Drought Management Plan

2017 Interbasin Transfer Certificate

Yadkin Regional Water Supply

Union County, NC
Town of Wingate, NC

Submitted to:
NC Division of Water Resources

May 2019

Introduction

In a letter dated May 25, 2017, Union County (the County) and the Town of Wingate (Applicants) were notified that at their May 11, 2017 meeting the Environmental Management Commission (EMC) granted an Interbasin Transfer (IBT) Certificate to transfer 23.0 million gallons per day (MGD) from the Yadkin River IBT Basin to the Rocky River IBT Basin.

The Union County Water System currently serves customers in both the Catawba River IBT Basin and the Rocky River IBT Basin, which is a sub-basin of the Yadkin River. The ridgeline between the Catawba River Basin and Yadkin River Basin divides the County, with neither of these two major rivers flowing within the County boundaries.

The County currently holds a 5 MGD authorized transfer (i.e., a grandfathered IBT amount) of water from the Catawba River IBT Basin to the Rocky River IBT Basin. This value is based upon the definition of a grandfathered IBT as stipulated in North Carolina Administrative Code 15A NCAC 02E .0401(d) where "a certificate is not required to transfer water from one river basin to another up to the full capacity of a facility to transfer water from one basin to another if the facility was existing or under construction on July 1, 1993. The full capacity of a facility to transfer water shall be determined as the capacity of the combined system of withdrawal, treatment, transmission, and discharge of water, limited by the element of this system with the least capacity as existing or under construction on July 1, 1993."

The County's 5 MGD authorized transfer from the Catawba River IBT Basin to the Rocky River IBT Basin is based upon the capacity of the water transfer infrastructure which was in place within the County as of July 1, 1993, as documented in the County's Grandfathered IBT Worksheet prepared by CH2MHill on behalf of the County and submitted to the North Carolina Division of Water Resources (DWR) on October 19, 2000.

To maintain compliance with the Catawba River IBT Basin grandfathered IBT, the County currently returns a portion of the transferred water back into the Catawba River IBT Basin via the Poplin Road wastewater pumping station. The County also has plans to build scalping infrastructure to allow the capability to return additional water to the Catawba River IBT Basin via the Crooked Creek Wastewater Treatment Plant. Additionally, the County currently holds a water purchase agreement (which will be automatically renewed in 2019, based on the 12-month notification deadline having passed) with Anson County for 4 MGD of water supply that is utilized in the County's Yadkin River Basin Service Area. The County is not required to have an IBT Certificate for this purchase since Anson County is the entity moving the water

from the Yadkin River IBT Basin to the Rocky River IBT Basin and they have secured a grandfathered IBT for this transfer.

As a condition of the most recent IBT Certificate granted, and pursuant to N.C.G.S. § 143-215.22L(n)(1), the Applicants are required to provide a drought management plan that "specifies how the transfer shall be managed to protect the source river basin during drought conditions or other emergencies that occur within the source river basin. Except in circumstances of technical or economic infeasibility or adverse environmental impact, this drought management plan shall include mandatory reductions in the permitted amount of the transfer based on the severity and duration of a drought occurring within the source river basin and shall provide for the mandatory implementation of a drought management plan by the applicant that equals or exceeds the most stringent water conservation plan implemented by a public water system that withdraws water from the source river basin."

To facilitate the required water conservation and water shortage response plan comparisons, the Applicants have completed an evaluation of the conservation and water shortage response plans for 28 water systems in the basin that were identified for inclusion. This evaluation included both a system website review and, where needed, staff interviews relative to conservation plans and measures implemented. It also included a review of all available WSRPs relative to drought management measures.

Based on this review it was determined that the WSRPs are serving as both the conservation plan and drought management plan for all but a few of the more proactive systems or systems also under this same IBT requirement (i.e., Concord, Kannapolis, and Davidson Water).

A Conservation Plan Comparison Matrix was created to capture the six primary components expected in a conservation plan – rate structure, water loss reduction efforts, outdoor water use, plumbing retrofitting, public education, and alternative water management (i.e., reuse, etc). The Conservation Plan Comparison Matrix is included in Appendix A of this plan.

A Water Shortage Response Plan Comparison Matrix was created to capture response stages, triggers, and measures taken at all response stages. The Water Shortage Response Plan Comparison Matrix is included in Appendix B of this plan.

In order to evaluate these plans to determine the most stringent (effective), a Water Conservation Program Stringency/ Effectiveness Comparison Matrix was developed that has one to two measures for each of the six conservation categories for a total of eight measures. Each of the system plans were evaluated for all the established conservation measures. Those systems meeting at least four of the eight measures (Concord, Kannapolis, Mt Airy, and

Union County) were further evaluated relative to the triggers used to implement the conservation/drought response stages. The measure used for this last evaluation was the Yadkin Pee Dee LIP or Catawba Wateree LIP as the response trigger for the various response levels. To have a fully valid plan comparison the plans need a common trigger for the higher-level conservation implementation. The results of this evaluation are shown in the Conservation Plan Comparison Decision Matrix's figure in Appendix C.

In each case the Union County Conservation Plan and Water Shortage Response Plan is either equal to or exceeds the requirements and actions of other plans and therefore meets the requirements of N.C.G.S. 143-215.22L(n)(1). This Plan will be implemented by the Applicants.

Source Basin Protection

As discussed in the previous section, the Union County Water System currently serves customers in both the Catawba River IBT Basin and the Rocky River IBT Basin, which is a sub-basin of the Yadkin River. Union County's current water shortage response plan (WSRP) uses the Catawba-Wateree Low Inflow Protocol and the NC Drought Management Advisory Council to prompt a change in water shortage stage, and thus a change in mandatory water restrictions, using whichever level is highest to apply to all Union County customers. When the Applicants begin withdrawing water via this IBT Certificate, they will use the Yadkin-Pee Dee Low Inflow Protocol as an additional source of drought stage guidance as well.

The Applicants have made a commitment to protect both source basins at the time of withdrawals under this IBT Certificate by implementing the drought response from their Water Shortage Supply Plans based on the most severe drought stage indicated by the Low Inflow Protocol in either the Catawba or Yadkin basin, which will apply to all Union County customers regardless of in which basin they are located. Union County's current WSRP is included as Appendix D, for additional details. A revised WSRP that incorporates the Yadkin-Pee Dee Low Inflow Protocol will be submitted to DWR prior to the withdrawal of water from the Yadkin River IBT basin.

Yadkin-Pee Dee Low Inflow Protocol

The Yadkin-Pee Dee Federal Energy Regulatory Commission (FERC) relicensing process was completed in 2015. One major element of the Comprehensive Settlement Agreement or CSA is the implementation of the Yadkin-Pee Dee Low Inflow Protocol (YPD-LIP), which established a policy for how the licensees and other Yadkin River stakeholders will operate during periods

of drought. This YPD-LIP requires regional water users to move through a series of staged water use restrictions during worsening drought conditions. The goal of the YPD-LIP is to delay the point at which the Yadkin Hydroelectric Project and the Yadkin-Pee Dee Hydroelectric Project reservoirs are fully depleted while maintaining downstream flows. As a stakeholder in the Yadkin-Pee Dee River Basin, Union County has agreed to comply with the prescribed requirements defined in the YPD-LIP.

The YPD-LIP describes indicators defined by worsening hydrologic conditions. These indicators use specific measurements to determine the various water shortage stages of low inflow conditions or water shortages. A summary of indicators for the various water shortage stages is provided in the below table. When the licensees or the Yadkin-Pee Dee Drought Advisory Group declare a water shortage stage based on the YPD-LIP indicators, the County shall also declare the same stage, or a more severe stage if other conditions apply in the County.

