind	115	6	100	110	1
Newcastle	89	24	0	76	0
Durant	960	30	1,100	1,007	1
Grant	48	8	12	72	0
Pocola	126	15	110	132	1
Total	3,018	83	2,872	3,253	4

c) Have studies been conducted to verify the existence of non-efficient appliances and fixtures? Provide published water savings rates for each of these devices and reference the source for each of the device savings rates.

Yes, each facility has taken an inventory of the non-efficient appliances and fixtures that can be replaced. The table below summarizes the water savings for each type of fixture and references the source of the device savings rates.

Device	Savings	Use Type	Average
Low Flow Shower Head[1]	21%	Domestic/Restroom	31%
Faucet Aerators[2]	30%	Domestic/Restroom	
Low Flow Toilets[1]	52%	Domestic/Restroom	
Low Flow Urinals[3]	20%	Domestic/Restroom	
Commercial Laundry[1]	65%	Laundry	65%

Sources: [1] Water Conservation for Small and Medium Sized Utilities, Maddaus, W.O. and Green, D. AWWA, 2010. [2] Saving Water in *Bathroom Sink Faucets & Accessories, EPA Water Sense, Publication EPA-832-F-07-020 February 2013.* [3] *Saving Water in Office Buildings EPA Water Sense, Publication EPA-832-F-12-032 November 2012.*

This table summarizes the total water savings that may be accomplished through installation of efficient appliances and fixtures at each facility. Taking the conservative approach, we have estimated that half of the water savings projected by industry standards may be achieved with this project.

Facility	Annual Water Use (Gallons) (gallons/yr)	Estimated Domestic/Restroom Use Savings (gallons/yr)	Estimated Laundry Use Savings (gallons/yr)	Total Estimated Water Conserved (gallons/yr)	(MGY)	Final Estimate of Water Conserved (MGY)
Winstar	278,961,998	25,943,466	29,012,048	54,955,514	54.96	27.48
New Castle	900,462	83,743	93,648	177,391	0.18	0.09
Riverwind	22,529,000	2,095,197	2,343,016	4,438,213	4.44	2.22
Durant	100,696,400	9,364,765	10,472,426	19,837,191	19.84	9.92
Grant	13,778,450	1,281,396	1,432,959	2,714,355	2.71	1.36
Pocola	14,985,700	1,393,670	1,558,513	2,952,183	2.95	1.48
					Total	**42.54**

d) Will the devices be installed through rebate or direct-install programs?

The water saving devices will be installed through direct-install programs at each facility.

e) How will actual water savings be verified upon completion of the project?

Task 1 of the approach includes installation of electronic devices to capture meter reading at critical locations in each system. This data collection will be one of the very first tasks to obtain baseline information for both indoor and outdoor uses, as well as irrigation. This data will be incorporated into a data management system to assist in deriving various factors associate with use including, but not limited to, instantaneous volume, time of daily peaks and low water usage. In addition to contributing to the selection of best apparent water conservation strategies, these devices will remain in place for years to come to allow constant monitoring and verification of water usage. By comparing the original baseline flow data with the current data, the actual savings can be continuously measured.

(8) Small-scale Water Recycling and Water Reuse

Not applicable

(9) Other Project Types Not Listed Above:

Not applicable

Quantifiable Water Savings Summary

Using the quantitative analysis described above, the table below provides a summary of the total water saving that could be captured by the identified water conservation strategies.

Facility	Fixture Water Savings (MGY)	Irrigation Water Savings (MGY)	Total Water Savings (MGY)
Winstar	27.48	13.69	41.17
New Castle	0.09	0.01	0.10
Riverwind	2.22	0.36	2.58
Durant	9.92	1.30	11.22
Grant	1.36	0.22	1.58
Pocola	1.48	0.24	1.72
Total	**42.54**	**15.83**	**58.36**

The previous table illustrates the amount of water that has been identified which could be saved if all the water conservation measures were implemented. However, there is a budget and a limitation on the amount of measures which can be installed as part of this project. Reviewing the project budget and the amount of fixture and irrigation modifications that can be accomplished within the budget, it is estimated that 58.3 MGY (179.1 AFY) can be realized with implementation of this project.

Subcriterion No. A.2: Percentage of Total Supply

Because the project uses multiple water supplies and suppliers, the most relevant determination of water savings is the percentage of total water use conserved by the Project Facilities as a direct result of this project. The percentage of total water saved is 13.5%:

$$\frac{179.1\ AFY\ (Water\ Conserved)}{1{,}325\ AFY\ (Average\ Annual\ Water\ Use)} \times 100 = 13.5\%$$

Evaluation Criterion B: Energy-Water Nexus (16 points)

The Project facilities offer opportunities to both provide renewable energy strategies as well as increased energy efficiency from energy saving from reduced pumping, treatment, distribution, wastewater conveyance and treatment and reduction in the use of chemicals. The following Subcriterion sections discuss the specific opportunities to achieve the energy-water nexus.

