MUNICIPAL WATER CONSERVATION PLAN

FOR

TOWN OF BERNALILLO, NEW MEXICO

Prepared by:

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and

PCR Resources

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Executive Summary

This Plan provides information on the current status of the water system and water use in the Town of Bernalillo, documents the history, status, and success of the Town's current water conservation program, and presents the Town's plans for further conservation efforts. The Conservation Plan is designed to address the requirements of both the New Mexico Office of the State Engineer (OSE) and the New Mexico Water Trust Board (WTB). It is also consistent with the Town's Forty-Year Water Development Plan and the water conservation sections of the Middle Rio Grande regional water plan.

Bernalillo's existing water conservation program has reduced water demand to 120 GPCD in 2014, as determined through the OSE GPCD Calculator. This is well below the goal of 140 GPCD established in the Town's water right permit, and it is very modest for an urban area located along New Mexico's Rio Grande Valley. The benefits of conservation are shown by the fact that total water diversions decreased from 1315 AF in 2004 to 1229 AF in 2014, despite a 25% growth in service area population during the same period. In just four years, 2010-2014, non-revenue water was reduced from 24 to 17 percent.

This Plan is organized as directed by OSE guidance. The Plan proposes that the Town will continue its existing successful conservation program, but given the progress already made, anticipates that the primary result of this continuation will be maintenance of the existing condition, with potentially some additional savings. The Plan sets two goals which reflect an expansion of the existing program.

(1) To improve the operational efficiency of the water supply system to reduce water losses and more accurately account for water use; and

(2) To increase water use efficiency in the commercial and residential sectors.

Improvements in the operation of the water system include such actions as completing a transition from manual-read to automatic-read meters, continued efforts to reduce line breaks related to construction activities and repairing or replacing old distribution lines that are prone to leakage. The Plan identifies a number of educational, incentive and regulatory actions for existing residences and facilities, as well as for new development, to increase customer conservation.

The Plan covers a five-year period of 2015 to 2020, although most of the actions taken during this period will continue past those five years, or at least have a longer lasting impact. If all of the measures contained in this plan are fully implemented, a water savings of up to five to seven percent may be achieved. However, Bernalillo faces some notable challenges, such as limited financial and other resources, that may affect its ability to fully implement all the measures in the plan and achieve the projected level of savings within the planning period. In addition, if there is continued development, these savings will be offset by increases in new demand.

The Town of Bernalillo prepared the Water Conservation Plan with the assistance of its water planning consultants, Lee Wilson & Associates, Inc. and PCR Resources. The U.S. Bureau of Reclamation provided funding assistance for the Plan.

1. Data Collection

1.1 Purpose

The Town of Bernalillo prepared its initial water conservation plan in 2005, with the assistance of funding from the U.S. Bureau of Reclamation. During the ten years since that time, there have been numerous changes in the community and the Town's water system which necessitate an update of the 2005 plan. Bernalillo, located next to Rio Rancho and only a short commute from Albuquerque, continues to grow in both the residential and commercial sectors, requiring an increased supply of water to serve the new growth. This trend is expected to continue in the future.

At the same time, New Mexico is experiencing a multi-year drought that threatens to negatively affect the water supply of the Town and neighboring communities as dry weather conditions continue. Predictions for long-term weather patterns resulting from climate change also point towards a reduced water supply throughout the region. In recent years, surface water supplies for irrigation purposes along the Rio Grande have been curtailed because of unusually low river flows attributed to drought.

In addition, the New Mexico Office of the State Engineer (OSE) is requiring Bernalillo to submit a water conservation plan as a condition of its water right permit. The New Mexico Water Trust Board (WTB) is also requiring communities to have water conservation plans in order to be eligible for water-related project funds. Bernalillo depends upon these funds to implement water infrastructure improvements critical to the management and operation of its water supply system.

Although Bernalillo has initiated several successful water conservation actions since 2005, the community is prepared to identify additional conservation measures, evaluate their costs and water savings, and set a schedule for implementation. The purpose of this plan is to update the 2005 plan, meet state regulatory and funding requirements, and to help ensure that Bernalillo's water supply remains adequate to serve the community's needs well into the future.

1.2 Planning Team

The planning team that directed the development of the water conservation plan included the Town's Acting Manager, Maria Rinaldi and the following Town staff members: Carla Salazar from the Planning and Community Development Department; and Andrew Edmundson, the Public Works Director. The Bernalillo planning team worked with the Town's water planning consultants, Lee Wilson & Associates, Inc. (Carole Cristiano, Lee Wilson and Casey Gierke) and PCR Resources (Alice Darilek) to develop the plan.

1.3 Local Conditions

<u>Map</u>

The Town of Bernalillo, situated along the Rio Grande, is located 16 miles north of downtown Albuquerque in the Middle Rio Grande Basin. The Town limits cover 4.6 square miles. Figure 1 is a map of the current service area of the Bernalillo water system, including areas both inside and outside the Town limits. The map also shows the locations of the Town's wells and wastewater treatment plant.

Water Supply Overview

Bernalillo provides water service to 3,365 residential and commercial customers. These include 3,056 single-family accounts, 30 multi-family accounts that serve 253 housing units, and 279 commercial accounts which include municipal and county government facilities. Included in these numbers are 124 residential accounts and 15 commercial accounts outside the Town limits.

The Town currently uses two groundwater wells that withdraw water from the Rio Grande Basin. The Town plans to equip two other existing wells for arsenic remediation and use those wells as additional points of diversion. The Town's Public Works Director indicates the first of these two wells should be put into service in the fall of 2015.

Bernalillo holds a comprehensive water right permit, RG-2478 et al, which allows the Town to divert up to 3,000 acre-feet of water per year (AFY), provided that the Town has adequate water rights associated with its permit. The Town currently holds 2,280.58 AFY of diversion rights. See the Town's Addendum to its Forty-Year Water Plan for a complete description of Bernalillo's water rights. The Town diverted 1,229 acre-feet of water in 2014. The Addendum projected that demand for water in 2020 would be 1,823 acre-feet.

