FINAL

2015 Interbasin Transfer Certificate

Water Conservation Plan

Prepared for

Town of Cary
Town of Apex

Submitted to

North Carolina
Division of Water Resources

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SECTION 1

Introduction

The Towns of Cary and Apex (Towns) have a long history of developing plans to effectively manage their water resources and to ensure safe and reliable water supply for the communities they serve while being good stewards of the natural environment. As part of the long-term planning efforts, the Towns were granted an interbasin transfer (IBT) certificate modification on March 12, 2015, by the North Carolina Environmental Management Commission (EMC). The 2015 IBT certificate provides the Towns with a permitted IBT of 31 million gallons per day (mgd) from the Haw River basin to the Neuse River basin, and 2 mgd from the Haw River basin to the Cape Fear River basin, calculated as a daily average of a calendar month. In addition to the permitted transfer volume, the 2015 IBT Certificate includes a number of conditions the Towns must meet in order to maintain compliance with the IBT certificate. Under the authority of North Carolina General Statute (NCGS) 143-215.22L, the EMC included a certificate condition requiring the development of a Water Conservation Plan that specifies the water conservation measures that will be implemented by the Towns to ensure the efficient use of the transferred water.

This Water Conservation Plan (Plan) is structured to:

- Summarize the history of the Towns' water resources planning efforts and water conservation programs
- Present the Towns' water conservation strategy, including the overarching objective
- Highlight the Towns' approaches to supply-side and demand-side management, and how these approaches will provide for the efficient use of transferred water from the Towns' IBT source basin
- Summarize the Towns' implementation plans for the water conservation strategy

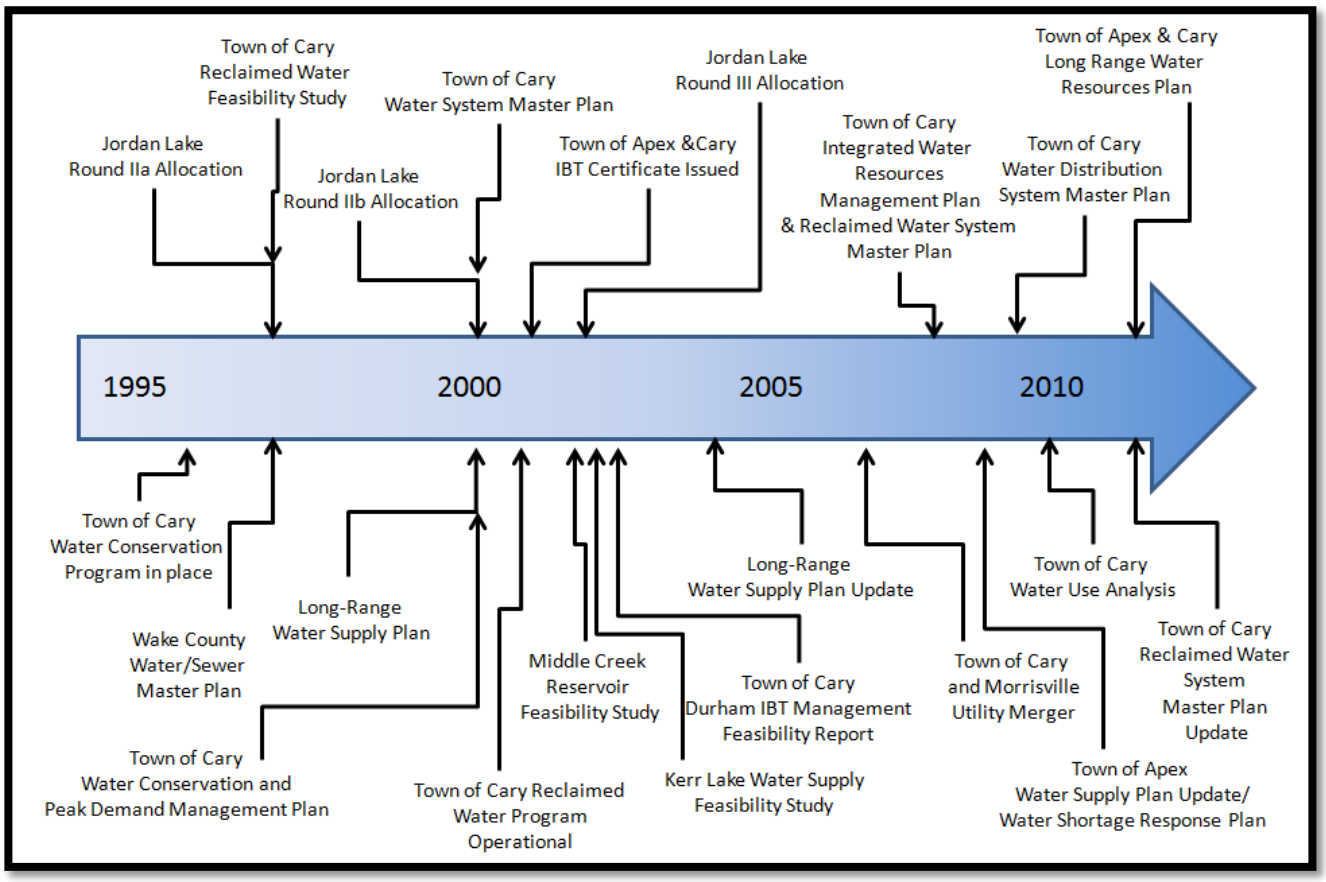
A description of each Town's current water conservation measures are outlined in Appendixes A and B, for the Town of Cary and Apex, respectively.