Subcriterion No. B.1: Implementing Renewable Energy Projects Related to Water Management and Delivery

No renewable energy systems are being considered as part of this project.

Subcriterion No. B.2: Increasing Energy Efficiency in Water Management

Describe any energy efficiencies that are expected to result from implementation of the water conservation or water management project.

Reducing water consumption saves energy because less water needs to be treated and pumped to end users and less wastewater needs to be treated after use in each facility. The project will create energy savings by increasing efficiency through water conservation improvements that result in reduced diversion, water treatment and raw water supply pumping, as well as wastewater treatment energy requirements.

1) **Please provide sufficient detail supporting the calculation of any energy savings expected to result from water conservation improvements. If quantifiable energy savings are expected to result from water conservation improvements, please provide sufficient details and supporting calculations. If quantifying energy savings, please state the estimated amount in kilowatt hours per year.**

Water and wastewater facilities are often the largest and most energy intensive loads owned and operated by local governments, representing up to 35% of municipal energy use. Energy will be saved by reducing the demand for treated water and wastewater treatment through water use efficiencies inside the facilities (installation of low flow fixtures). The energy needed to treat raw water will also be reduced outside of the facilities through the implementation of irrigation Best Management Practices. The table[6] lists the energy input per unit of water pumped and treated will be used to calculate the annual energy savings accomplished through water conservation at each of the six facilities.

Process	Energy Input Rate (kWh/MG/Year)
Source and Conveyance – Surface Water	2019
Source and Conveyance - Groundwater	2,844
Water Treatment	1,600
Distribution	600
Wastewater Treatment	2,850

The following table summarizes the total amount of energy potentially saved if all water conservation strategies are calculated from water savings determined both inside and outside of each of the six Project Facilities using the factors in the previous table.

Facility	Fixture Water Savings (gallons/yr)	Irrigation Water Savings (gallons/yr)	Water Treatment Savings (kWh/yr)	Wastewater Treatment Savings (kWh/yr)	Total Energy Savings (kWh/yr)
Winstar	27,477,757	13,690,000	207,650	78,312	285,962
New Castle	88,696	14,407	520	253	773
Riverwind	2,219,107	360,464	13,011	6,324	19,336
Durant	9,918,595	1,300,000	56,587	28,268	84,855
Grant	1,357,177	220,455	7,958	3,868	11,826
Pocola	1,476,091	239,771	8,655	4,207	12,862
				Total Energy Savings	415,612
				Total Energy Costs Savings ($0.06/kWh)	$ 24,936.73

[6] Watts in a Drop of Water: Savings at the Water-Energy Nexus, Young, R. American Council for an Energy-Efficient Economy, November 2014.

Using representative amounts of the 179.1 AFY (58.3 MGY) of water conservation which the budget for this project can achieve, would provide approximately 56,100 kWh/yr in total energy savings. The resulting cost savings at $0.06/kWh would be $3,350.

2) **Please describe the current pumping requirements and the types of pumps (e.g. size) currently being used. How would the proposed project impact the current pumping requirements?**

The type of pumps currently used to distribute treated water to each facility will not change with the implementation of this project, however pumping energy requirements will be reduced because of reduced demand. The total energy savings that can be accomplished through implementation of water efficiency measures is 56,100 kWh/yr of which approximately 75% are pumping energy demands or 42,000 kWh/yr.

3) **Please indicate whether your energy savings estimate originates from the point of diversion, or whether the estimate is based upon an alternate site of origin.**

The estimate for energy savings originates from the point of diversion by reducing the demand for treated raw water and an alternate site of origin by reducing the wastewater treatment requirements due to reduced indoor water demand at each facility.

4) **Does the calculation include the energy required to treat the water?**

Yes, the calculation of savings includes the energy required to treat the water.

5) **Will the project result in reduced vehicle miles driven, in turn reducing carbon emissions? Please provide supporting details and calculations.**

No, the project does not reduce vehicle miles driven.

6) **Describe any renewable energy components that will results in minimal energy savings/production (e.g. installing small-scale solar as part of a SCADA system).**

No renewable energy components are currently included, but may be considered depending upon the applicability to certain water conservation measures.

Evaluation Criterion C: Benefits to Endangered Species (12 points)

The proposed project includes water use efficiency and water reuse efforts in five Oklahoma Counties including McLain, Love, Bryan, Choctaw and LeFlore. Within this project area there are seven Federally-listed endangered or threatened species that rely on Oklahoma's rivers, streams, lakes, and wetlands for habitat. The Whooping Crane (*Grus americana*), Interior Least Tern (*Sterna antillarum*), Piping Plover (Charadrius melodus), Arkansas River Shiner (*Notropis girardi*), Leopard Darter (*Percina pantherina*), Scaleshell mussel (*Leptodea leptodon*), and Ouachita Rock Pocketbook mussel (*Arkansia wheeleri*) are the Federally-listed threatened and endangered species that can be found in the project area.