The Town's water right permit, issued in 2012 by the OSE, was approved on the basis that the groundwater supply was adequate to allow withdrawals at the projected rate of diversion for 40 years without impairment to other water users. This determination, along with the water rights that the town currently holds, should provide the community with adequate water supplies well into the future.

Demographics

The 2010 U.S. Census estimated Bernalillo's population at 8,320. In 2012, according to the New Mexico Bureau of Business and Economic Research (BBER), the estimated population totaled 8,413, an increase of 1.1% since 2010. BBER projections for Sandoval County, in which Bernalillo is located, indicate the county's population should grow by 3.02 percent through 2015, 2.7 percent from 2016 to 2020, and 2.42 percent from 2020-2025.

According to the 2010 U.S. Census, the median age in Bernalillo is 38.8 years. The median household income is \$42,244; however, 16.6 percent of the population lives below the poverty level. The residents reflect a diversity of ethnic backgrounds, with 69.8 percent being Hispanic or Latino and 23.5 percent being white alone. This is reflected in the fact that 46.2 percent of the population speaks Spanish, while 50.4 percent speak English alone.

The community has two very different characteristics: one resulting from its early settlement by Native Americans and Spanish explorers; and the second from its recent growth, primarily because of its nearby location to Albuquerque. The town contains a combination of old adobe residences connected to earlier farms and large new residential developments, a number of which have been built for retirees moving to the area.

Commercial development has expanded along the tourism gateway of Highway 550, along which tourists travel from Albuquerque to scenic destinations in northwestern New Mexico. Growth in the commercial sector has remained relatively steady during the recent economic downturn, an may accelerate in the next few years. In addition, Bernalillo serves as the county seat of Sandoval County; and the county detention facility and other county buildings are located in the town. The community is

also linked by rail service to both Albuquerque and Santa Fe, making it an ideal location for residents to commute to jobs in both cities.

<u>Housing</u>

As noted above, Bernalillo is a community that mixes the very old with the very new. This characteristic also affects the nature of the community's landscaped areas. Older homes have less turf areas than post-1960s single family residential development. Residential neighborhoods which were developed after 2000 may or may not have large yards, but all such developments contain large common areas dominated by turf. The most recent housing developments are located on the west side of the Rio Grande in the Santiago, Bosque Encantado and Bosque del Rio Grande developments. An additional development in that area, Corazon del Bosque, is currently pursuing plat approval.

Most residents live in single-family dwellings, while only a small percentage reside in multi-family units. Multi-family residences consist primarily of public housing and mobile home parks. A new apartment complex of 36 units was constructed in 2013 and the developer is in the process of building a second phase, which will consist of 28 additional units.

According to the 2010 U.S. Census, the average household in Bernalillo is composed of 2.65 residents. A large percentage of the homes, 67.3 percent, were built prior to 1990, with 32.7 percent constructed from 1990 to 2010.

Temperature and Precipitation

Bernalillo has a semi-arid climate with low humidity and precipitation. Records from the Western Regional Climate Center show that the average maximum temperature is 94.1 degrees Fahrenheit (F.) in July, with the annual maximum average at 72.1 degrees F. The average minimum temperature is 19.1 degrees F. in December, with an annual minimum average of 37.1 degrees F. Annual precipitation totals 8.86 inches. Most of the precipitation occurs in the summer, usually in July and August.

Other Local Conditions

Known as the "City of Coronado," Bernalillo connects its 500-year history to the settlement of the area by Spanish explorers. However, the area was inhabited well before then. Evidence of Paleo-Indians settlements in the area has been dated back to 12,000 years.

The Middle Rio Grande Basin, in which Bernalillo is located, is the largest of three major basins in the Rio Grande rift. Even though the basin's climate is semi-arid, the Middle Rio Grande Valley has been irrigated for at least 1,000 years with water from the Rio Grande. The Pueblo system of irrigation, one of the oldest in North America, was expanded by the Spanish when they arrived in the late 16th century. Intense irrigation began in the late 19th century with the arrival of Anglo settlers and the railway. In 1925, the Middle Rio Grande Conservancy District was formed to support agriculture and reduce the impact of floods.

The community of Bernalillo has evolved from a primarily rural area of farms to a suburban town located in the Albuquerque Metropolitan Statistical Area. It houses commuters who work in Albuquerque and Santa Fe, and has a growing residential and commercial sector. However, it still retains much of its small community nature. Nearby pueblos and other historical sites draw many out-of-state visitors, as do local festivals.

2. Assessing Public Water Supplier Performance

The OSE requires that a municipal water conservation plan contain documents which provide a detailed breakdown and analysis of diversion and water use data. These documents are contained in Appendices A-D and are as follows:

- Appendix A: AWWA Audit. This document contains information about 2014 diversions and water use, a grading matrix to provide information about the efficiency of the water system and a breakdown of non-revenue water between apparent water losses and real losses.
- Appendix B: AWWA Audit Narrative. This document contains a narrative which explains how the Town selected the grades and calculations for each category of water use documented in Appendix A. The template for this narrative was designed by the Town's water rights consultant and the narrative was prepared by LWA in consultation with Town staff.
- Appendix C: OSE GPCD Calculator. This document contains information about 2014 diversions and metered use by category. It is used to identify overall per capita use and per capita use by sector, along with a calculation of non-revenue water.
- Appendix D: Summary of Data Results. This document reviews and analyzes the information contained in the Calculator and Audit in accordance with OSE requirements.

The findings and data analysis are summarized below.

2.1 Data Results and Analysis, AWWA Water Audit

Appendix A contains the AWWA Water Audit; and Appendix B contains the water audit narrative. The data results and analysis for the audit are found in the first section of Appendix D. The Audit indicates that management and record-keeping related to the water system has improved over the past four years. The Audit also indicates that two priorities for reduction of non-revenue water are:

- actions to reduce line breaks related to construction, water leaks and breaks in older areas of Town; and
- the replacement of older, manual read water meters with automatic read water meters.