1.1 Water Resources Planning History

Combined planning efforts for the Towns began in the mid-1990s, and since 2000, the Towns have been actively implementing the recommendations provided in the *Long Range Water Supply Plan* (CH2M HILL, 2000) and the *Integrated Water Resources Management Plan* (CH2M HILL, 2007). A timeline of the water resources planning efforts since the 1990s is presented in Figure 1.

Most recently, the Towns of Cary, Apex, and Morrisville, and Wake County developed a *Long Range Water Resources Plan* (LRWRP) (CH2M HILL, 2013). The LRWRP took a long view – through 2060 – to prepare the Towns and County to meet their water resources challenges in a dynamic and holistic way, through development of a strategic Water Resources Portfolio. The Water Resources Portfolio represents a suite of strategies that provide flexible solutions to meet the Towns' water supply and demand challenges of the future.

FIGURE 1
Individual and Joint Water Resources Planning Efforts by the Towns of Cary and Apex



1.2 Water Conservation Program History

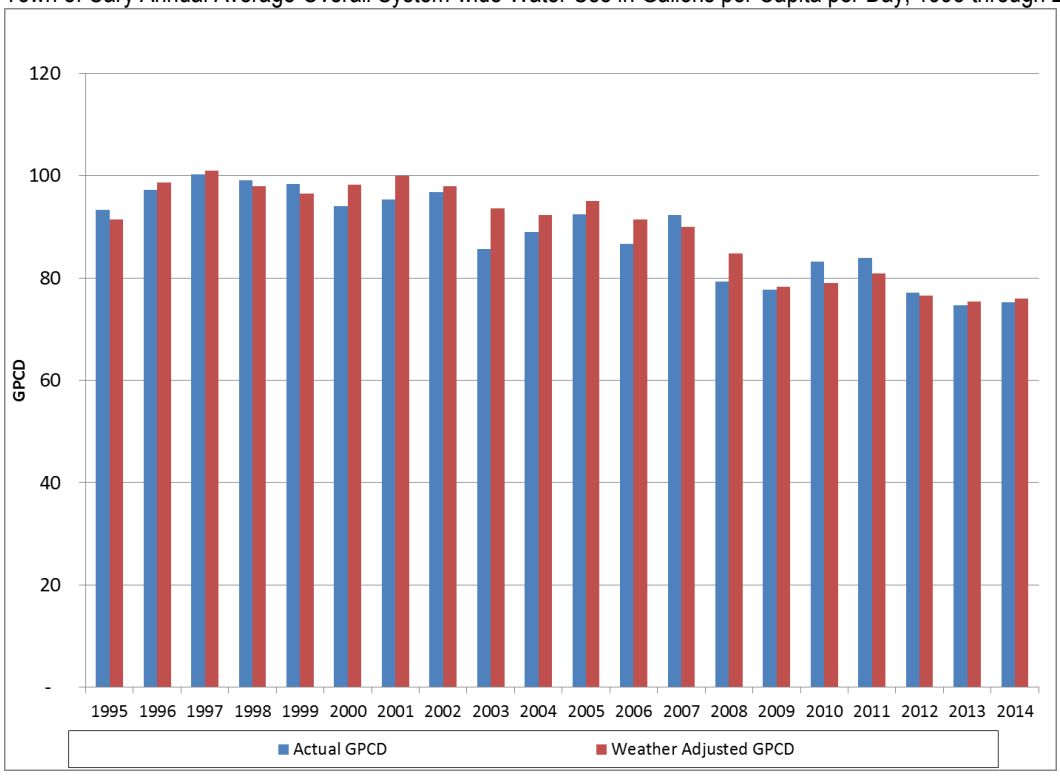
The Town of Cary's water conservation program started in 1996, and the Town of Apex put into place its first water conservation ordinance in 1973. The Town of Cary's program had a goal of reducing per capita water use by 20 percent in 2015 – a goal that was achieved early, in 2013. Both programs have evolved over the years in response to the success of conservation measures, as well as to changes in technology, customer use patterns, state regulations, and other factors. A description of the Towns' current water conservation programs are presented in Appendixes A and B, for the Town of Cary and Apex respectively.