Whooping Cranes pass through Oklahoma each spring and fall during migration. While in Oklahoma, they are typically found in shallow wetlands, marshes, the margins of ponds and lakes, sandbars and shorelines of shallow rivers, wet prairies and crop fields near wetlands.

Terns live along large rivers and may sometimes be found hunting fish in shallow wetlands and the margins of ponds and lakes. Least Terns require bare sand and gravel for nesting.

Widespread loss and alteration of its riverine nesting habitat has eliminated the Least Tern from many locations within its former breeding range in the interior U.S. The construction of large reservoirs has permanently submerged some nesting areas and altered the season flooding dynamics required to build and sustain the sandbars that the terns need for nesting.

Piping Plovers are found on mudflats, sandy beaches and shallow wetlands with sparse vegetation. They may be found along the margins of lakes and large rivers where there is exposed (bare) sand or mud. Piping Plover populations have declined in their nesting range as a result of habitat destruction and alteration due to dam construction and channelization projects along rivers and streams, as well as the draining and filling of shallow wetlands.

The Arkansas River Shiner inhabits the shallow braided channels of wide sandy prairie rivers in the Arkansas River system. At the present time, nearly all remaining Arkansas River Shiners occur in the Canadian River in Oklahoma, western Texas and eastern New Mexico. The alteration of river flow patterns as a result of reservoir construction and the removal of water from the watershed for irrigation and household use has probably had the greatest effect on its decline.

Leopard Darters live among the rocks and cobble on the bottom of clear, swift-flowing small rivers in the southern Ouachita Mountains. Reservoir construction has had the greatest impact on the Leopard Darter's population. Reservoirs have fragmented and isolated its populations, have permanently inundated much of their habitat and made it too deep to be suitable, and have altered flow patterns and temperatures below dams.

Scaleshell Mussels are typically found in riffles within relatively swift moving water. In Oklahoma, populations of the Scaleshell are thought to remain only in the Kiamichi and Little rivers in the Ouachita Mountains in the southeastern part of the state. The causes for their decline may be related to modification of river flow patterns by reservoir construction. During a recent mussel survey of the Poteau River, Oklahoma it was found that species richness decreased below Lake Wister. This decrease in species richness was attributed to large-scale disturbance from the upstream impoundment along with other more localized impacts.

The Ouachita Rock Pocketbook, which are rarely found, embeds itself in coarse sediment and gravel at the bottom of the river channel in the Kiamichi and Little rivers in southeastern Oklahoma. They are threatened by existing and proposed new man-made reservoirs which alter the season flow patterns of rivers and isolate mussel populations above and below dams.

Each of these species rely on suitable habitat provided by Oklahoma's surface waters. Reducing the reliance on surface waters for potable water supply by meeting large demands with reclaimed water and improving water use efficiency makes more water available to maintain this habitat. The impact may be most beneficial during drought conditions where flows are too low to provide riffles and maintain shallow wetlands. Improving habitat conditions during drought conditions for threatened and endangered species serves to support their recovery over the long term by fostering critical habitat throughout the species' life cycle.

1) How is the species adversely affected by a Reclamation Project?

Reclamation has constructed reservoirs on major river systems, which have reduced flows and natural hydrology of the rivers. Frequently, there is a resulting decrease in high flow pulses, which are needed to scour woody vegetation and create un-vegetated sandbars use by the Interior Least Tern.

Reservoirs have fragmented and isolated populations of Leopard Darters, Arkansas River Shiners, Ouachita Rock Pocketbook mussels, and Scaleshell mussels. Reservoirs have permanently inundated much of their habitat and made it too deep to be suitable, and have altered seasonal flow patterns and temperatures below dams.

2) Is the species subject to a recovery plan or conservation plan under the ESA?

Yes, recovery plans for the Interior Least Tern, and Piping Plover exist and were established in 1990, 1991, and 1988 (first release). Conservation plans exist for each species as well; the Interior Least Tern has one habitat conservation plan (HCP) and the Piping Plover has three HCPs. An International recovery plan for the Whooping Crane is in its third revision as of 2007. As of 2011, a draft recovery plan has been developed for the Leopard Darter. Scaleshell mussel

recovery plan was established in 2010. The Ouachita Rock Pocketbook recovery plan was established in 2004. A recovery plan has not been prepared for the Arkansas River Shiner.

3) What is the extent to which the proposed Project would reduce the likelihood of listing or would otherwise improve the status of the species?

Of the species listed previously, a reduction in surface water demand for potable water supplies has the potential to improve their status by improving habitat conditions. For example, Riverwind and Newcastle Casinos in McClain County purchase water from and the City of Newcastle that sources its water from the Canadian River Alluvium and recently from Oklahoma City. Reducing water supplied from their wells could improve flows during drought conditions in the Canadian River where Arkansas River Shiner has habitat, and support beneficial flows for Least Tern and Piping Plover nesting habitat.