Yadkin-Pee Dee Low Inflow Protocol Triggers

Stage	High Rock Reservoir Elevation		US Drought Monitor 3-Month Numeric Average		Stream Gage 3-Month Rolling Average as a percent of the Historical Average[3]
0	< NME[1] minus 0.5 ft	**and**	any	**or**	any
	OR				
	< NME[1]	**and either**	≥ 0	or	<48%
1	< NME[1] minus 1 ft	**and either**	≥ 1	**or**	<41%
2	< NME[1] minus 2 ft	**and either**	≥ 2	**or**	<35%
3	< NME[1] minus 3 ft	**and either**	≥ 3	**or**	<30%
4	< 1/2 of NME[1] minus Critical Reservoir Water Elevation[2]	**and either**	≥ 4	**or**	<30%

[1] *NME is defined as the monthly normal minimum elevation in the reservoir.*
[2] *Critical Reservoir Water Elevation is defined as the minimum water elevation at which hydropower generation can be operated under normal conditions at High Rock Reservoir.*
[3] *The sum of the rolling 3-month average for the Monitored United States Geological Survey ("USGS") Streamflow Gages as a percentage of the period of record rolling average for the same historical 3-month period for the Monitored USGS Streamflow Gages.*

Recovery from the YPD-LIP will be triggered by any of the following three conditions:

1. All three trigger points identified on the above table for the lower water shortage stage are met.
2. High Rock Reservoir water elevations return to at or above the NME plus 2.5ft.
3. High Rock Reservoir water elevations return to at or above the NME for two consecutive weeks.

Upon meeting any of the above three conditions, the responses will be as follows (respectively):

1. The LIP recovery will be a general reversal of the staged approach on the first of each month if a slow recovery is indicated.
2. The LIP will be discontinued immediately.
3. The LIP will be discontinued immediately.

Catawba-Wateree Low Inflow Protocol

Union County participated in Duke Energy's Federal Energy Regulatory Commission (FERC) relicensing process for the Catawba River and became a signatory stakeholder for the Relicensing Agreement. One major element of the Relicensing Agreement is the implementation of the Catawba-Wateree Low Inflow Protocol (CW-LIP), which establishes a policy for how Duke Energy and other Catawba River stakeholders will operate during periods of drought. This CW-LIP requires regional water users to move through a series of staged water use restrictions during worsening drought conditions. The goal of the CW-LIP is to delay the point at which the Catawba-Wateree River system's usable water storage is fully depleted and provide additional time to allow precipitation to restore stream flow, reservoir levels, and groundwater levels to normal ranges. As a signatory stakeholder, Union County has agreed to comply with the prescribed requirements defined in the CW-LIP.

The CW-LIP describes indicators defined by worsening hydrologic conditions. These indicators use specific measurements to determine the various water shortage stages of low inflow conditions or water shortages. A summary of indicators for the various water shortage stages is provided in the table below. When Duke Energy declares a water shortage stage based on the CW-LIP indicators, the County shall also declare the same stage, or a more severe stage if other conditions apply in the County.

Catawba-Wateree Low Inflow Protocol Triggers

Stage	Storage Index[1]		US Drought Monitor 3-Month Numeric Average		Stream Gage 6-Month Rolling Average as a percent of the Historical Average[2]
0[3]	90% < SI < 100% TSI		DM ≥ 0		≤ 85%
1	75% < SI ≤ 90% TSI	**and**	DM ≥ 1	**or**	≤ 78%
2	57% < SI ≤ 75% TSI	**and**	DM ≥ 2	**or**	≤ 65%
3	42% < SI ≤ 57% TSI	**and**	DM ≥ 3	**or**	≤ 55%
4	SI ≤ 42% TSI	**and**	DM ≥ 4	**or**	≤ 40%

[1] *The ratio of Remaining Usable Storage to Total Usable Storage at a given point in time.*
[2] *The sum of the rolling 6-month average for the Monitored United States Geological Survey ("USGS") Streamflow Gages as a percentage of the period of record rolling average for the same historical 6-month period for the Monitored USGS Streamflow Gages.*
[3] *Stage 0 is triggered when any two of the three indicator points are reached.*

During recovery from a water shortage stage, the progression of stages will be reversed. All three indicator points identified on the above table for the lower water shortage stage must be met or exceeded before returning to that lower stage (except as indicated in the table above regarding a Stage 0 Water Shortage).

North Carolina Drought Management Advisory

The North Carolina Drought Management Advisory Council (NCDMAC) has statutory authority and is responsible for issuing drought advisories tailored to local conditions. The NCDMAC can issue drought classification and response actions by county. If the US Drought Monitor of North Carolina shows more than one drought designation in a county, the drought classification for the county is the highest drought designation that applies to at least twenty five percent (25%) of the land area of the county.

The NCDMAC may recommend a drought designation for a county that is different from the designation based on the U.S. Drought Monitor of North Carolina if the depiction of drought does not accurately reflect localized conditions. In recommending a drought designation that differs from the U.S. Drought Monitor designation, NCDMAC will consider stream flows, ground water levels, the amount of water stored in reservoirs, weather forecasts, the time of year and other factors that are relevant to determining the location and severity of drought conditions. The NCDMAC makes recommendations that the County will take into consideration. When the NCDMAC declares a water shortage stage, the County shall also declare the same stage, or a more severe stage, if other conditions apply in the County.

Water Shortage Response

The Applicants' Water Shortage Response Plans (WSRPs) are filed with DWR and attached to this document as Appendices D and E. Union County supplies all of the Town of Wingate's water, thus Town of Wingate is required to recognize the same drought stage as Union County. Union County will declare the drought stage based upon the sources described in the previous section, and keep Town of Wingate abreast of the latest information.

Modifications to WSRPs

This drought management plan references Water Shortage Response Plans filed with DWR. As such, any approved modifications to those documents will be considered effective immediately in the context of this plan.

Mandatory Drought-based Transfer Reduction Schedule

Pursuant to the IBT statute N.C.G.S. 143-215.22L (n)(2)the Drought Management Plan needs to contain information addressing the following requirement – "….drought management plan shall include mandatory reductions in the permitted amount of the transfer based on the severity and duration of a drought….". The Applicants are also bound by the Catawba-Wateree and Yadkin-Pee Dee LIPs and will implement all required actions required by the LIPs and aim for the included reduction goals that vary based on the drought stage. These reduction goals are shown by stage in the table below.

The vast majority of utilities as shown in Appendices A and B as well as the LIPs have no mandatory restrictions on water usage until reaching Stage 2 drought. This is contrast with the Applicants that have proactively implemented year-round irrigation restrictions limiting irrigation to only three days per week regardless of the drought conditions. In addition to this, more than 80% of residential customers had homes constructed since 1990 when plumbing code changes set maximum water consumption standards for fixtures that were significantly lower than historical devices, and these maximums have been revised downward multiple times since their initial implementation. The County also engages in extensive year-round educational outreach around conservation. The effect of these unique system characteristics are estimated to produce an effect of 5-10% reduction in water usage on top of reductions proposed below.

With the prevalence of low-flow devices throughout the customer base, the biggest target for additional conservation during times of drought comes from outdoor water use, although other behavioral changes are encouraged or required based on the stage of drought as shown in Appendix D. An analysis of historical outdoor water use by customers in the Rocky River IBT Basin as a percent of total water use within the basin was done to determine what would be the reasonable upper limit of mandatory reductions.