The Town of Cary's program applies to customers in Morrisville and the Wake County portion of Research Triangle Park. The total water usage per capita for the Town of Cary's service area has declined, as shown in Figure 2. As part of a benchmarking study, completed for the Catawba-Wateree Water Management Group (Jacobs, 2014), of the nation's longest standing and successful water conservation programs, Cary's overall system-wide gallons per capita per day (gpcd) values were found to be the second lowest in the study group and well below the national average. As reported in their Local Water Supply Plans (LWSPs) submitted to the North Carolina Division of Water Resources (NCDWR) and available on NCDWR's website, Apex's per capita usage has similarly declined, from about 105 gpcd in 1997 to 80 gpcd in 2014.

In 1973, the Town of Apex recognized water as a valuable natural resource and adopted its first water conservation ordinance. In 1986, the Town updated this ordinance to recognize water as a limited natural resource. The Town's Water Conservation Program includes both supply-side and demand-side water management approaches and has a threefold approach to achieving water conservation by Town residents and businesses—education, incentive, and regulatory mechanisms.

Because of the decline in water use seen by the Towns over the past few decades – due to long-term conservation program efforts, and most recently, following two droughts of record (2002, 2007/2008) and an economic recession beginning in 2008, the focus of continued water conservation efforts is to maintain per capita usage within the same range.

FIGURE 2
Town of Cary Annual Average Overall System-wide Water Use in Gallons per Capita per Day, 1995 through 2014



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SECTION 2

Water Conservation Strategy

2.1 Overarching Objectives

As discussed in the preceding section, the Towns have done extensive planning and made it a priority to wisely manage available water resources with the overarching objectives, as defined in the Towns' LRWRP, as follows:

- Maintaining flexibility in managing available water supplies
- Maintaining efficient use of water resources
- Increasing the Towns' water resources resilience, which will also improve the overall regional resiliency
- Increasing the ability to adapt to changes in the future that are relatively uncertain; including, economic and business climate, technological advances, hydrologic and climate variability, and environmental regulatory changes

The Towns have implemented a number of water resources management and conservation strategies to achieve these objectives, including supply-side management and demand-side management. Sections 2.2 and 2.3 provide a highlight of the Towns' water conservation strategies. Appendixes A and B provide specifics on measures currently implemented by Cary and Apex, respectively, that are aligned with these strategies to achieve the Towns' overarching water resources management and conservation objectives.

2.2 Supply-side Management

For the Towns, the supply-side management strategy focuses on the accounting of water usage and minimizing water loss, with the overall objective of the efficient use of water for system operations. The following bullets highlight the Towns' approaches to achieving efficient water use within the potable water supply distribution system:

- The Town of Cary performs annual system-wide water audits using the American Water Works Association (AWWA) Water Loss Control Committee water audit method and software (*AWWA Manual M36*) (AWWA, 2009). For the period of July 2008 through June 2014, the amount of unmetered, nonrevenue water has ranged between 2 and 6 percent of potable water produced. This unmetered, nonrevenue water includes authorized, unmetered flushing and other distribution system operations.
- The Town of Cary use a hydraulic distribution system model to evaluate pressure and water delivery to customers.
- Regular calibration and replacement of water meters. The large meters at the Cary/Apex Water Treatment Facility (30 and 42 inches) are tested and calibrated about every 6 months.
- Cary has a leak detection program, and both Cary and Apex have pipe repair programs.