Oklahoma City sources some of it supply through the Atoka Pipeline, which brings water from McGee Creek Lake and Atoka Reservoir in the Muddy Boggy River Basin in Atoka County. Reduction of water supply demands from Newcastle will result in increased water levels in both reservoirs and may provide benefits to the Piping Plover by maintaining suitable habitat for wintering grounds downstream of the both reservoirs during drought conditions.

In Durant, the Proposed Project will reduce the amount of water diverted from the Blue River and Arbuckle Simpson Aquifer. The Blue River has historically hosted diverse mussel fauna. Reduced impact from diversions may promote re-establishment of freshwater mussels, including the Scaleshell and Ouachita Rock Pocketbook.

Pocola receives water from Wister Lake through the Poteau Valley Improvement Authority (PVIA). Wister Lake is the primary development project for water resources in the Poteau River Basin. Wister Lake has been eutrophic for at least 20 years with extremely turbid conditions due to sediment pollution. Reduced water demand from Lake Wister would provide additional water, especially during drought conditions, that may improve the Lake's nutrient assimilation capacity and mitigate the impacts of sediment loading. As a result, conditions downstream of Wister Lake may improve where Scaleshell mussel populations have declined due to unsuitable habitat.

EVALUATION CRITERION D: WATER MARKETING (12 POINTS)

Five of the six project facilities purchase water from municipal water supply systems. The WinStar facility owns and operates its own set of wells, treatment and distribution system. Because of the several different water supply systems used by different facilities and that the water marketing mechanism is different for each, they are discussed separately below. The evaluation criteria questions follow the descriptions to assist in summarizing the criterion.

Choctaw Casino Resort – Durant

The Choctaw Casino Resort in Durant, Oklahoma purchases water from the City of Durant. The City's primary source of water is the Blue River which obtains its base flow from springs out of the Arbuckle-Simpson Aquifer. In the drought of 2011, the Blue River went dry and the City had to switch to a small city owned lake with very poor quality water. There are multiple water rights in the Blue River before it flows into the Red River. Water savings through conservation would have proved critical for allowing flows to stay in the Blue River for municipal and other users downstream during these drought conditions.

Choctaw Casino Hotel - Pocola

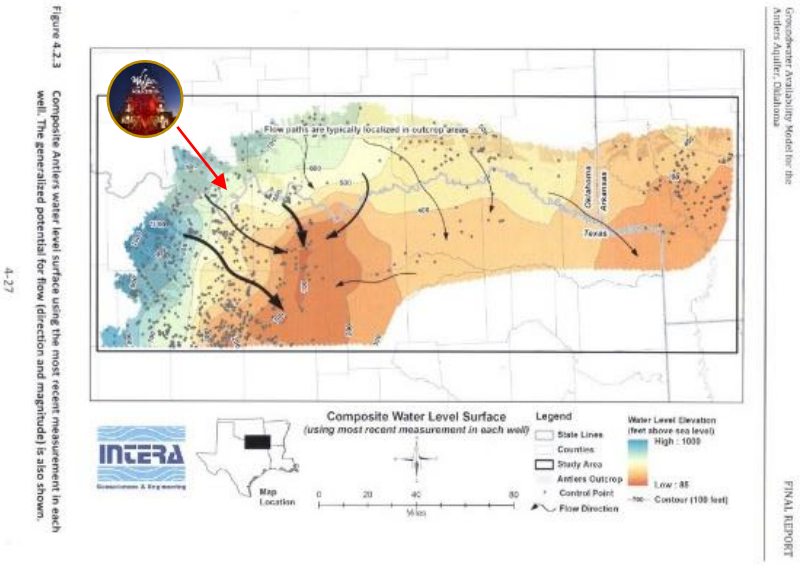
The City of Pocola provides water service to the Choctaw Casino Hotel. The City purchases wholesale water from the Poteau Valley Improvement Authority (PVIA). PVIA is a regional provider suppling treated drinking water to 16 municipalities and rural water districts, in LeFlore County and adjacent Haskell and Latimer counties. They obtain raw water from Lake Wister. For many years, Lake Wister has been in significant decline. Nutrient levels and loss of storage capacity due to sediment have severely limited the lake's current and future ability to remain a raw water source. The lake covers 6,300 acres and averages 8-feet in depth. Based on current estimates, the lake loses approximately 475 acre-feet of capacity each year due to sediment. Few other options for new water supply exist for the region other than very expensive water conveyance systems from other basins. Water conserved as a result of this project will be available to extend the remaining water storage in Lake Wister for the other existing municipalities and rural water districts which supports economic growth in the region.

Choctaw Casino Resort - Grant

The Choctaw Casino Resort in Grant obtains water from the Choctaw County Rural Water District No. 1. The rural water district obtains a portion of its supply from groundwater wells and through purchases from the City of Hugo. Although the City of Hugo's water system has struggled to meet water quality standards this last year, this Project Facility in the most southeast portion of the Nations' territory is not as severely limited with respect to water supply concerns and does not provide a significant water marketing opportunity.