Outdoor use was defined two different ways, given that only a small percent of residential customers have a separate irrigation meter. The data analyzed was for the time period of May through November for the years 2016, 2017 and 2018. For the first method, all usage by irrigation meters, including both residential and non-residential customer categories, was totaled and determined to be approximately 6% of summer water sales to customers in the basin. Second, all residential usage through the domestic meter that exceeds 7,000 gallons in a month was totaled and determined to be approximately 9% of water sales in summer months.

Since no outdoor water usage is permitted during Stage 4, it was assumed that the sum of these two reductions would be the reasonable mandatory reduction maximum. This mandatory reduction of 15% was used for Stage 4, with the lower stages increasing incrementally.

Appendix F details the calculations used to arrive at the mandatory reductions. Both LIP reduction goals as well as the mandatory reductions are shown in the table below. In keeping with the requirements in the LIPS, the mandatory goals will be effective within 14 days of the declaration of a drought stage and recovery from the mandatory transfer reductions will follow the same process outlined in the Yadkin LIP.

Drought Target and Mandatory Reductions Summary

LIP Drought Stage	% Reduction Goal in Catawba-Wateree LIP	% Reduction Goal in Yadkin-Pee Dee LIP	% Mandatory Reduction	Maximum Transfer Amount (MMAD) in MGD
None or 0	0	0	0	23
1	3 - 5%	5%	2.5%	22.43
2	5 - 10%	10%	5.0%	21.85
3	10 - 20%	20%	10.0%	20.70
4	20 - 30%	30%	15.0%	19.55

These mandatory reductions for allowable basin transfers represent the expected reductions in water use in the Yadkin portion of the Union County Utilities service area. The reduction percentages are based upon the specific water use restrictions that will go into effect at the various drought stages as defined in the Union County Water Shortage Response Plan (Appendix F). These restrictions include, but are not limited to, water drawn from a County hydrant and transported by tanker outside the boundaries of Union County beginning in Stage 1; prohibition of public building, sidewalk, and street washing in Stage 2; prohibition of the use of water for dust control on construction sites in Stage 3; and required use of disposable plates and utensils at all restaurants in Stage 4. Limitations on the number of allowable irrigation days are in all stages, reducing as the stages increase, with the prohibition of all non-essential water use (I.e., irrigation and any other use of water outside a structure, except for fire suppression) in Stage 4. It is important to note that all voluntary and mandatory restrictions from the previous stages are applicable on all subsequent stages. A complete list of the voluntary and mandatory restrictions by stage, stage triggers, and additional details are in Appendix F, Union County Water Shortage Response Plan.

A

Appendix A

Conservation Plan Comparison Matrix

Water Conservation Program Comparison

Utility		Union Co	Albemarle	Anson Co	Concord	Davidson Water
Water Rates	Gallons included with Base Rate	Residential and Commercial Base rate includes 0 gallons	Residential & Commercial Base rate includes 300 gallons	Residential & Commercial Base rate includes 2,000 gallons	Residential & Commercial Base rate includes 0 gallons	Residential & Commercial Base rate includes 2,000 gallons
	Structure	Residential: 5 rate tiers - inclining block Irrigation: 5 rate tiers - inclining block Commercial: uniform rate All rates increase based on drought stage except Tier 1 (<3,000 gallons)	Declining block Residential & Commercial: 3 rate tiers	Declining block	Residential: 3 rate tiers - inclining block Irrigation: uniform Commercial: uniform Tiers 2 and 3 increase 10% during drought stage	Uniform rate
	"Conservation Signal Rate" (> 10,000 gal/month consumption) from UNC Environmental Finance Center study	Conservation signal (Tier 4): $6.60/1,000 gallons Also have Tier 5: $10.75 (>15,000 gal) Base rate: $2.50/1,000 gallons	N/A - Declining block	N/A - Declining block	Conservation signal: $8.58/1,000 gallons (same as irrigation rate) Base rate: $5.36/1,000 gallons	N/A - Uniform rate
Education		Annual water quality report posted on website; Information on website (lowers rates, minimizes effects of droughts/water shortages, preserves environment, builds safe/beautiful communities); link to other water resources information; WSRP and Water Use Ordinance. Other activities include school presentations, booths at community events and businesses, bill inserts, social media posts and customer email blasts, vehicle signs promoting conservation and website year-round, outbound customer calls.	No education information or WSRP found on the website: however, website notes that due to their supply they did not have to implement mandatory restrictions in last severe drought. No response to phone inquiries (2).	No information found on county website for water conservation other than the unauthorized use of fire hydrants is prohibited. WSRP not found on Anson County website. No response to phone inquiries (2).	Website prominently displays water conservation stage on Water Resources page with easy links to additional information. Includes: Water use guidelines based on level of drought; WSRP; annual water reports; conservation tips including tips for watering plants in a drought. Link to water resources which include facts of Concord's water usage and links to guidelines, conservation tips, checking for leaks, rain barrels, backflow prevention, and other water information.	Website contains Water Conservation as a primary tab on the site. Extensive tips for customers as well as the complete water conservation plan and drought management plan for Davidson Water.
Water Loss Reduction		Annual AWWA water audit conducted with periodic 3rd party validation. Recommendations followed up on in next year. Perform leak detection, large meter testing and notify customers of high usage when meter read.	No info found and no inquiry response.	No info found and no response from phone inquiries (2).	The website has a page with detailed instructions on how to use the water meter to determine if there are potential plumbing leaks.	Website notes that Davidson Water monitors unaccounted for water monthly and utilizes SCADA system to detect leaks through tank levels and pump run times.
Outdoor Water Use		Mandatory year-round irrigation restrictions limiting all customers to 3 days per week irrigation regardless of water shortage status. Policy requires rain sensors for all irrigation systems equipped with timers. WSRP has progressively more restrictive irrigation restrictions depending on water shortage circumstances.	WSRP has standard outdoor use conservation measures for outdoor use ranging from voluntary to mandatory depending on stage declared.	No info found and no response from phone inquiries (2).	Website has extensive information on ways to conserve water outdoors including information on species of drought tolerant plants for landscaping. Outdoor water use restrictions in the WSRP are similar to other plans but with more detailed triggers for implementation.	Conservation tips for outdoor conservation on website. Most measures are standard to all plans.
Plumbing Retrofits		Union County does not have a plumbing retrofit program, as more than 80% of the system and population served are relatively new with plumbing systems built under current low flow codes (post 1990).	No info found and no response from phone inquiries (2).	No info found and no response from phone inquiries (2).	Concord has a toilet replacement credit of $50 per toilet (limit 3) for the replacement of toilets installed before 1994.	Conservation tips contain significant information on maintaining plumbing and appliances to save water. No retrofit incentives found.

Water Conservation Program Comparison

Alternative Water Management	Provide reuse water to golf course from a small WWTP. Two other WWTPs permitted for reuse and the County has studied potential distribution network or bulk hauling options for use.	No info found and no response from phone inquiries (2).	No info found and no response from phone inquiries (2).	WSRP recommends reusing household water to the greatest extent possible at all times.	Conservation page on website gives specific tips on types of graywater usages.