2.3 Demand-side Management

The Towns' demand-side management strategy focuses on influencing customers to use water efficiently – resulting in reduced water demand. Long-term water use reductions are achieved through a combination of changing technologies (for example, low-flow toilets) and behaviors (for example, fixing leaks).

The Towns' strategy is based on a three-point approach that includes the following elements:

- ***Education and Outreach***
    - The continued reinforcement of water conservation messaging helps ensure the long-term objectives for water use are met.

- Messages include educating customers on the value of water, wise water use practices, water-efficient technology, available incentives, and current water use regulations.

- ***Incentives***
  - Utility rate structures incentivize customers to use water efficiently by charging customers based on individual usage; the less water customers use, the more money they save.
- ***Regulations***
  - Regulations provide enforceable requirements to ensure the efficient use of water throughout the entire utility service area.

Inherent in the implementation of any demand-side management strategy are the uncertainties related to the outcomes and the end benefit from implementation. These uncertainties typically include customer (behavioral) response levels to conservation programs and messaging, market penetration, program funding levels, and growth, as well as larger societal trends. All of these factors not only impact the level of potential water savings on the potable water system from demand-side management, but also the timing of the potential savings.

Because of these uncertainties, the Towns take an adaptive approach to the implementation of conservation measures; evaluating, implementing, monitoring, and updating measures within each of the three categories as conditions change.

2.4 Efficient Use of Water from the Towns' Interbasin Transfer Source Basin

The implementation of the Towns' water conservation strategies (supply-side and demand-side management) will result in the efficient use of water in both the source and receiving river basins (Haw, Neuse, and Cape Fear River basins).

The projected future water demands and IBT volumes that are the basis of the Towns' approved IBT certificate modification include the water use efficiencies gained by the measures implemented to date by each Town continuing into the future, through 2045. In order to maintain the achieved water use efficiency and to keep alignment with the Towns' water conservation strategy objectives, continued commitment to supply-side and demand-side management will be necessary.

2.5 Reporting

2.5.1 Water Conservation Measure Implementation

Both Towns have a Secondary and Cumulative Master Management Plan (SCIMMP) by agreement with the North Carolina Department of Environment and Natural Resources (NCDENR), which includes a detailed description of Water Conservation measures (CH2M HILL, 2015a, 2015b). The SCIMMP requires a biennial report that is reviewed by NCDENR, including NCDWR. Therefore, the SCIMMP biennial reports will serve as the reporting document for this Water Conservation Plan.

2.5.2 Reporting on Water Conservation Effectiveness

The Towns are required to submit a LWSP annually to NCDWR. As part of this submission, the annual GPCD (residential and overall system-wide GPCD) is calculated and can be used to track the long-term status of water use efficiency on a per capita basis, similar to Figure 2. The LWSP updates will serve as the reporting mechanism regarding water conservation effectiveness.

SECTION 3

References

American Water Works Association (AWWA). 2009. *Manual M36: Water Audits and Water Loss Control Programs*. 3rd Edition.

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CH2M HILL. 2013. *Long Range Water Resources Plan*. Prepared for the Towns of Cary, Apex, and Morrisville and Wake County.

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North Carolina Environmental Management Commission (EMC). 2015. Certificate Authorizing the Towns of Cary and Apex to Transfer Water from the Haw River Basin to the Neuse and Cape Fear River Basins. March 12, 2015.

North Carolina General Statute (NCGS). 2014. Regulation of surface water transfers (NCGS 143-215.22L).

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Appendix A
Town of Cary Water Conservation Measures

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APPENDIX A

Town of Cary Water Conservation Measures (June 1, 2015)

This appendix describes the measures currently in place to implement the Town of Cary's (Town's) Water Conservation Program.

A.1 Supply-side Management

A.1.1 Annual System Water Audits, Leak Detection and Repair, and Meter Calibration

Measures to achieve efficient water use in the potable water distribution system implemented by the Town include:

- Annual system-wide water audits, using the American Water Works Association (AWWA) Water Loss Control Committee water audit method and software.
- Use of the Towns' hydraulic distribution system models to evaluate pressure and water delivery to customers.
- Regular replacement and calibration of meters.
- Leak detection and repair program.