WinStar

The WinStar facilities, including their golf course, are supplied via 6 wells into the Antlers Aquifer. The wells are approximately 750 feet deep. The Antlers Aquifer extends well into Texas. The aquifer is referred to as the Trinity Aquifer on the Texas side. The WinStar wells are located in a heavily used portion of the aquifer.[7] The groundwater also generally flows north to south, from Oklahoma to Texas.



Antlers/Trinity Aquifer Flow Direction & Magnitude

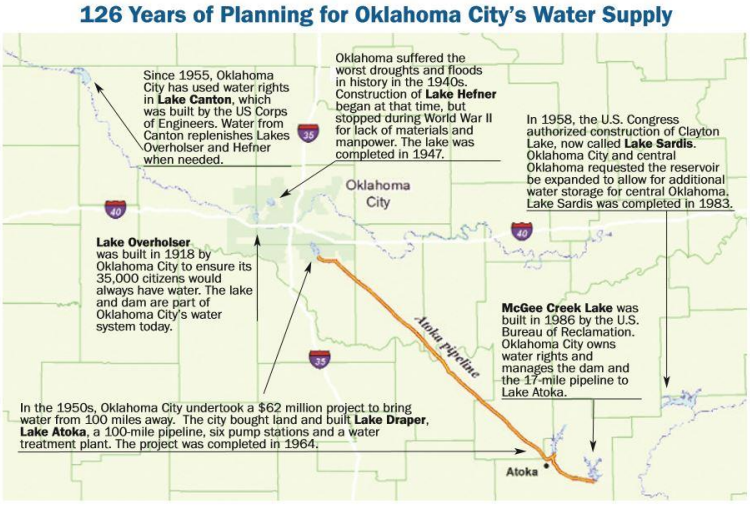
Since the WinStar facility is the largest user of water among the other Project Facilities, savings at this site will have the greatest impact. Preliminary estimates of water savings indicate that approximately 41.2 MGY or 46,144 AFY can be achieved through the anticipated water conservation measures.

Water not pumped by the WinStar facility remains in the groundwater for use by other regional entities. Particularly for users in the highest demand segment of the aquifer as shown in the figure.[8] Using the current flow patterns in the aquifer, water conserved as a result of this project will remain to support current and future aquifer users and support maintaining groundwater levels. The duration of this supplemental water market is unlimited as long as the water conservation measures will remain in place as is anticipated.

[7] "Development of a Groundwater Model for the Antlers Aquifer in Southeastern Oklahoma," Intera, W. Oliver, et. al., October 2013, Figure 2.1.1.
[8] Ibid, Figure 4.2.3

Riverwind and Newcastle Facilities

Both of these facilities purchase their water from the City of Newcastle. The City of Newcastle receives a majority of its water by purchasing from the Oklahoma City (OKC) water system. The figure illustrates the many water supply reservoirs across the region which make up the raw water supply for OKC and the numerous regional water systems OKC supplies. The OKC system serves approximately 1.3 million people, in addition to commercial and industrial users daily. Significant among these are McGee Creek Lake and Lake Sardis. **McGee Creek Lake is a U.S. Bureau of Reclamation reservoir.** Additionally, water use in the Kiamichi is currently under litigation, with the parties trying to balance the local regional water needs and those of the OKC metropolitan area. Water savings at these facilities due to water conservation measures can be up to 2.6 MGY or 2,900 AFY. Water not taken from these reservoirs can directly benefit local water users, in addition to improving the energy-water nexus by reducing significant pumping costs to OKC, the City of Newcastle and ultimately the Riverwind and Newcastle Facilities. The duration of new water being available for other regional uses will remain long-term with the implementation of these water conservation measures.



1) **Estimated amount of water to be marketed?**

Based on the identified potential water savings, this project has budget to capture approximately 179 AFY of water which can be marketing in accordance with the options presented above.

2) **A detailed description of the mechanism through which water will be marketed?**

See specific description for each Project Facility above.

3) **Number of users, types of water use, etc. in the market?**

See specific description for each Project Facility above.

4) **A description of any legal issues pertaining to water marketing?**

At this stage of the project, no legal issues have been identified which would prevent or impede the associated water marketing opportunities identified above.

5) **Estimated duration of the water market?**

Because the water conservation measures under consideration are considered permanent system modifications, the water markets created as a result of this project are also considered permanent.

Evaluation Criterion E: Other Contributions to Water Supply Sustainability (14 points)

Water supply sustainability is directly improved at each Project Facility location by conserving water which would be taken from existing water supplies, postponing, limiting or eliminating new infrastructure to serve water needs met from the water savings of this project, and reducing the need for additional wastewater collection, treatment and discharge due to less water entering the wastewater system.