2.2 Data Results and Analysis, GPCD Calculator

Appendix C contains the GPCD Calculator. The data results and analysis for the calculator are found in the second section of Appendix D. The Calculator indicates that per capita use has decreased from 151 gallons per capita per day (gpcd) in 2010 to 120 gpcd in 2014. Non-revenue water has decreased from 114 million gallons (MG) in 2010 to 66 MG in 2014.

3. Setting Water Conservation Goals

3.1 Objective

The objective of the water conservation plan is to help sustain the community's water supply to meet water needs in the coming years.

3.2 Reasons for Developing a Water Conservation Plan

There are numerous reasons for Bernalillo to prepare and adopt a new water conservation plan. They include the following.

- <u>Update 2005 plan.</u> The Town's most recent water conservation plan is ten years old and therefore contains water supply and water system information that is now dated. In addition, the plan is general in nature and does not include specific information about the conservation measures to be implemented. A new plan is needed to update information on the water supply situation and water distribution system, as well as to better identify specific conservation actions for implementation within a scheduled timeframe, as required by the OSE.
- <u>Consider future water needs.</u> Bernalillo experienced significant population growth from 2000-2007. The growth rate decreased during the financial crisis from 2008-2012; however, there will likely be continued and perhaps accelerated growth in the Town, primarily because of Bernalillo's nearby location to Albuquerque and Rio Rancho. Although Bernalillo's water supply is adequate to meet near-future needs, additional water rights will be needed to meet long-term water demand. Such rights are becoming more difficult to find in this region.
- <u>Respond to drought.</u> For the past 3 years, New Mexico has experienced severe drought conditions. Although the water supply picture has improved this year, surface water supplies are still below average. Coupled with the drier weather patterns forecast for the Southwest because of climate change, there is concern about the reliability of surface water supplies, including the San Juan Chama Project water rights to offset effects of pumping the Town's wells.
- <u>Meet state requirements.</u> The OSE is requiring that Bernalillo develop a water conservation plan as a condition of the Town's water right permit. In addition, WTB is strengthening its requirements for municipal water conservation plans in order for cities to qualify for state waterrelated funding. For a community like Bernalillo, with limited financial resources, such funding is important to maintaining its water supply infrastructure.
- <u>Respond to increasing costs of water rights and water production</u>. As the Town continues to grow, the purchase price of water rights may increase as water supplies become scarcer; and water conservation provides a lower cost water supply alternative for the community. Water system operating costs for such necessities as electrical power and meter and line maintenance are also rising. Reductions in water use reduce the costs of pumping and treatment.
- <u>Participate in regional efforts.</u> Several nearby communities, such as Albuquerque and Rio Rancho, have implemented comprehensive water conservation programs. In such a water-short region, Bernalillo's management staff believes it is the Town's responsibility to take similar actions to protect this resource for future needs.

3.3 Identify Water Conservation Goals

The overall water conservation objective for Bernalillo is to help sustain the community's water supply to meet water needs in the coming years. To attain that objective, the community has identified the following two action-oriented goals.

- Improve the operational efficiency of the water supply system to reduce water losses and more accurately account for water use; and
- Increase water use efficiency in the commercial and residential sectors.

3.4 Prioritize Goals

Both goals identified above are important in achieving a sustainable water supply for Bernalillo; and the community plans to implement them in a comprehensive manner. However, the first priority will be given to improving the operational efficiency of the water supply system.

3.5 Evaluate Goals

<u>Goal #1: Improving the operational efficiency of the water supply system</u> is expected to bring the most significant water savings through more accurate accounting of water use and a reduction in water losses. Completion of the transition to automatic-read meters, along with the increased capability they bring in detecting water leaks and unusually high water usage, should be a major improvement. The Town will continue to identify water line locations in advance of construction projects in order to minimize breaks related to construction activities. In addition, replacement of distribution lines in areas that experience the majority of water leaks and breaks will result in reduced water losses and will likely identify illegal connections in these areas. As discussed in Appendix B, the process of replacing distribution lines in Las Cocinitas resulted in the elimination of 50 illegal connections. Regular meter testing and repair or replacement of malfunctioning production meters, as well as additional leak detection and repair efforts, should also result in reducing the amount of non-revenue water, which has been more than the industry standard of 10 percent.

<u>Goal #2:</u> Increasing water use efficiency in the commercial and residential sectors is also an important goal. Bernalillo's highest water users are found in the commercial sector and in the newer subdivisions that attract a number of retirees from other areas of the country and include large common landscaped areas. A typical increase in water use occurs during the summer months and is attributed to landscape irrigation. Older residential areas tend to have less landscaping and generally use less water. Because of these water use characteristics, water conservation efforts are expected to focus more on the commercial sector and high-water-use residential subdivisions and will likely target outdoor water use. Attention will also be given to increasing water use efficiency in new residential and commercial developments in this growing community.

3.6 Best Management Practices

Best Management Practices Considered

The best management practices considered for each goal are described below.

<u>Goal #1 – Improve the operational efficiency of the water supply system to reduce water losses and</u> <u>more accurately account for water use.</u>

Included for consideration were completion of the installation of automatic-read meters for all water users; use of related meter software to more quickly identify and respond to leaks and abnormal water

usage; regular meter testing for production meters; identification and replacement or repair of leakage in older distribution lines; and adjustment of water rates to better encourage conservation.

Goal #2 – Increase water use efficiency in the commercial and residential sectors.

Included for consideration were the installation of water-efficient equipment and practices in municipal buildings and landscapes; education of residential and commercial water users, as well as developers, about the requirements in the Town's water conservation and drought management ordinance, as well as enforcement of the ordinance; use of water consultations for targeted high-water-use customers; consideration of incentives to reduce water use; reuse of treated wastewater; and additional educational efforts for adults and school children.