A.1.2 Water Treatment Plant Operations

The Town operates the Cary/Apex Water Treatment Facility and shares ownership of the plant with the Town of Apex. Town staff continually looks for ways to limit the amount of water used during the treatment process by improving the efficiency of the facility. This process water is discharged back to Jordan Lake.

The North Carolina Division of Water Resources Public Water Supply Section (PWSS) has granted approval to the Town to recycle treated residuals handling effluent during unusual or emergency events, such as a water supply emergency or peak flow condition. The Town must obtain approval from PWSS prior to recycling, conduct additional water quality monitoring during recycling, and stop recycling if there is a negative impact on the water treatment process.

A.2 Demand-side Management

A.2.1 Education

The Town has developed a broad spectrum of initiatives to educate the public about wise water use, including the various methods described in this section.

Beat the Peak Campaign

The Beat the Peak campaign, started in 1998, is an annual outdoor water conservation initiative to educate customers about efficient irrigation practices, technology, and equipment, and to remind them of the year-round watering ordinances. The campaign varies from year to year but typically includes tactics such as a residential postcard, ads shown during Town-sponsored movie events, monthly BUD utility newsletter tips, Cary It Green Facebook posts, and Conservation Corner public access television spots.

School and Public Educational Programs

Upon request and when staff schedules permit, the Town provides educational lessons in the classroom, prior to tours of water or wastewater treatment facilities, or for other student or civic group meetings.

Fix a Leak Week

As a U.S. Environmental Protection Agency WaterSense promotional partner, the Town participates in the Fix a Leak Week campaign held in March each year. This program helps keep wise water use at the forefront of customers' minds even in the winter by helping customers understand how to analyze their water use.

Block Leader Program

The Block Leader Program, which began focusing on water conservation in 1998, is a volunteer program to educate residential customers about water wise tools, tips, and program offerings. The scope of the program has expanded to include other conservation, utility, transportation, and stormwater issues. Block Leaders, after attending a training session, distribute information and promotional items to a designated residential "block" or area within their neighborhood.

AquaStar

The Town's AquaStar system, an advanced metering infrastructure system, provides customers with online data showing their water use monthly, weekly, daily, or even hourly. Customers are encouraged to understand their water use and to set alerts so that they are notified of water use that might be outside their normal range. Using AquaStar data, Town Finance staff identify potential leaks on the customer side of the meter by identifying anomalies. Customers with the highest potential for large or continuous leaks are called by Finance staff to alert them about potential issues.

Water Audits

Town staff conduct water audits for customers upon request. Most of the requests for indoor water audits are generated through the Finance Department from customers who are concerned about an abnormally high water bill. While the main focus of the water audit is usually to identify whether there is a leak, it also provides an opportunity for Town staff to have a one-on-one discussion with the customer about water-efficient technology, water-wise habits, incentives for lower water use, and whether the customer is statistically above or below Town water use averages. The Town also conducts one-on-one irrigation audits to help customers improve the efficiency and effectiveness of their irrigation system.

Promotional Materials and Town Website

Direct mailings, utility bill insert messages, brochures, flyers, and messages in the distribution of Annual Drinking Water Quality Reports all aid in the education of customers. The Town's website (https://www.townofcary.org/Departments/waterresources/waterconservation.htm) provides information on ordinances, incentives, education programs, and measures for being more water efficient, and also provides significant detail on irrigation systems and landscaping.

A.2.2 Incentives

Tiered Rate Structure

A tiered rate structure is a set of utility rates designed to incentivize efficient use of water by charging customers higher incremental rates for larger quantities of water consumed.

The Town's tiered rate structure was implemented in 2001. Current utility rates and fees can be found on the Town's website (www.townofcary.org) by searching "Utility Rates and Fees."

A.2.3 Regulations

Water Waste Ordinance

The Water Waste Ordinance (Town of Cary Ordinances, Article III, Division I, Chapter 36, Section 36-83, effective in 1997):

1. States that a customer cannot directly water impervious surfaces to the extent that the water runs off the property.

2. Prohibits over-watering to the extent that the soil is saturated and excess, irrigated water flows off the property.
3. Prohibits knowingly allowing a leak to persist on the customer side of the meter.