Each Project Facility is addressed below for the corresponding subcriterion.

Subcriterion No. E.1: Addressing Adaptation Strategies in a WaterSMART Basin Study

No WaterSMART Basin Studies have been completed in the basins impacted by this proposed project.

Subcriterion No. E.2: Expediting Future On-Farm Irrigation Improvements

This project does not address on-farm improvements.

Subcriterion No. E.3: Other Water Supply Sustainability Benefits

- **Will the project make water available to alleviate water supply shortages resulting from drought?**

As previously discussed, severe drought hit this entire region in 2011 resulting in water rationing and switching to poor quality water sources because the primary source was no longer available. Specifically, for the City of Durant, the Blue River is their primary water source. During the 2011 drought, the Blue River ran dry. Had the conservation measures proposed by this project been in place, the saved water may have improved their flexibility in extending the use of this source before switching to a much poorer quality water supply. This

project will help by directly and consistently saving water, not if but when the next drought occurs.

Additionally, for the Choctaw facility in Pocola, water rationing impacted all 16 of the municipal and rural water district customers that system serves. Water conservation would have had a direct impact on allowing water to remain in the lake and improve water management of the entire system. This facility being one of the largest single water customers can have significant impact to whole region's water supply in the next drought.

- **Will the project make additional water available for Indian Tribes?**

Because the Choctaw and Chickasaw Nations are not traditional tribes with a reservation, their territory covers a 22 county area of Southeastern Oklahoma and addresses the need for tribal members as well as non-tribal citizens. The multiple water basins serving tribal and nontribal populations will be positively impacted by implementation of this project, therefore making additional water available for Indian Tribes.

- **Will the project make water available for rural or economically disadvantage communities?**

A recent designation which is recognized by all Federal agencies is the issue of ***Promise Zones***. The Choctaw Nation of Oklahoma and its 10 ½ - county, 10,613 square mile tribal service area in southeastern Oklahoma received the nation's first tribal Promise Zone designation in 2014. This rural region (larger than the state of Maryland) struggles with many socioeconomic challenges such as extreme levels of poverty, unemployment, and low educational attainment. However, as implied with the federal Promise Zone designation, the region also holds significant potential for success in combating those challenges and improving quality of life in the region.

In addition to the federal Promise Zone designation, all counties within the Choctaw Nation have been added to the USDA's StrikeForce Initiative for Rural Growth and Opportunity, which is intended to serve persistent poverty communities. The proposed project will impact several communities within the Promise Zone and USDA StrikeForce designation area including: Durant, Pocola and Grant. This water conservation project will help to preserve existing water supplies and delay or eliminate future infrastructure needs to meet new demands, thereby helping to keep water rates as low as possible for this economically challenged area.

- **Does the project promote and encourage collaboration among parties?**

The Choctaw and Chickasaw Nations collaborate on a number of different community and regionally focused issues. One significant topic is their ongoing development of a Choctaw and Chickasaw Regional Water Plan (CCRWP) to address the overall water resources, considering all aspects of water resources throughout the 22 county tribal territory including water supply and quality, consumptive and non-consumptive demands and infrastructure. Through development of this plan, the Nations have met with water and wastewater providers serving a majority of the population in the region. They continue to work with local utilities to assist with technical and financial support to ensure safe reliable water supplies for all communities. This project will continue and strengthen that relationship by creating more shared interests in benefiting all the members of the community, plus the direct benefit to the local water suppliers. Water conservation to these systems benefits all the customers and citizens, not just the Choctaws and Chickasaws.

- **Will the project increase awareness of water and/or energy conservation and efficiency efforts?**

Two components of this project will create opportunities to have a positive impact on the local communities as well as impacting the large number of tourist these Project Facilities attract annually. First, the Choctaws and Chickasaws, by working closely with the local governments and water system will provide publicity associated with the water conservation measures being undertaken with the project using money from the Nations and the Bureau of Reclamation. This public relations effort will work to show the local citizens that the Nations and their local leaders are working to address current water use and measure to assist in the next drought. The second component is improving the information provided to tourist and hotel customers regarding the efforts to conserve water. Through these efforts as part of the proposed project, there can be a confidence that public awareness of water and/or energy conservation and efficiency can impact many individuals.

Evaluation Criterion F: Implementation and Results (10 points)

Subcriterion No. F.1: Project Planning

The Choctaws and Chickasaws have been in collaboration for several years and continue developing a Regional Water Plan. The CCRWP has been providing support in overall basin planning for both groundwater and surface water studies, consumptive and non-consumptive demands and review the infrastructure needs of water and wastewater systems throughout their 22 county territory. This project planning, including other joint studies with the Bureau of Reclamation, U.S. Army Corps of Engineers, the South Central Climate Science Center, among

others, has identified the certainty that drought will return to this region and developing specific strategies to minimize those impacts. Water conservation has been identified as one of the largest single strategies to manage current water supplies and minimize the impact of future drought to water supply, the environment and the local economy which relies heavily on the lakes and rivers to support tourism.