Best Management Practices Selected

The following best management practices were selected for inclusion in the conservation plan. They are summarized in Table 1 and will be referred to in future sections of the Plan text.

<u>Goal #1</u> – Improve the operational efficiency of the water supply system to reduce water losses and more accurately account for water use.

- Complete installation of automatic-read meters for all water user accounts.
- Expand the use of automatic-read meter software to identify and respond to unusually high water use and suspected water leaks.
- Initiate regular meter testing schedule for production meters.
- Identify areas of leakage in older distribution lines and repair leaks or replace lines as needed.
- Review water rate structure and adjust water rates to maintain adequate revenues while encouraging conservation.

<u>Goal #2</u> – Increase water use efficiency in the commercial and residential sectors.

- Install water-efficient equipment and perform water-efficient practices in municipal buildings and landscapes.
- Conduct water use consultations and voluntary audits for commercial customers with high water use to encourage improvements in water use efficiency.
- Evaluate various incentive programs to encourage water-efficient practices by commercial and residential water users; choose appropriate incentives for implementation.
- Educate commercial and residential water users, as well as developers, about the requirements of the water conservation and drought management ordinance, as well as other conservation actions that benefit them and the community.
- Improve enforcement of the water waste provisions of the Town's water conservation ordinance.
- Implement the reuse of treated wastewater to irrigate community parks and provide water for construction use.
- Expand school education programs to teach the importance of water conservation to students.

4. Public Involvement, Education, and Outreach

4.1 Public Involvement During the Planning Process

The planning process used both traditional communication methods, as well as social media, to inform members of the community about the development of the conservation plan and to request comments about proposed water conservation measures. For example, the Town staff developed a conservation forum on the Town's Facebook page to: (1) inform the public about the plan; and (2) obtain comments about the kinds of conservation measures the public wanted to be included. Another way in which the Town obtained this information was through an online water conservation survey. Similar information was also placed in the Town's newsletter, which is sent to water users with their monthly water bills.

The survey generated 31 responses, with 61 percent coming from residents who were 50 years or older and 19 percent from the 35 to 50 age group. About 48 percent of the persons answering the survey had lived in Bernalillo for 10 years or less, while 25 percent had lived there all their lives. The respondents were fairly evenly divided into those living in the Bosque area and/or west of the Rio Grande (43 percent) and those living in the core of the city and/or older neighborhoods close to downtown (47 percent). The remainder of the respondents live along the Highway 550 corridor.

As a group, the respondents indicated that the two most important reasons to conserve water were related to concerns about a limited water supply and a desire for their children and grandchildren to have plenty of water. Overall, the respondents indicated they would like to have additional information about two topics: the bigger water supply picture, and Bernalillo's water use restrictions. Also mentioned several times were water conservation tips and xeriscape. When asked what Bernalillo should do to conserve water and include in the water conservation plan, the answers centered around time-of-day irrigation restrictions, adopting higher water rates, and focusing on outdoor water use. More detailed information about the survey results is contained in Appendix G.

Two public meetings were scheduled: one for the public to discuss potential water conservation measures; and another to inform the Town Council and the public about the chosen measures. In addition, an internal planning committee composed of relevant Town staff held several meetings with the Town's water planning consultants to review the proposed conservation measures and other information contained in the plan.

4.2 Education and Outreach after Plan Adoption

Public Information Program

Bernalillo staff will continue to use the Town's Facebook page, website and the monthly newsletter that accompanies water bills as the primary methods of communication to the public as conservation actions are implemented. Staff will also brief the Town Council on implementation actions as they are planned and implemented. The focus of the public information program will be on informing residents and businesses about the requirements of the water conservation and drought management ordinance, seasonal reminders related to outdoor irrigation times and practices, notices of incentive programs, and actions related to the installation of automatic-read meters and other water system improvements.

Outreach Program Activities

Some outreach efforts will be directed at developers of residential and commercial projects to inform them about the requirements of the water conservation and drought management ordinance. Highwater users, such as commercial facilities and large subdivisions with substantial landscaped areas, will be identified and offered water use consultations to help them reduce water use. Finally, as the transition to automatic-read meters is completed, Town staff will expand an outreach effort to businesses and residents to help them take advantage of the high-usage and leak alerts the new metering system offers.

In-School Educational Programs

In recent years, Bernalillo Public Schools has sent its fourth-grade students to an annual Children's Water Festival held in the neighboring community of Rio Rancho. The students learn about various aspects of their water supply at this event, including water conservation. The Town supports the Water Festival through its membership in the Albuquerque Area Flood Control Authority, which is a sponsor of the Festival. The Town plans to continue its support of the program in the coming years. In addition, Town staff will encourage Bernalillo school administrators to use available water conservation curricula from the OSE and other sources to teach students about the importance of water and how they can save this valuable resource. Town staff is also including water conservation education for children in the Town library's summer program. The first conservation education session was held recently. Approximately 70 first- to fourth-grade students attended the session.

5. Developing a Water Conservation Program

5.1 Challenges

The main challenge to the implementation of Bernalillo's water conservation plan is the limited availability of financial resources and personnel to implement the water conservation measures described in the plan. Although Bernalillo has moved forward in its efforts to improve the efficiency of its water system through such actions as the installation of automatic-read meters and replacement of old, leaking distribution lines, these infrastructure improvements are costly and take time to implement. In most cases, the Town has needed to obtain grant funds to help pay the cost of these improvements. Additional conservation measures that can help businesses and residents save water, such as water use consultations and incentive programs, may also need additional sources of funding, as well as more staff or assistance from consultants, to be fully implemented.

5.2 Program Components

The program components consist of the supply-side water efficiency measures identified in Goal #1 and the demand-side measures that address Goal #2.