Rain Sensor Ordinance

The Rain Sensor Ordinance (Town of Cary Ordinances, Article III, Division I, Chapter 36, Section 36-84, effective in 1997) requires all automatic irrigation systems, existing and new, to be fitted with a rain sensor that overrides the irrigation controller, shutting off irrigation, when one-quarter inch of rain or more has fallen.

Alternate Day Watering Ordinance

This ordinance (Town of Cary Ordinances, Article III, Division I, Chapter 36, Section 36-80, effective in 2000) regulates the days of the week that customers can irrigate with automatic irrigation systems and sprinklers. The schedule for all customers is based upon the address number associated with the meter. Odd-numbered addresses can water on Tuesday, Thursday, and Saturday; and even-numbered addresses can water on Wednesday, Friday, and Sunday. On Mondays, all irrigation with potable water using an automated irrigation system is prohibited. Hand watering and drip irrigation can occur any day of the week. Residences that use reclaimed water, well water, or ponds for irrigation are not subject to this ordinance.

Land Development Ordinance

The Land Development Ordinance (LDO) (Chapter 7, Development and Design Standards) regulates how land within Cary's town limits and planning jurisdiction can be developed. Chapter 7 of the LDO states that non-residential customers shall promote water conservation and efficiency through preserving natural areas, encouraging good soil management, and encouraging the use of native and drought-tolerant plant materials.

The Town recommends using a list of native, drought-tolerant plants published by the North Carolina Agricultural Cooperative Extension for selection of plants to include in landscaping plans. The Town's Planning Department reviews, approves, and permits all development plans for non-residential areas and ensures compliance with the LDO.

The Town's 2003 *Community Appearance Manual*, referenced by the LDO, specifies requirements for irrigation system design, such as head-to-head coverage and check valves on all heads on a steep slope.

Irrigation System Permitting

In 2003, the Town began requiring a permit for all new automated irrigation systems. The system and its installation must comply with the North Carolina State Plumbing Code and the Town's Irrigation Design Specifications. Irrigation contractors must also comply with General Statute Chapter 87G Irrigation Contractor License, and plumbing contractors must be licensed by the State and be listed in the permit application. Commercial irrigation system plans are required to be sealed by a professional engineer, a landscape architect, or a certified irrigation contractor or designer. Residential property owners must follow the irrigation design specifications and plumbing requirements, but do not have to submit a professionally designed plan. Town staff review irrigation system plans as part of the permit application process.

Requirement for Separate Irrigation Meters

The Town has had an ordinance in place requiring separate irrigation meters for in-ground irrigation systems since 2002 (Article III, Division I, Chapter 36, Section 36-76). The Town's ordinance is consistent with North Carolina Session Law 2008-143, enacted in 2008, which specifies that separate irrigation meters be required by water providers statewide.

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Appendix B
Town of Apex Water Conservation Measures

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APPENDIX B

Town of Apex Water Conservation Measures (June 1, 2015)

In 1973, the Town of Apex (Town) recognized water as a valuable natural resource and adopted its first water conservation ordinance. In 1986, the Town updated this ordinance to recognize water as a limited natural resource. The Town's Water Conservation Program, overseen by the Public Works and Utilities Department, includes both supply-side and demand-side water management approaches and has a threefold approach to achieving water conservation by Town residents and businesses—education, incentive, and regulatory mechanisms. This appendix describes the measures currently in place to implement the Town's Water Conservation Program.

B.1 Supply-side Management

B.1.1 System Water Audits, Pipe Repair and Replacement, and Meter Calibration

Measures to optimize the Towns' water distribution infrastructure and, in turn, limit water loss include:

- System-wide water audits
- Regular replacement and calibration of meters
- Repair and replacement program for distribution system pipes

B.1.2 Water Treatment Plant

The Town collaborates with the Town of Cary in the operation of the Cary/Apex Water Treatment Facility. Town staff continually looks for ways to limit the amount of water used during the treatment process by improving the efficiency of the facility. This process water is discharged back to Jordan Lake.

The North Carolina Division of Water Resources Public Water Supply Section (PWSS) has granted approval to the Town to recycle treated residuals handling effluent during unusual or emergency events, such as a water supply emergency or peak flow condition. Apex and Cary must obtain approval from PWSS prior to recycling, conduct additional water quality monitoring during recycling, and stop recycling if there is a negative impact on the water treatment process.