Subcriterion No. F.2: Readiness to Proceed

The Project Facilities identified as part of this project are already in place and operational. They are typically one of the largest single water users within their respective communities. Because the Choctaws and Chickasaws own and operate the facilities targeted with developing these water conservation strategies, the project will immediately begin upon award. All the applicant's funding can be allocated and when combined with the Bureau funding, will proceed on schedule according to the tasks previously presented. Additionally, all project components considered in this proposed project will take place on developed land, eliminating any need for other permitting or regulatory hurdles which might impact other projects.

Subcriterion No. F.3: Performance Measures

One of the more recent developments in the field of water management and water conservation is the application of technology. As described in the project approach, we will install electronic data collectors to monitor water and energy usage at critical locations in each Project Facility system. The data is relayed via wireless communication to a central database. This information will be used to evaluate and select water conservation strategies to be implemented. Perhaps the strongest aspect of this application of technology is that it can remain on-site and continue to measure water and energy usage. By comparing the original baseline data collected at the beginning of the project, we can directly confirm the actual water savings achieved with implementation of certain conservation methods. Additionally, due to the low cost of such a system to continue to collect and save this information, it can be continued long after this project is completed to provide these facilities in managing their water use and assist others in developing similar conservation efforts.

Additionally, because of good performance measurements and once water savings are established, the Nations can directly calculate the cost of modifications versus the associated conservation amount to determine ways to capture more of the water conservation opportunities developed as part of the project.

Subcriterion No. F.4: Reasonableness of Costs

The total cost for the Water Conservation Measures Project is $630,000 and the annual acre-feet conserved is 179.1 AFY. The expected life of water conservation modifications is expected to be 20 years. This is an industry accepted life-expectancy given regular operation & maintenance is performed on the equipment. Given these estimates, the reasonableness of costs is calculated to be:

$$\frac{\$630{,}000\ (\ Total\ Project\ Cost)}{179.1\ AF\ (Acre-Feet\ Conserved) \times 20\ years\ (Improvement\ Life)} = \$175.88\ per\ AFY-year$$

Evaluation Criterion G: Additional Non-Federal Funding (4 points)

The applicant, the Choctaw Nation of Oklahoma and with financial support from the Chickasaw Nation of Oklahoma will provide 52.4% of the total project budget. The detail of the funding split is provided in the Project Budget section.

Evaluation Criterion H: Connection to Reclamation Activities (4 points)

The Bureau and the Choctaw and Chickasaw Nations have several recent and ongoing projects that are being jointly accomplished. There are several points of connection to other Bureau of Reclamation activities and this proposed project. The points of connection are listed and summarized below.

Feasibility Study of Water Pipeline from Lake of the Arbuckles to Sulphur

This report jointly prepared by the Bureau and Chickasaw Nation, evaluated the feasibility to construct infrastructure (intake, pipeline and water treatment plant) to connect the City of Sulphur to their existing water right in the Lake of the Arbuckles in March 2013. *Lake of the Arbuckles is a Bureau of Reclamation reservoir.* Sulphur and other surrounding communities rely on the Arbuckle-Simpson Aquifer for new water supplies. Water rights in the aquifer were recently reduced by the State of Oklahoma due to pressure on water levels, which directly impacts the Blue River, whose source is the Arbuckle-Simpson Aquifer. By taking water from the lake, pressure on the aquifer is reduced. Additionally, the City of Durant, which supplies water to the Choctaw Casino included in this project, uses the Blue River as their primary source of water supply.

Feasibility Study to Reuse Sulphur's Treated Wastewater for Direct Irrigation Use

This project was prepared in association with the Bureau and the Chickasaw Nation to review wastewater reuse for nonpotable irrigation in order to relieve pressure on the Arbuckle-Simpson Aquifer. Similar to the previous project description, by reducing water pumped from the aquifer, it can remain available for other regional users. This is because the City of Durant uses the Blue River as its primary source of water supply and the Blue River receives its base flow through springs from the Arbuckle-Simpson Aquifer.

Developing Guidelines for Addressing Disinfection-By-Products (DBP)

This joint study between the Bureau and the Choctaw and Chickasaw Nations was undertaken to address the significant number of communities in the Nations' territory which have DBP issues. The study was intended to provide small to medium sized communities basic guidelines to address DBP issues in their system. Often, the implementation of corrective infrastructure is required to resolve DBP problems. This proposed project, by reducing water demands through water conservation, can limit the costs of these system modifications for communities without having to increase associated capacities to meet increased demand.

Drought Contingency Study for the Arbuckle-Simpson Region

This study, which is just beginning, addresses mitigation and response actions for drought in the Arbuckle-Simpson region, which includes the Arbuckle-Simpson Aquifer and Lake of the Arbuckles (*a Bureau of Reclamation reservoir*). This project will assist in the mitigation measures by reducing the respective demands during future drought conditions.