5.2.1 Program Title: Goal #1 - Supply-Side Water Efficiency Measures

Program Summary

Table 1 summarizes the measures identified in Goal #1 to improve the operational efficiency of the water supply system to reduce water losses and more accurately account for water use.

An important priority for Bernalillo's water system is the replacement of its manual-read metering system to an automatic-read system. More than half of the old meters have already been replaced; and the remainder of replacements will occur as funds become available. The Town expects to complete the meter replacement in 2018. Once the meter replacement is completed, the Town's water utility staff will use the additional data that the ARM software will provide to more quickly identify and respond to abnormal water usage and water leaks. Although staff currently checks its metering results and responds to identified leaks both within the system and at businesses or residences, the process sometimes takes a month. Once the automatic-read meter installation is complete, that response time should be significantly shortened, which would help reduce water losses. The Town will also test production meters on an annual basis to ensure their efficient operation.

The Town will continue its proactive efforts to minimize line breaks related to construction activities. Since these breaks are often associated with very large water lines, they result in large amounts of water loss in relatively short periods of time. As described in Appendix E, since 2014, the Bernalillo Public Works staff has been very aggressive in clearly identifying and marking water line locations prior to all construction projects. As a result, line breaks decreased from 30 in 2013 to 6 in 2014.

Another important priority is the repair of leaks or replacement of older distribution and service lines prone to leakage and breaks. The Mountain View subdivision has been identified as an area of high leakage and line breaks. The Public Works Director estimates that this area currently accounts for approximately 75 percent of the leakage in the Town's water lines. A recent attempt to replace these lines was unsuccessful due to lack of adequate funding; however, it remains an implementation priority.

An increasing area of concern is the theft of water from fire hydrants. Although the Town has installed locks on a number of vulnerable hydrants, the water utility staff is receiving an increasing number of complaints from residents who have observed possible theft from fire hydrants located in less visible areas. Although the amount of water lost through theft is currently not known, the Town has identified this as an issue to be addressed.

Bernalillo's water rates had last been revised in 2005 and were based upon an inclining block rate structure. That rate structure was not adequate to meet the water utility's increasing revenue needs. Therefore, the Town needed to revise the rates to increase and stabilize revenue while continuing to encourage water conservation. Although rate revenues increased in recent years due to an aggressive effort to obtain payment of past-due water bills, that increase was temporary and will last only until the past-due payments are completed in 2018. The Town has also incurred significant expenses to build and operate an arsenic treatment facility, and the community needs to continue to make additional system improvements. Therefore, the Town included a review and revision of its water rate structure in its water conservation plan, as a rate revision would likely contain a rate increase that would encourage further reductions in water use.

As the Town prepared its Water Conservation Plan, the Town Council decided to proceed with the needed rate increase and adopted a new rate structure in August, to become effective in October, 2015. The Water Rate Ordinance is contained in Appendix H. The new rate structure increases the residential base rate from \$17.50 to \$23.50, and the commercial rate from \$30.73 to \$60.00. These base rates include the first 2,000 gallons of water use. Also increased are the inclining block charges per each additional 1,000 gallons of residential use, beginning at \$2.00 per 1,000 gallons and increasing to \$5.00 per 1,000 gallons in seven usage blocks. Commercial use is charged at \$5.00 per each additional 1,000 gallons of use.

Targeted User

Although the primary target of this program is the improvement of the water supply infrastructure, it will indirectly affect all water users served by the water utility.

Saturation of Target User

The meter replacement program will affect the total metering system, as well as indirectly affecting all residential and commercial water users served by the water utility. Replacement of the Mountain View service lines will affect 16 percent of the Town's distribution system and approximately 18 percent of the Town's population.

Implementation Dates

An estimated implementation schedule for each measure follows.

Automatic-Read Meter Installation	2015-2018
Expanded Use of ARM Software	2018-2020
Production Meter Testing	2015-2020
Leakage Identification and Repair	2015-2018
Water Rate Review/Adjustment	2015-2016

Anticipated Cost from 2015-2020

ARM Meter and Software Installation	\$ 242,000.00	
Mountain View Service Line Replacement	\$ 1,200,000.00	*
Production Meter Testing	\$ 6,000.00	**

*Project will only be possible with State funding assistance ** At an annual cost of \$1,200.00

Anticipated Staffing

Anticipated staffing includes the Public Works Director and other water utility staff. Additional help will come from contracted assistance for the replacement of distribution lines.

Funding Source

Additional funding will be needed for the replacement of leaking service lines and to complete the installation of automatic-read meters and related software. The Town plans to apply for funds from the New Mexico Water Trust Board, the state's Community Development Block Grant program, and the U.S. Bureau of Reclamation's Water Conservation Program.

Anticipated Results and Alignment with Goals

All of the measures in this program meet Goal #1 of the plan: to improve the operational efficiency of the water supply system to reduce water losses and more accurately account for water use.

Leakage in the Mountain View subdivision's water service lines is estimated to account for about 65 to 75 percent of total line leakage. The Public Works Director now tracks estimates of leaks on a monthly basis. He estimates that through May, 2015 there was a total of 1.3 MG of water lost due to leaks. Assuming this is representative of the losses throughout the year, total annual losses due to leakage will total 2.9 MGY. The loss attributed to Mountain View is between 1.9 and 2.1 MGY. The actual number is likely higher, since the leaks are not detectable in their early stages. In addition, as with the Las Cocinitas area, there are likely illegal connections in this older area of town which result in additional non-revenue water. Because of these factors, replacement of these lines is a plan priority. Once the replacement project is completed, real water losses should be reduced by two to three million gallons per year, which represents a little less than one percent of diversions.

The Town will continue to identify water lines in advance of construction projects, with the hope that it will further reduce breaks resulting from construction projects and/or reduce water loss from such breaks. However, it is difficult to predict whether these efforts will result in further reduction in construction-related line breaks, since a number of factors are out of the Town's control. These include equipment operator error, reporting of the problem and staff available to address the problem in a timely manner. See Section 5.5 (Non-Revenue Water over Time) for a further discussion of this issue.