Water Conservation Program Comparison

Utility		Davie Co	Denton	Dobson	Elkin	Hamlet Water System
Water Rates	Gallons included with Base Rate	Residential & Commercial Base rate includes 3,000 gallons	Residential & Commercial Base rate includes 1,000 gallons	Residential & Commercial Base rate includes 0 gallons	Residential & Commercial Base rate includes 2,000 gallons	Residential & Commercial Base rate includes 2,500 gallons
	Structure	Uniform rate	Uniform rate	Declining block	Uniform rate	Inclining block Residential & Commercial: 2 rate tiers
	"Conservation Signal Rate" (> 10,000 gal/month consumption) from UNC Environmental Finance Center study	Separate irrigation rate: $5.67/1000 gallons vs. $5.00/1,000 gallons for domestic use.	N/A - Uniform rate	N/A - Declining block	N/A - Uniform rate	N/A - Tier 2 initiates at 50,000 gallons
Education		Website has Annual Water reports and water rates posted but no active water conservation programs per phone interview. WSRP not available on the website but noted that it was available at the county offices (It is available on NCWATER website).	No water conservation or WSRP info on website. No active education program per phone interview.	No info found on website and no response from phone inquiries (2).	No water conservation or WSRP info on website. No active education program per phone interview.	No information found on the website and no WSRP listed on NCWATER website and no active program per phone interview. Annual water report available on website.
Water Loss Reduction		Use AMR meter system to assist in water loss reduction	Use system SCADA to assist with leak identification.	No info found on website and no response from phone inquiries (2).	No specific measures per phone interview.	No info found. No active measure per phone interview.
Outdoor Water Use		WSRP requires 50% price increase of irrigation rates in Stage 1 Voluntary. Stage 2 Mandatory has 100% increase. Other outdoor use measures are standard reductions. No active programs per phone interview.	WSRP has standard outdoor use conservation measures for outdoor use ranging from voluntary to mandatory depending on stage declared. No active program per phone interview.	No info found on website and no response from phone inquiries (2).	WSRP has standard outdoor use conservation measures for outdoor use ranging from voluntary to mandatory depending on stage declared. No active programs per phone interview.	No info found on website. No active measure per phone interview.
Plumbing Retrofits		No active program per phone interview.	No active program per phone interview.	No info found on website and no response from phone inquiries (2).	No incentives per phone interview.	No info found. No active measure per phone interview.
Alternative Water Management		No active program per phone interview.	No active program per phone interview.	No info found on website and no response from phone inquiries (2).	No active measures per phone interview.	No info found. No active measures per phone interview.

Water Conservation Program Comparison

Utility		Handy Sanitary District	Jonesville	Kannapolis	King	Lexington
Water Rates	Gallons included with Base Rate	Residential & Commercial Base rate includes 2,000 gallons	Residential & Commercial Base rate includes 2,000 gallons	Residential & Commercial Base rate includes 0 gallons	Residential & Commercial Base rate includes 4,000 gallons	Residential & Commercial Base rate includes 0 gallons
	Structure	Uniform rate	Uniform rate	Residential: 2 rate tiers - inclining block Commercial: uniform rate	Uniform rate	Uniform rate
	"Conservation Signal Rate" (> 10,000 gal/month consumption) from UNC Environmental Finance Center study	N/A - Uniform rate	N/A - Uniform rate	Tier 2 and irrigation rate $6.44/1,000 gallons Base rate: $6.15/1,000 gallons	N/A - Uniform rate	N/A - Uniform rate
Education		Website provides water conservation tips such as shortening showers, don't run water for cold/hot (use fridge/stove), no running water for washing fruits/veggies or brushing teeth, fill sink with water to wash dishes, water lawn early in morning, let grass grow longer to lessen evaporation, sweep walkways/driveways and wash cars with a bucket of water.	Website has WSRP and annual water quality report available. No other conservation information found on website and no active conservation education program per phone interview.	Website lists drought level and activities that consumers are encouraged to limit including lawn irrigation, car washing, filling fountains & swimming pools, watering shrubs/plants. A link is provided which gives tips on conserving water inside and outside the home (yard/garden). Information on smart water meters that are utilized by the city with a link providing more in-depth information.	Water webpage prominently displays water conservation tips such as repairing leaks/drips, running full loads of laundry and dishes in the dishwasher, using a broom to clean off walkways/driveways, only watering the lawn/landscape when it needs it, and reporting leaks in fire hydrants, plumbing or other public facilities. A Word version of conservation tips is provided and easily printable. Further detail and drought management in conservation ordinances.	No water conservation education information found on the website. Water conservation measures found in Code of Ordinances (WSRP). All levels of conservation activated by declaration by the board of commissioners. No active conservation education program per interview.
Water Loss Reduction		Tips sheet on website page on identifying leaks in plumbing systems.	No specific recommendations found for water loss reduction for customers. Per phone interview, distribution staff perform visual inspections and stream chlorine samples to look for leaks.	Use of Smart Meter technology to detect water loss on customer plumbing. Tips sheet on identifying leaks in plumbing systems.	No specific recommendations found for water loss reduction for customers or the distribution system.	No specific recommendations found for water loss reduction for customers or the distribution system. No active measures per phone interview.
Outdoor Water Use		Website has list of water conservation tips for outdoor use.	WSRP has standard outdoor use conservation measures for outdoor use ranging from voluntary to mandatory depending on stage declared. No specific active measures per phone interview.	Outdoor conservation tips prominently displayed on the water department homepage. Numerous tips given on info page which is well linked. Measures include standard items on irrigation, but also includes plant care tips such as mulching and using drought resistant plants.	WSRP has standard mandatory outdoor use conservation measures of varying degrees depending on water storage stage declared. First water shortage stage includes outdoor water use restrictions to one day per week and limits on washing vehicles or surfaces and limits on hydrant usage.	WSRP has standard outdoor use conservation measures for outdoor use ranging from voluntary to mandatory depending on stage declared.
Plumbing Retrofits		Website has tips for locating leaks, decreasing toilet flush volumes, and water saving devices. No retrofit incentives found.	No incentives per phone interview.	No plumbing retrofit incentives found. Website provides slightly more detail on water saving devices and insulating pipes than most.	No info found on website and no response from phone inquiries (2).	WSRP recommends use of water saving devices on a voluntary basis. No retrofit incentives per phone interview.
Alternative Water Management		No info found on website.	No program per phone interview.	Promotes Smart Meters as a technology to prevent water loss.	No information found and no response to phone interview.+P10:P11	Per phone interview they provide reuse water to a golf course from a small WWTP but no other customers.