B.2 Demand-side Management

B.2.1 Education

The Town wants to ensure that simple conservation measures become common knowledge and common practice through an education program. The Town distributes a brochure that identifies additional conservation information, including the irrigation schedule, approaches to limit overspray and backflow, and meter usage. In addition, the Town has water conservation tips, including ideas for the bathroom, kitchen, and yard, and a water usage tracker tool on their website: http://www.apexnc.org/246/ Water-Conservation/.

The following voluntary water conservation practices are encouraged through the education program and on the Town's website:

- Track water usage, trying to reduce each month.
- Irrigate the minimum required, not during the hottest time of the day, and avoid mowing during droughts.
- Limit vehicle washing.

- Refrain from washing down impervious surfaces, such as sidewalks, driveways, and patios.
- Refrain from leaving faucets running, and install water-saving devices.
- Only run full loads for laundry and dish washing, or use disposable or biodegradable dishes.
- Check for and repair leaks.
- Take showers instead of baths, and limit flushing of toilets.

B.2.2 Incentives

Rate Structure

The Town currently has a base charge rate and a cost per 1,000 gallons as its water rate structure. This base charge approach provides for a steady income stream into the Town even during drier periods when water uses are limited. This aids in maintaining funding for programs such as pipeline rehabilitation and replacement, which is important for limiting water loss and keeping the distribution system optimally functioning. The usage charge helps to promote efficient water use by charging customers for the water quantity used during the monthly billing cycle; customers can save money by reducing water consumption.

Current utility rates and fees can be found on the Town's website (https://www.apexnc.org/241/Utility-Rates-Schedules).

Rain Barrels

The Town offers rain barrels for sale at cost to its customers. These devices help to shave peak water demands in drier periods. Advertised on the Town's website, up to two rain barrels can be purchased per customer.

B.2.3 Regulations

Water Conservation Ordinance

First adopted in 1973, and amended many times since then, the Town's Water Conservation Ordinance (Town Code, Chapter 12, Article III, Division 5) details continuing water conservation measures. To help ensure the wise and efficient use of water, the following measures apply to all Town water customers at all times, whether or not a water shortage exists:

Water Waste

- No person will operate an irrigation system in a manner that allows water to fall on impervious surfaces, such as driveways, roads, sidewalks, or the like.
- No person will operate an irrigation system in a manner that allows water to accumulate to the extent that it runs off the property.

Rain Sensor

- Rain sensors are required on all automatic irrigation systems. Rain sensors are devices that measure rainfall and override the irrigation systems; thus, shutting them off.
- To meet the requirements of this ordinance, meters should shut off irrigation systems when one-quarter inch or more of rain has fallen.

Alternate Day Watering

- An odd/even day irrigation schedule for all Town customers is enforceable year-round, allowing customers to irrigate 3 days per week. No irrigation is permitted on Mondays.

- Water customers may obtain a 45-day New Landscape Permit to allow for the establishment of new plantings, including large commercial plantings or the installation of new sod or seed to a bare area of more than 50 percent of the grassed or proposed grassed area of a residential yard.

The Water Conservation Ordinance Section 12-103 (c) states that if restrictions or bans are placed on certain types of water use, the Public Works and Utilities Department and other Town employees enforce the restrictions or bans. The first violation results in a written notice ordering that the violation be corrected within a specified time. If the violation is not corrected or repeat violations occur, civil penalties of up to $1,000 per day may be enforced.

Building Code

The Town uses its building code to require the installation of water-saving devices. This is part of the Town's commitment to ensuring quality development that protects the environment. Recent advances in water-saving devices, like low-flow showerheads and toilets, can use up to a third less water than devices installed just a few years ago. Required by the current building code, these two advances save millions of gallons per year. Ongoing advances in water-saving devices will continue to reap benefits in water conservation as they are either replaced in older developments or installed in new developments.

Landscaping Design Standard

Section 8.2.2 of the Town's Unified Development Ordinance states that new landscaping shall be entirely native or adaptive plants that reflect the surrounding plant materials and environment, with the goal of furthering the benefits of water conservation.

Requirement for Separate Irrigation Meters

A second water meter for new irrigation systems connected to the Town's water system were required beginning July 1, 2009. The Town's ordinance is consistent with North Carolina Session Law 2008-143, enacted in 2008, which specifies that separate irrigation meters be required by water providers statewide.

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