The installation of automatic-read water meters is also a plan priority. The Town Public Works Director believes that diversions will decrease by one to two percent once installation of the system is complete. This decrease will result from two factors. First, because the meters will be more accurate and will register close to 100 percent of use, water bills will tend to be higher and residents will monitor and likely be more efficient in their water use. More importantly, since the water department staff will be able to complete meter readings more quickly, they will have more time to promptly follow up with customers to inform them about possible leaks and assist in resolving them.

The implementation of an annual meter-testing program for the Town's production meters would insure their continued accurate operation. The water rates revision would bring additional revenues needed to continue system improvements. Water savings from production meter testing is difficult to predict; and water savings from a water rate revision would occur in the demand side, so no additional water savings are estimated from these measures in this section.

The total estimated water savings from these supply-side programs is three percent.

Why Program was Chosen

The program was chosen as a top priority for making needed improvements in the operation and maintenance of the Town's water supply system. These improvements would address problems associated with significant amounts of water loss, as well as meter reading and billing inaccuracies. The program addresses the findings of the AWWA water system audit, as well as additional information gathered by the Public Works Director and the Town's water resources consultant.

Estimated Lifetime Impact of Program

The installation of automatic-read meters should achieve effectively permanent impacts, including increased accuracy of water meter readings, along with a potential increase in revenue, as old meters tend to register lower-than-actual water use. Use of the additional data produced by the ARM software should result in both water leaks being detected and repaired more quickly, thus reducing water losses. The software should also help identify and more quickly address abnormally high water

usage by customers, which could result in water use reductions. The replacement of older distribution and service lines prone to leakage and breaks, such as the Mountain View area, will also result in reduced water loss. Implementation of the supply-side measures is estimated to result in a water savings of up to three percent of diversions.

How the Program Will Be Implemented

The Public Works Director will oversee the implementation of the program by the Town's water utility staff. The program will require contracted assistance for the replacement of service lines.

Tracking and Evaluation

The Public Works Director and water utility staff will track and evaluate the program's progress on an annual basis, identify needed adjustments, and implement them.

Annual Reporting and Updates

The Public Works Director, in coordination with the Town Manager and the Town's water resources consultant, will prepare an annual report and updates on the program's status as required by the Town and by the OSE.

5.2.2 Program Title: Goal #2 - Demand-Side Water Efficiency Measures

Program Summary

Table 1 summarizes the measures identified in Goal #2 to increase water use efficiency in the commercial and residential sectors. All of the measures in this program address the need for increased water use efficiency by the Town's residential and commercial water users. Single family residential water use accounts for about 50 percent of the Town's total water use, while commercial use accounts for about 30 percent, with the remainder used for municipal purposes and multi-family accounts. The Town plans to create separate water user accounts for municipal and industrial customers to better define where water is being used. There is a spike in water usage during the summer months, which is attributed primarily to landscape irrigation. While many of the Town's residents are efficient about their water use, higher than necessary usage may occur in the commercial sector, as well as in the large landscaped common areas of the newer subdivisions.

The Town plans to set an example for water efficiency by installing water-efficient plumbing fixtures and irrigation equipment in its buildings and parks. Also planned is the reuse of treated wastewater for irrigating Rotary Park, the Town's largest park. A water filling station may also be included to provide reuse water for construction projects.

Bernalillo has recently amended and strengthened its water conservation and drought management ordinance. The ordinance includes prohibitions against wasteful water use practices, water efficiency requirements for new and remodel construction, irrigation time-of-day schedules, and drought response actions to further restrict water use. Information about the ordinance requirements needs to be communicated regularly to the community's residents and businesses; and ordinance enforcement efforts could be improved. The Town assumes that, as more ARM meters are installed, the staff would have more time to devote to enforcement issues, especially monitoring fugitive water and the time-ofday restrictions. Other educational measures to inform the community about wise water use practices are also planned, primarily through the Town's Facebook page and website, but also through school education. Such topics as water-wise landscaping and efficient plumbing fixtures and appliances (including swamp coolers) will be addressed. The Town plans to offer water use consultations to high water users in the commercial sector to help them make water-efficient improvements in buildings and landscapes. The Town will also evaluate options for incentive programs to encourage less water use.

Bernalillo will continue to support the Children's Water Festival in the coming years. The Town is also planning to participate in the EPA Water Sense Fix a Leak program, which involves several educational efforts to inform residents about locating and repairing indoor plumbing leaks and outdoor irrigation system leaks. Town staff also plans to meet with school administrators to encourage the use of educational materials available through the OSE and other agencies.

Targeted User

This program would affect both residential and commercial water users, as well as school students.

Saturation of Target User

Of the Town's educational measures, the Facebook page reaches approximately 27 percent of the utility's customers, while the newsletter reaches about 90 percent, as it is mailed out with the water bills. The Children's Water Festival involves about 115 fourth-grade students, approximately five percent of the total school population. The summer library program, to which the Town plans to add the topic of water conservation, attracted 2,000 children in 2014. The incentive, water use consultation, and ordinance enforcement measures will likely be directed at small, targeted groups and are estimated to affect approximately 15 percent of the Town's water users.

Implementation Dates

An estimated implementation schedule for each conservation measure follows.

Municipal Equipment and Practices	2016-2018
Ordinance Enforcement	2015-2020
Water Use Consultations	2016-2018
Incentives Program	2017-2019
Ordinance and Other Education	2015-2020
Reuse	2018-2020
School Education	2015-2020

Anticipated Cost

The Town staff could accomplish most of the education and enforcement measures at a minimal cost. However, some contractual assistance, estimated to total approximately \$1,000, may be needed.