Water Conservation Program Comparison

Utility		Mocksville	Montgomery Co	Mount Airy	North Wilkesboro	Norwood
Water Rates	Gallons included with Base Rate	Residential & Commercial Base rate includes 3,000 gallons	Residential: Base and flat rates include 1,000 gallons Commercial: Base rate includes 0 gallons	Residential & Commercial Base rate includes 0 gallons	Residential & Commercial Base rate includes 0 gallons	Residential & Commercial Base rate includes 1,000 gallons
	Structure	Uniform rate	Residential: 3 rate tiers - inclining block Commercial: 2 rate tiers - declining block $7.40 to $2.99/1000 gallons for > 1MG/mo	Combined Residential & Commercial Tier 1: Base rate Tier 2: inclining block (<1MG) Tier 3: declining block (>1MG)	Uniform rate	Declining block
	"Conservation Signal Rate" (> 10,000 gal/month consumption) from UNC Environmental Finance Center study	N/A - Uniform rate	Conservation signal = $8.00/1,000 gallons (Residential only) Tier 1 = $4.00 Tier 2 = $6.00 WSRP has water shortage rates provision.	Conservation signal - $3.34/1,000 gallons Base rate: $2.37/1,000 gallons	N/A - Uniform rate	N/A - Declining block
Education		No water conservation education program or information on website.	No water conservation education information found on the website. Water conservation measures found in Code of Ordinances (WSRP). All levels of conservation activated by declaration by the board of commissioners. No response from phone interview inquiries (2).	Recommendations for water conservation found in Utility Billing FAQ under high bill causes. No active conservation education program per phone interview.	Website conservation brochure in Forms and Downloads section on water leak impacts to consumption and billing. Per phone interview, no active conservation program.	No water conservation information found on the website other than the WSRP contained in the Code of Ordinances (#106). Per phone interview, no active conservation program.
Water Loss Reduction		No specific recommendations found for water loss reduction for customers or the distribution system. No active measures per Mocksville staff.	"Waste of Water" defined in ordinance to include repairable leaks or allowing surface runoff (paraphrased). No response from phone interview inquiries (2).	WSRP Stage 1 Voluntary includes a statement to repair all leaks. Per phone interview, SCADA is used with meter data to monitor unaccounted water on supply side.	Website conservation brochure (NCRWA) on identifying and repairing leaks with info on water loss based on leak size consumption during irrigation.	No specific recommendations found for water loss reduction for customers or the distribution system. Per phone interview, track water production and billing volumes for unaccounted for water.
Outdoor Water Use		No info found on website. No active measures per phone interview.	WSRP has standard outdoor use conservation measures for outdoor use ranging from voluntary to mandatory depending on stage declared.	WSRP has standard outdoor use conservation measures for outdoor use ranging from voluntary to mandatory depending on stage declared. Per phone interview, no active customer measures.	Per phone interview, no active measures.	WSRP has standard outdoor use conservation measures for outdoor use ranging from voluntary to mandatory depending on stage declared. Per phone interview, no active measures.
Plumbing Retrofits		No plumbing retrofit program.	No information found and no response from phone interview inquiries (2).	WSRP recommends use of water saving devices on a voluntary basis. No retrofit incentives.	No retrofit incentive program per phone interview.	No retrofit incentive program per phone interview.
Alternative Water Management		No info found on website. No active measures per phone interview.	No information found and no response from phone interview inquiries (2).	WSRP has recommendation to "re-utilize" household water where possible. No water reuse program.	No alternative water use measures per phone interview.	No alternative water use measures per phone interview.

Water Conservation Program Comparison

Utility		Pilot Mountain	Richmond County	Rockingham	Salisbury	Thomasville
Water Rates	Gallons included with Base Rate	Residential & Commercial Base rate includes 1,000 gallons	Residential & Commercial Base rate includes 2,000 gallons	Residential & Commercial Base rate includes 2,000 gallons	Residential & Commercial Base rate includes 0 gallons	Residential & Commercial Base rate includes 0 gallons
	Structure	Uniform rate	Residential: 8 rate tiers, declining Commercial: 8 rate tiers, declining	Declining block	Uniform rate	Uniform rate
	"Conservation Signal Rate" (> 10,000 gal/month consumption) from UNC Environmental Finance Center study	N/A - Uniform rate	N/A - Declining block	N/A - Declining block	N/A - Uniform rate	N/A - Uniform rate
Education		No conservation program found other than WSRP. No voluntary conservation measures found. No response from phone interview inquiries (2).	No water conservation information found on the county website and no response from phone interview inquiries (2). WSRP on NCWater website notes that brochures on water conservation are available at the Water Billing Department.	No active conservation education program per phone interview.	Salisbury has environmental education position that includes conservation education.	Water conservation policy available through Code of Ordinances link on the website. No active conservation education program per phone interview.
Water Loss Reduction		No specific recommendations found for water loss reduction for customers or the distribution system. No response from phone interview inquiries (2).	WSRP Stage 1 Voluntary includes a statement to repair all leaks. No response from phone interview inquiries (2).	WSRP Stage 1 Voluntary includes a statement to repair all leaks. No active customer measures per phone interview.	Use AMI for customer leak analytics and have historically performed water audits.	No specific Water Loss measures found beyond the customer conservation requirements in the ordinance. System tracking of unaccounted for water with billing data.
Outdoor Water Use		WSRP has standard outdoor use conservation measures for outdoor use for mandatory restrictions depending on stage declared. No voluntary measures found and no response from phone interview inquiries (2).	WSRP has standard outdoor use conservation measures for outdoor use ranging from voluntary to mandatory depending on stage declared. No response from phone interview inquiries (2).	WSRP has standard outdoor use conservation measures for outdoor use ranging from voluntary to mandatory depending on stage declared. No customer measures per phone interview.	WSRP has standard outdoor use conservation measures for outdoor use ranging from voluntary to mandatory depending on stage declared. No other specific measures per phone interview.	WSRP has standard outdoor use conservation measures for outdoor use ranging from voluntary to mandatory depending on stage declared. No specific measures per phone interview.
Plumbing Retrofits		No retrofit incentive program found on website or WSRP and no response from phone interview inquiries (2).	WSRP recommends use of water saving devices on a voluntary basis. No info found for retrofit incentives and no response from phone interview inquiries (2).	No retrofit program per phone interview.	WSRP recommends use of water saving devices on a voluntary basis. No plumbing retrofit incentives per phone interview.	WSRP recommends use of water saving devices on a voluntary basis. No plumbing retrofit incentives per phone interview.
Alternative Water Management		No info found and no response from phone interview inquiries (2).	No info found and no response from phone interview inquiries (2).	Website has guidance on cistern use for water conservation. No other measures per phone interview.	WSRP has recommendation to "re-utilize" household water where possible. No other measures per phone interview.	No alternative water use measures per phone interview.

Water Conservation Program Comparison

Utility		Wilkesboro	Wingate	Winston-Salem	Yadkinville
Water Rates	Gallons included with Base Rate	Residential & Commercial Base rate includes 3,000 gallons	Residential & Commercial Base rate includes 1,500 gallons	Residential & Commercial Base rate includes 0 gallons	Residential & Commercial Base rate includes 3,000 gallons
	Structure	Uniform rate	Inclining block Residential & Commercial: 3 rate tiers	Residential & Commercial: 3 rate tiers, inclining block until 150,000 gallon/month. Tier 4: similar rate as Tier 1 for industrial volumes.	Declining block 4 rate tiers
	"Conservation Signal Rate" (> 10,000 gal/month consumption) from UNC Environmental Finance Center study	N/A - Uniform rate	Conservation signal: $6.25/1,000 gallons (Tier 2) Base rate: $4.95/1,000 gallons	Conservation signal: $4.81/1,000 gallons Base rate: $2.80/1,000 gallons	N/A - Declining block
Education		Website has a downloadable PDF offering water conservation tips. No active education program per phone interview.	Water conservation policy available through Code of Ordinances link on the website. No active conservation education program per phone interview.	Website has list of steps to conserve water. Lists challenges/solutions for leaks, saving water and using water wisely, water trivia, kids links, quizzes, links to other websites about water. Lists volunteer opportunities (Adopt-A-Stream), don't dump oil down the drain. Workshops about water quality.	No active conservation education program per phone interview.
Water Loss Reduction		Perform annual water audit for the distribution system. Website brochure post information regarding water loss due to varying size leaks for customers. Assist customers with identifying demand side leaks.	No specific Water Loss measures found beyond the customer conservation requirements in the ordinance. Monitor water billing data for abnormalities per phone interview.	No specific Water Loss measures found beyond the customer conservation requirements in the ordinance.	Monitor water billing usage data for abnormalities.
Outdoor Water Use		Website brochure provides tips on outdoor water conservation. No other outdoor use measures per phone interview.	WSRP has standard outdoor use conservation measures for outdoor use ranging from voluntary to mandatory depending on stage declared. Policy requires rain sensors for all irrigation systems equipped with timers. No other measures per phone interview.	Stage 1 has voluntary limits on irrigation, washing vehicles and sidewalks and filling pools. Stage 2 initiates mandatory irrigation schedule and recommends 3 gallon hand watering. Stage 3 eliminates most outdoor water use. Penalties limited to $200 but does allow for misdemeanor charge.	Require rain sensors on all irrigation systems which must be used in water shortage. No other active outdoor water use measures per phone interview.
Plumbing Retrofits		Website brochure included tip to install water saving devices. No plumbing retrofit incentives per phone interview.	WSRP recommends use of water saving devices on a voluntary basis. No plumbing retrofit incentives per phone interview.	Voluntary Stage 1 recommends fixing leaks and replacing water devices with low flow. No incentives found.	No plumbing retrofit incentive programs per phone interview.
Alternative Water Management		No alternative water use measures per phone interview.	WSRP has recommendation to "re-utilize" household water where possible. No other alternative use measures per phone interview.	No info found.	Customers requested to reuse household water to water plants. No other alternative water use measures per phone interview.