ENVIRONMENTAL AND CULTURAL RESOURCES COMPLIANCE

The following section addresses each of the questions put forward in the FOA.

1) **Will the project impact the surrounding environment (e.g., soil [dust], air, water [quality and quantity], animal habitat)? Please briefly describe all earth-disturbing work and any work that will affect the air, water, or animal habitat in the project area. Please also explain the impacts of such work on the surrounding environment and any steps that could be taken to minimize the impacts.**

The project will have minimum impact on the surrounding environments. The project will mainly consist of pipeline excavation that will take place in previously developed areas and rights of way. The pipes proposed for the project are not particularly large (<8-inches) and will therefore require minimal excavation with total trench depth not expected to exceed 4 feet and trench width not to exceed 24 inches. Shoring or other special construction techniques will not be required. The water reuse project will require contractors to maintain erosion and sedimentation controls at all times and provide dust control measures when required. There is no expected impact to animal habitat or water quality in the region.

2) **Are you aware of any species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the project area? If so, would they be affected by any activities associated with the proposed project?**

The project area is within previously developed areas so no wildlife or habitat is expected to be impacted by the project.

3) **Are there wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as "waters of the United States?" If so, would they be affected by any activities associated with the proposed project?**

There are no surface waters or wetlands inside the project boundaries that fall under CWA jurisdiction.

4) **When was the water delivery system constructed?**

New reclaimed water delivery systems for each facility will be built as a part of this project.

5) **Will the project result in any modification of or effects to, individual features of an irrigation system (e.g., headgates, canals, or flumes)? If so, state when those features were constructed and describe the nature and timing of any extensive alterations or modifications to those features completed previously.**

The project will provide water to smaller irrigation system, such as those typically found on a golf course or at a ball field. No canals, flumes, headgates or similar structures will be used or modified as a result of implementing this project.

6) **Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places? A cultural resources specialist at your local Reclamation office or the State Historic Preservation Office can assist in answering this question.**

No. There are no buildings, structures, or features located in the irrigation district listed or eligible for listing on the National Register of Historic Places.

7) **Are there any known archeological sites in the proposed area?**

No, there are no known archeological sites in the proposed project area. The various project facility sites are located in previously developed areas.

8) **Will the project have a disproportionally high and adverse effect on low income or minority populations?**

The project will not have any adverse effect on income or minority populations. The project should have a positive effect on all water users in the area by offsetting future capital costs required for expansion of the water supplies.

9) **Will the project limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands?**

No, the project will not limit access to and ceremonial use of Indian sacred sites or results in impacts on tribal lands.

10) **Will the project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area?**

No, the project is not expected to contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species.

REQUIRED PERMITS OR APPROVALS

This project is focused at existing facilities in current operation at six different sites across the Choctaw and Chickasaw territory. Due to the project changes being made only to existing developed property owned by the applicant and the other participant, no permits or other regulatory approvals issues are anticipated.

OFFICIAL RESOLUTION

The fully executed document will be emailed to Janeen Koza (jkoza@usbr.gov) on February 19,2016.

Council Bill will be presented at the next Council Meeting on February 13, 2016

CB - - 16

TO APPROVE APPLICATION FOR THE WATERSMART: WATER AND ENERGY EFFICIENCY GRANTS

IN THE TRIBAL COUNCIL OF THE CHOCTAW NATION

ANTHONY DILLARD INTRODUCED THE FOLLOWING COUNCIL BILL

A COUNCIL BILL

TO APPROVE application to the United States Department of Interior for the WaterSMART: Water and Energy Efficiency Grants.

WHEREAS, the Choctaw Nation of Oklahoma realizes the need to increase water conservation and efficiency, and

WHEREAS, funds from the United States Department of Interior will assist the Choctaw Nation in increasing energy efficiency and auditing water supplies and use at resort facilities.

THEREFORE BE IT ENACTED by the Tribal Council of the Choctaw Nation of Oklahoma that this Act be cited as approval to make application to the United States Department of Interior for the WaterSMART: Water and Energy Efficiency Grants.

CERTIFICATION

I, the undersigned, as speaker of the Tribal Council of the Choctaw Nation of Oklahoma, do hereby certify that the Tribal Council is composed of twelve (12) seats. Eight (8) members must be present to constitute a quorum. I further certify that _____ ( ) members answered roll call and that a quorum was present at the Regular Session of the Tribal Council at Tuskahoma, Oklahoma on February 13, 2016. I further certify that the foregoing Council Bill CB- -16 was adopted at such meeting by the affirmative vote of _____ ( ) members, _____ ( ) negative votes, and _____ ( ) abstaining.

_____
Thomas Williston, Speaker
Choctaw Nation Tribal Council

_____
Anthony Dillard, Secretary
Choctaw Nation Tribal Council

_____
Gary Batton, Chief
Choctaw Nation of Oklahoma

Date_____