The cost for the replacement of toilets with more water-efficient ones in Town buildings is estimated to run \$75 per toilet for a flushometer valve replacement and \$225 per toilet if the total toilet fixture is replaced. There are about 80 toilets in the Town Hall, library, recreation center and other Town facilities. In 2014, a professional water auditor conducted an irrigation efficiency workshop, which included a water use survey of Athena Park. He found that the replacement of sprinkler head nozzles

would improve the water use efficiency of the park at a minimal cost. Similar improvements in the Town's other parks could bring additional water savings.

The Town plans to contract with a water use auditor to offer water use consultations to commercial customers. Each consultation would cost about \$500. Approximately six consultations would be conducted annually for a three-year period at an estimated annual cost of \$3,000. Additional grant funds will be needed to construct the infrastructure for reuse of treated wastewater. This project is estimated to cost about \$550,000.

The cost of implementing an incentive program depends upon the type of program that is chosen. For example, if Bernalillo were to implement a community-wide rebate program for the replacement of inefficient toilets for single-family residences at a typical rebate of \$100 per participant, the total estimated project cost could amount to about \$45,000 if 15 percent of the water utility's customers participated in the program. Because its financial resources are limited, the Town would require grant funding in order to accomplish such an effort.

For this reason, Bernalillo will likely choose an incentive program that is directed at a smaller, targeted group, such as older residences or high water users. For example, if 50 residential customers from a targeted group responded to a \$100 rebate for one toilet replacement per customer, that cost would be \$5,000. If 10 commercial customers took advantage of a \$100 rebate for replacing two flushometer toilets per customer, the cost would be \$2,000. In summary, the total project costs from 2015-2020 would be as follows.

Wastewater Reuse	\$ 550,000.00	*
Municipal Improvements (Toilets and Parks)	\$ 13,000.00	**
Ordinance/Other Education	\$ 1,000.00	***
Water Use Consultations	\$ 9,000.00	
Incentives Program	\$ 8,000.00	****

* This program element would require financial assistance from the State.

- ** Assumes a combination of partial (valve) and full toilet replacement
- *** For contractual assistance
- ****Possible targeted toilet rebate program; includes contractual assistance

Anticipated Staffing

The Town's water utility, planning and community development staff will implement the measures. Some contractual assistance will be needed to conduct the water use consultations, incentives program and education efforts. In addition, the completion of the reuse project will require contracting with a construction firm to build the reuse infrastructure according to the design plans that have been completed.

Funding Source

Additional funding will likely be needed to complete some of the facility improvement, incentive and consultation measures. In addition, state or federal funds will be required to build the infrastructure for reuse of treated wastewater. The Town plans to apply for funds from the New Mexico Water Trust

Board, the state's Community Development Block Grant program, and the U.S. Bureau of Reclamation's Water Conservation Program.

Anticipated Results and How They Align with Goals

All of the measures in this program meet Goal #2 of the plan: to increase water use efficiency in the commercial and residential sectors.

The installation of water-efficient toilets and plumbing fixtures in municipal buildings could reduce water use in those facilities by at least 10 percent. Commercial customers participating in water use consultations could expect to achieve a five percent reduction in water use. An incentive program would bring a range of water savings, depending upon its nature. The toilet rebate program used as an example in this plan would likely reduce water use in the homes and businesses of participating customers by about 20 percent. Increased enforcement of the Town's water conservation and drought management ordinance would also help increase water use efficiency by its focus on reducing wasteful water use practices. Although these programs would bring noticeable water savings to the customers affected, they would result in minimal overall water savings for the community, as they would affect only a small portion of water users. Therefore, the combined savings from these programs is estimated at one percent.

Significant water savings would occur from the reuse of treated wastewater to irrigate the Town's largest park, Rotary Park, which uses approximately 15 acre-feet of water annually for irrigation. The results of a recent survey conducted at Athena Park indicated that the replacement of sprinkler head nozzles to improve precipitation rates could potentially result in a water savings of up to 4 AFY. The total water savings from the reuse of treated wastewater for Rotary Park and potential irrigation efficiency improvements at Athena Park are estimated at one percent.

Educational programs, both for adults and children, have proven to reduce water use. Although it is difficult to directly attribute specific savings amounts to educational efforts, a conservative savings of one percent is reasonably anticipated. Although the recently enacted water rate revision was planned primarily to increase revenues to pay for rising system operational costs, the water rate increase will likely result in some reduced water use. Since per capita use is relatively low and most residential water use is related to indoor use, which has a relatively inelastic demand, a modest water savings of one percent is estimated.

The total estimated water savings from these demand management programs is four percent.

Why the Program was Chosen

The program was chosen to help achieve demand-side improvements in water use efficiency. A majority of the community's residents are efficient in their water use. However, additional regulatory and educational efforts are needed to educate high water users and eliminate wasteful practices, protect the water supply during water shortages related to drought and climate change, and educate school children for the future sustainability of the community's water resources. Water reuse is also planned to more efficiently meet the water demand for park irrigation and construction projects.

Estimated Lifetime Impact of the Program

The Town's water conservation and drought management ordinance contains requirements that are expected to remain in effect for many years and be strengthened over time. Educational efforts, especially those aimed at school children, are also expected to have a long-term impact. Water reuse may initially begin on a small scale but increase as additional infrastructure is added. The installation of water-efficient plumbing fixtures and irrigation equipment in the Town's facilities will help set a lasting example of wise water use. Incentive programs should also bring long-lasting impacts from the installation of water-efficient plumbing fixtures, appliances and irrigation equipment. Water savings from these demand management measures are estimated at four percent; and such savings should remain in place if water conservation program efforts take place at the anticipated level.

How the Program Will Be Implemented

The Public Works Director and the Town Manager will oversee the implementation of the program by the water utility, community development and planning staff. The program will likely some require contractual assistance for the consultation, incentive and education measures. The reuse project will require contractors to building the needed infrastructure.

Tracking and Evaluation

The Public Works Director, with assistance from the water utility, community development and planning staff, will track and evaluate the program's progress on an annual basis, identify needed adjustments, and implement them.