Rates Comparison

Base Charge

Union Co

Base Facility Fee – monthly fixed charge per meter for residential and non-residential water customers (based on meter size).

METER SIZE	FY 2018	FY 2019	FY 2020
3/4"	$9.65	$10.30	$10.95
1"	$24.25	$25.85	$27.55
1 1/2"	$48.00	$51.10	$54.40
2"	$76.75	$81.75	$87.05
3"	$215.95	$230.00	$244.95
4"	$479.95	$511.15	$544.35
6"	$671.85	$715.50	$762.00

Albemarle

Monthly Fixed Charges

WATER / SEWER RATE SCHEDULE

Water - Inside Corporate Limits	
0 - 300 Cubic Feet (minimum)	$11.64
301 - 30,000 c.f.	$2.54 per 100 c.f.
30,001 - 275,000 c.f.	$2.19 per 100 c.f.
Over 275,000 c.f.	$1.60 per 100 c.f.
Water - Outside Corporate Limits	
0 - 300 Cubic Feet (minimum)	$23.26
301 - 30,000 c.f.	$5.10 per 100 c.f.
30,001 - 275,000 c.f.	$4.39 per 100 c.f.
Over 275,000 c.f.	$1.60 per 100 c.f.

Anson Co

Residential Unit Base Fee (per single unit if multi-unit) $13.00

Commercial Unit Base Fee (per single unit if multi-unit) $13.00

Residential

Union Co

Volumetric Rates – charge for water per 1,000 gallons of usage based on the current Water Shortage Stage as declared by the County Manager.

		Standard Rates / Water Shortage Stage I			Water Shortage Stage II			Water Shortage Stage III			Water Shortage Stage IV		
		FY 2018	FY 2019	FY 2020	FY 2018	FY 2019	FY 2020	FY 2018	FY 2019	FY 2020	FY 2018	FY 2019	FY 2020
Residential													
Tier 1	0 - 3,000 gallons	$2.35	$2.50	$2.65	$2.35	$2.50	$2.65	$2.35	$2.50	$2.65	$3.20	$3.40	$3.60
Tier 2	3,001 - 7,000 gallons	3.20	3.40	3.60	3.20	3.40	3.60	3.20	3.40	3.60	4.80	5.10	5.45
Tier 3	7,001 - 10,000 gallons	4.55	4.85	5.15	4.55	4.85	5.15	9.05	9.65	10.30	10.15	10.80	11.50
Tier 4	10,001 - 15,000 gallons	6.60	7.05	7.50	10.55	11.25	12.00	18.00	19.15	20.40	19.45	20.70	22.05
Tier 5	> 15,000 gallons	10.75	11.45	12.20	17.20	18.30	19.50	29.40	31.30	33.35	31.80	33.85	36.05

Albemarle

WATER / SEWER RATE SCHEDULE

Water - Inside Corporate Limits	
0 - 300 Cubic Feet (minimum)	$11.64
301 - 30,000 c.f.	$2.54 per 100 c.f.
30,001 - 275,000 c.f.	$2.19 per 100 c.f.
Over 275,000 c.f.	$1.60 per 100 c.f.
Water - Outside Corporate Limits	
0 - 300 Cubic Feet (minimum)	$23.26
301 - 30,000 c.f.	$5.10 per 100 c.f.
30,001 - 275,000 c.f.	$4.39 per 100 c.f.
Over 275,000 c.f.	$1.60 per 100 c.f.

Anson Co

Usage Rate $4.32/per 1,000gallons

Commercial

Union Co

Volumetric Rates – charge for water per 1,000 gallons of usage based on the current Water Shortage Stage as declared by the County Manager.

	Standard Rates / Water Shortage Stage I			Water Shortage Stage II			Water Shortage Stage III			Water Shortage Stage IV		
	FY 2018	FY 2019	FY 2020	FY 2018	FY 2019	FY 2020	FY 2018	FY 2019	FY 2020	FY 2018	FY 2019	FY 2020
Non-Residential All Usage	$3.25	$3.45	$3.70	3.45	3.65	3.90	3.75	4.00	4.25	4.45	4.75	5.05
Wholesale All Usage	$2.60	$2.77	$2.95	$2.60	$2.77	$2.95	$2.85	$3.05	$3.25	$3.15	$3.35	$3.55

Albemarle

WATER / SEWER RATE SCHEDULE

Water - Inside Corporate Limits	
0 - 300 Cubic Feet (minimum)	$11.64
301 - 30,000 c.f.	$2.54 per 100 c.f.
30,001 - 275,000 c.f.	$2.19 per 100 c.f.
Over 275,000 c.f.	$1.60 per 100 c.f.
Water - Outside Corporate Limits	
0 - 300 Cubic Feet (minimum)	$23.26
301 - 30,000 c.f.	$5.10 per 100 c.f.
30,001 - 275,000 c.f.	$4.39 per 100 c.f.
Over 275,000 c.f.	$1.60 per 100 c.f.

Anson Co

Usage Rate

10,000 gallons	$45.09
25,000 gallons	$91.24
50,000 gallons	$168.15
100,000 gallons	$317.97
250,000 gallons	$721.84
500,000 gallons	$1,390.78

Irrigation

Union Co

Volumetric Rates – charge for water per 1,000 gallons of usage based on the current Water Shortage Stage as declared by the County Manager.

		Standard Rates / Water Shortage Stage I			Water Shortage Stage II			Water Shortage Stage III			Water Shortage Stage IV		
		FY 2018	FY 2019	FY 2020	FY 2018	FY 2019	FY 2020	FY 2018	FY 2019	FY 2020	FY 2018	FY 2019	FY 2020
Irrigation													
Tier 1	0 - 3,000 gallons	$4.55	$4.85	$5.15	$4.55	$4.85	$5.15	$9.05	$9.65	$10.30	$10.15	$10.80	$11.50
Tier 2	3,001 - 7,000 gallons	4.55	4.85	5.15	4.55	4.85	5.15	9.05	9.65	10.30	10.15	10.80	11.50
Tier 3	7,001 - 10,000 gallons	4.55	4.85	5.15	4.55	4.85	5.15	9.05	9.65	10.30	10.15	10.80	11.50
Tier 4	10,001 - 15,000 gallons	6.60	7.05	7.50	10.55	11.25	12.00	18.00	19.15	20.40	19.45	20.70	22.05
Tier 5	> 15,000 gallons	10.75	11.45	12.20	17.20	18.30	19.50	29.40	31.30	33.35	31.80	33.85	36.05

Albemarle

No separate irrigation rates

Anson Co

No separate irrigation rates.

Rates Comparison

Utility	Concord	Davidson Water	Davie Co	Denton
Base Charge	Base Charge Inside City: / Outside City: ¾" $4.04 / $4.54 1" $5.76 / $6.61 1 ½" $9.71 / $11.35 2" $14.66 / $17.29 3" $26.28 / $31.23 4" $42.85 / $51.11 6" $83.89 / $100.36 8" $133.34 / $159.70 10" $191.20 / $229.13 12" $355.86 / $426.73	Dependent on meter size Residential Unit Base Fee (3/4 inch meter) $13.35 includes 2,000 gallons	Bi-monthly Base Charge $26.00 includes 3,000 gallons	Base Charge (1,000 gallons): In town / Out of town $25.00 / $50.00
Residential	Usage Rate Residential volume charges inside city: Residential service: Block 1 (0 - 6,000 gallons/month) $5.36/1,000 gallons Block 2 (6,001 – 8,999 gallons/month) $6.97/1,000 gallons Block 3 (9,000+ gallons) & Irrigation service: $8.58/1,000 gallons Residential volume charges outside city: Residential service: Block 1 (0 - 6,000 gallons/month) $6.44/1,000 gallons Block 2 (6,001 – 8,999 gallons/month) $8.37/1,000 gallons Block 3 (9,000+ gallons) & Irrigation service $10.30/1,000 gallons	Usage Rates Over 2,000 gallons $4.75/1,000gallons	Uniform usage rate $5/1,000 gallons above 3,000 gallons in base charge. Projected Bill 3,000 gallons $20.50 4,000 gallons $25.50 5,000 gallons $30.50 10,000 gallons $55.50 15,000 gallons $80.50	Usage Rate Inside: $6.15/1,000 gallons Outside: $12.30/1,000 gallons Projected Bill / Inside / Outside 3,000 gallons $37.30 $74.60 4,000 gallons $43.45 $86.90 5,000 gallons $49.60 $99.20 10,000 gallons $80.35 $160.70 15,000 gallons $111.10 $222.20
Commercial	Usage Rate Commercial and institutional volume charges inside city: Commercial/institutional service $5.41/1,000 gallons Commercial/institutional irrigation service $8.58/1,000 gallons Commercial and institutional volume charges outside city: Commercial/institutional service $6.50/1,000 gallons Commercial/institutional irrigation service $10.30 /1,000 gallons Industrial volume charge inside city: Industrial service $4.00/1,000 gallons Industrial irrigation service $8.58/1,000 gallons Industrial volume charge outside city: Industrial service $4.80/1,000 gallons Industrial irrigation service $10.30/1,000 gallons	Usage Rates Over 2,000 gallons $4.75/1,000gallons	Commercial and residential rate the same. Projected Bill 10,000 gallons $55.50 25,000 gallons $130.50 50,000 gallons $255.50 100,000 gallons $505.50 250,000 gallons $1,255.50 500,000 gallons $2,505.50	Usage Rate Inside / Outside 10,000 gallons $80.35 $160.70 25,000 gallons $172.60 $345.20 50,000 gallons $326.35 $652.70 100,000 gallons $633.85 $1,267.70 250,000 gallons $1,556.35 $3,112.70 500,000 gallons $3,093.85 $6,187.70
Irrigation	Residential Irrigation Base Fee (Based on meter size) Residential Irrigation Usage Rate $8.58/1000 gallons for inside city and $10.30 outside city	No separate irrigation rates	Uniform rate of $5.67 per 1000 gallons above 3,000 gallons in base.	No separate irrigation rates

Rates Comparison

Utility	Dobson	Elkin	Hamlet Water System	Handy Sanitary District
Base Charge	Dependent on meter size. Inside Outside Residential Unit Base Fee $12.50 $25.00 (per single unit if multi-unit) Commercial Unit Base Fee $12.50 $25.00 (per single unit if multi-unit)	Inside Outside Residential Unit Base Fee $15.50 $31.00 (per single unit if multi-unit) Commercial Unit Base Fee $15.50 $31.00 (per single unit if multi-unit)	Inside Outside Residential Unit Base Fee $21.00 $31.00 (per single unit if multi-unit) Commercial Unit Base Fee $21.00 $31.00 (per single unit if multi-unit)	A minimum monthly bill is $21.00 and includes up to 2,000 gallons.
Residential	Usage Rate Up to 1MG monthly $3.10/1,000 gallons Greater than 1MG monthly $1.82/1,000 gallon Projected Bill Inside Outside 3,000 gallons $21.80 $43.60 4,000 gallons $24.90 $49.80 5,000 gallons $28.00 $56.00 10,000 gallons $43.50 $87.00 15,000 gallons $59.00 $118.00	Usage Rate $6/1,000 gallons over 2,000 gallons usage inside city Projected Bill Inside Outside 3,000 gallons $21.50 $43.00 4,000 gallons $24.50 $55.00 5,000 gallons $33.50 $67.00 10,000 gallons $63.50 $127.00 15,000 gallons $93.50 $187.00	Usage Rate 2501-50,000 gallons $1.40/1,000 gallons Over 50,000 gallons $1.50/1,000 gallons Outside city rates double Projected Bill Inside Outside 3,000 gallons $21.70 $32.40 4,000 gallons $23.10 $35.20 5,000 gallons $24.50 $38.00 10,000 gallons $31.50 $52.00 15,000 gallons $38.50 $66.00	Usage Rate $6/1,000 gallons over initial 2,000 gallons 3,000 gallons $27.00 4,000 gallons $33.00 5,000 gallons $39.00 10,000 gallons $69.00 15,000 gallons $99.00
Commercial	Usage Rate Commercial rate same as residential Projected Bill Inside Outside 10,000 gallons $43.50 $87.00 25,000 gallons $90.00 $180.00 50,000 gallons $167.50 $335.00 100,000 gallons $322.50 $645.00 250,000 gallons $790.00 $1,580.00 500,000 gallons $1,592.50 $3,185.00	Usage Rate Commercial rate same as residential Projected Bill Inside Outside 10,000 gallons $63.50 $127.00 25,000 gallons $153.50 $307.00 50,000 gallons $303.50 $607.00 100,000 gallons $603.50 $1,207.00 250,000 gallons $1,503.50 $3,007.00 500,000 gallons $3,003.50 $6,007.00	Usage Rate Commercial rate same as residential Projected Bill Inside Outside 10,000 gallons $31.50 $52.00 25,000 gallons $52.50 $94.00 50,000 gallons $87.50 $164.00 100,000 gallons $162.50 $314.00 250,000 gallons $387.50 $764.00 500,000 gallons $762.50 $1,514.00	Usage Rate Commercial rates same as residential rates 10,000 gallons $69.00 25,000 gallons $159.00 50,000 gallons $309.00 100,000 gallons $609.00 250,000 gallons $1,509.00 500,000 gallons $3,009.00
Irrigation	No separate irrigation rates.	No separate irrigation rates	No separate irrigation rates	No separate irrigation rates