Annual Reporting and Updates

The Public Works Director and Town Manager, in coordination with the Town's water resources consultant, will prepare an annual report and updates on the program's status as required by the Town and by the OSE.

5.3 Process of Prioritizing Programs

Although both programs chosen for the water conservation plan are important to achieving the community's goal of water use efficiency, Goal #1 to improve the operational efficiency of the water supply system to reduce water losses and more accurately account for water use, is the program designated as the Town's first priority.

In the past, the Town has experienced a number of large leaks from distribution lines and problems with inaccurate meter readings, resulting in both apparent and real water losses. As a result, the Town's water utility staff has been focusing its efforts on metering and leakage improvements. These include beginning the replacement of manual-read meters with automatic-read meters, and repairing and replacing old distribution lines where the most leakage has occurred. Although significant progress has been made, there remains more to be done. The meter replacement program is approximately 50 percent completed, and there are still a number of old distribution lines prone to leakage that need to be replaced. This supply-side effort is the program that is expected to bring the most immediate and substantial water savings to the community.

A demand-side program is also planned, with the aim of improving water use efficiency in the residential and commercial sectors. This will be accomplished through educational and regulatory efforts related primarily to the implementation of the Town's recently adopted water conservation and drought management ordinance, which affects current water users and new developments. This program is the Town's second priority.

5.4 Current and Past Water Conservation Programs

Bernalillo has initiated a number of water conservation measures during the last twelve years to improve the efficiency of its water system, more accurately account for water use, and reduce water use by residential and commercial water users. The measures include the development of an initial water conservation plan, adoption of a water conservation and drought management ordinance, water use audits, distribution line replacement, disconnection of illegal connections, water use surveys, pressure reduction, monitoring of high usage accounts and meter issues, and beginning the transition to an ARM metering system. These actions are covered in more detail in Appendix D.

According to the GPCD Calculator, Bernalillo's water use has fallen from 152 GPCD in 2010 to 120 GPCD in 2014. This is well beyond the goal of 140 GPCD established by the OSE in the Town's water right permit. Similarly, the amount of non-revenue water has dropped from 37 GPCD (24 percent of diversions) in 2010 to 20 GPCD (less than 17 percent of diversions) in 2014. Although residential and commercial water use has decreased during this time, the primary reasons for the reductions have been supply-side measures such as the construction of a new wastewater treatment plant, repair and replacement of leaking water lines and pressure reduction.

5.5 Proposed Water Conservation Programs

How Selected Water Conservation Programs Meet Stated Goals and Objectives

There are two program areas identified in the water conservation plan. Each of these programs relate to one of the following goals, which in turn meet the plan's objective in helping to sustain the community's water supply to meet water needs in the coming years.

Goal #1: Improve the operational efficiency of the water supply system to reduce water losses and more accurately account for water use.

This goal and its related program include a meter replacement program to install automatic-read meters, use of the ARM-related software to more quickly identify leaks and respond to abnormally high water use, repair and replacement of distribution lines in which leakage is identified, regular production meter testing, and adjustment of water to maintain adequate rate revenues to meet increasing operational costs while continuing to encourage water conservation.

Goal #2: Increase water use efficiency in the commercial and residential sectors.

This goal and its related program include the installation of water-efficient equipment in Town buildings and landscapes, improved enforcement of the water conservation and drought management ordinance, water use consultations for high water users, incentives to encourage water use reductions, reuse of treated wastewater, and educational initiatives for both adults and school children.

Overall Timeline of Programs as Related to Objectives

Bernalillo plans to implement these programs during the five-year period of 2015-2020 covered by the water conservation plan, with most of the activity occurring from 2016 through 2018. Specific timeframes for each water conservation activity are identified in Section 5.2: Program Components.

Anticipated / Reported Results for the Water Conservation Plan

Table 2 lists the water conservation measures to be implemented from 2015 to 2020. These include both supply-side measures, estimated to result in potential water savings of three percent, and demand-side measures, with estimated savings of four percent. It is possible that implementation of all of these measures may decrease the impact of individual measures. For example, if leaking distribution lines are replaced, the effect of the enhanced leak detection efforts may be reduced. Therefore, we estimate that the total implementation of all of the measures will be to reduce diversions by five to seven percent.

System Total GPCD over Time

The Town of Bernalillo serves as a commercial center for a large percentage of Rio Rancho residents. As a result, there is a larger percentage of commercial use in Bernalillo than there is in towns of similar size. If there is a very large new commercial development, such as the Walmart Superstore, with no attendant increase in population, per capita use will increase even with increased conservation efforts. Although per capita use is very reasonable at 120 GPCD, it is the goal of this Plan to reduce per capita demand to 114 GPCD over time, based upon a five percent reduction in diversions. However, to the extent that there is extensive commercial development, that decrease may be offset by an increase in demand for commercial purposes.

SFR GPCD over Time

If all the demand management measures included in the plan are fully implemented, a projected water savings of up to two percent could be achieved. Based upon the 2014 single-family residential water use of 61 GPCD, the single-family residential GPCD could decrease to 60 GPCD over time.

Non-Revenue Water over Time

In 2014, non-revenue water represented 17 percent of diversions. This was primarily caused by older, inaccurate customer meters, the loss from older distribution lines and associated illegal connections in neighborhoods, such as in Las Cocinitas. In 2014, there was also significant water loss from line breaks which resulted from construction activities. If the Town is able to fund the completion of the ARM replacement program, and the replacement of the Mountain View distribution line, this should result in a decrease of 10-12 MGY in non-revenue water. If the Town continues to aggressively identify the location of water lines prior to construction projects, and is able to limit line breaks to three per year, with an estimated loss of 3 MG each, we estimate that there would be an additional savings of 10-12 MGY in non-revenue water. We believe the Town could reduce non-revenue water to less than 15 percent in the next five years and, depending upon the number of construction line breaks, could potentially reduce it to 12 percent of diversions.