Rates Comparison

Utility	Jonesville	Kannapolis	King
Base Charge	Inside / Outside Residential Unit Base Fee $24.20 / $48.40 (per single unit if multi-unit) Commercial Unit Base Fee $24.20 / $48.40 (per single unit if multi-unit)	Inside City / Outside City Residential Unit Base Fee $6.95 / $8.15 (per single unit if multi-unit) Commercial Unit Base Fee $6.95 / $8.15 (per single unit if multi-unit)	Unit Base Fee Inside City $28.99/bi-monthly 0-4,000 gallons Outside City $36.25/bi-monthly 0-4,000 gallons
Residential	Usage Rate $9.75/1,000 gallons over initial 2,000 gallon usage Projected Bill / Inside / Outside 3,000 gallons $33.95 $67.90 4,000 gallons $43.70 $87.40 5,000 gallons $53.45 $106.90 10,000 gallons $102.20 $204.40 15,000 gallons $150.95 $301.90	Usage Rate Individual Water Service: (less than 2 inch) (Note 1) • Tier 1 per 1,000 gallons *(0-7,000 gals)* $ 6.15 $ 7.30 • Tier 2 per 1,000 gallons (over 7,000 gals) $ 6.44 $ 7.65 • Irrigation per 1,000 gallons $ 6.44 $ 7.65 * Base monthly charge (Note 2) $ 6.95 $ 8.15 * monthly rate for unmetered service – residential only (Note 3) $ 47.20 $ 56.64 Private Water Systems (more than one user): • Tier 1 per 1,000 gallons *(0-7,000 gals)* $ 6.15 $ 7.30 • Tier 2 per 1,000 gallons (over 7,000 gals) $ 6.44 $ 7.65 • Irrigation per 1,000 gallons $ 6.44 $ 7.65 * base monthly charge per user as determined by number of dwelling units or commercial spaces on site, occupied or vacant $ 6.95 $ 8.15	Usage Rate Inside City $3.11/bi-monthly per thousand gallons over 4,000 gallons Outside City $3.89/bi-monthly per thousand gallons over 4,000 gallons
Commercial	Usage Rate Commercial rates same as residential Project Bill / Inside / Outside 10,000 gallons $102.20 $204.40 25,000 gallons $248.45 $496.90 50,000 gallons $492.20 $984.40 100,000 gallons $979.70 $1,959.40 250,000 gallons $2,442.20 $4,884.40 500,000 gallons $4,879.70 $9,759.40	Commercial Water Service • Tier 1 per 1,000 gallons *(0-7,000 gals)* $ 6.15 $ 7.30 • Tier 2 per 1,000 gallons (over 7,000 gals) $ 6.15 $ 7.30 • Irrigation per 1,000 gallons $ 6.44 $ 7.65 *base monthly charge $ 6.95 $ 8.15	Usage Rate Inside City $3.11/bi-monthly per thousand gallons over 4,000 gallons Outside City $3.89/bi-monthly per thousand gallons over 4,000 gallons
Irrigation	No separate irrigation rates	Inside / Outside Irrigation Base Fee $6.95 / $8.15 Usage Rate Inside city: $6.44/1,000gallons Outside city: $7.65/1,000 gallons	No separate irrigation rates

Rates Comparison

<table>
<tr><th>Utility</th><th>Lexington</th><th>Mocksville</th><th>Montgomery Co</th></tr>
<tr><td>Base Charge</td><td>
<table>
<tr><th>Meter Size</th><th>Inside City Limits</th><th>Outside City Limits</th></tr>
<tr><td></td><td colspan="2">Monthly Base Charge</td></tr>
<tr><td>5/8"</td><td>$14.60</td><td>$29.93</td></tr>
<tr><td>1"</td><td>$36.50</td><td>$74.83</td></tr>
<tr><td>1.5"</td><td>$73.00</td><td>$149.65</td></tr>
<tr><td>2"</td><td>$116.80</td><td>$239.44</td></tr>
<tr><td>3"</td><td>$219.00</td><td>$448.95</td></tr>
<tr><td>4"</td><td>$365.00</td><td>$748.25</td></tr>
<tr><td>6"</td><td>$730.00</td><td>$1,496.50</td></tr>
<tr><td>8"</td><td>$1,168.00</td><td>$2,394.40</td></tr>
</table>
</td><td>Residential Unit Base Fee $29.69 that includes up to 3000 gallons</td><td>Residential Unit Base Fee $12.00/per 0-10 gallons
(per single unit if multi-unit)

Commercial Unit Base Fee $38.00 Flat Rate
(per single unit if multi-unit)</td></tr>
<tr><td>Residential</td><td>Monthly Volume Charges All Meter Sizes
Inside City $1.89/CCF
Outside City $3.87/CCF</td><td>Monthly Volume Charges (>3000 gal)

Inside City
$4.21/1000 gal

Outside City
$7.18/1000 gal</td><td>Flat Charge $5.00/flat rate for 1-1,000 gallons
Low Usage $4.00/per 1,000 gallons between 1,001-2,000
Medium Usage $6.00/per 1,000 gallons between 2,001-4,000
High Usage $8.00/per 1,000 gallons between >4,000</td></tr>
<tr><td>Commercial</td><td>Monthly Volume Charges All Meter Sizes
Inside City $1.89/CCF
Outside City $3.87/CCF</td><td>Monthly Volume Charges (>3000 gal)

Inside City
$4.21/1000 gal

Outside City
$7.18/1000 gal</td><td>Low Usage $7.40/per 1,000 gallons between 0-1,000,000
High Usage $2.99/per 1,000 gallons between >1,000,000</td></tr>
<tr><td>Irrigation</td><td>No separate irrigation rates</td><td>No separate irrigation rates</td><td>No separate irrigation fees</td></tr>
</table>

Rates Comparison

Base Charge

Mount Airy

Minimum Monthly Charge:

Inside City Limits

Meter Size	Equivalent Residential Unit Factor	Water
3/4 Inch	1.00	$ 10.77
1.0 Inch	2.50	$ 26.93
1.5 Inch	5.00	$ 53.85
2.0 Inch	8.00	$ 86.16
3.0 Inch	16.00	$ 172.32
4.0 Inch	25.00	$ 269.25
6.0 Inch	50.00	$ 538.50
8.0 Inch	80.00	$ 861.60

Minimum Monthly Charge:

Outside City Limits

Meter Size	Equivalent Residential Unit Factor	Water
3/4 Inch	1.00	$ 21.54
1.0 Inch	2.50	$ 53.86
1.5 Inch	5.00	$ 107.70
2.0 Inch	8.00	$ 172.32
3.0 Inch	16.00	$ 344.64
4.0 Inch	25.00	$ 538.50
6.0 Inch	50.00	$ 1,077.00
8.0 Inch	80.00	$ 1,723.20

North Wilkesboro

Unit Base Fee

In Town $9.08 - Minimum Charge
Out of Town $13.61 - Minimum Charge

Norwood

Base monthly charge of $16.44 for first 1,000 gallons in city.

Pilot Mountain, Town of

Unit Base Fee

Inside Town Limits $16.50 includes 1,000 gallons
Outside Town Limits $30.50 includes 1,000 gallons

Residential

Mount Airy

Inside City Limits

Volumetric Rates:

Usage Block	Monthly Usage	Rate Per 1,000 Gallons Water	Rate Per 1,000 Gallons Wastewater
1	0 - 2,000	$ 2.37	$ 2.68
2	2,001 - 1,000,000	$ 3.34	$ 3.76
3	Over 1,000,000	$ 2.86	$ 3.23

Outside City Limits

Volumetric Rates:

Usage Block	Monthly Usage	Rate Per 1,000 Gallons Water	Rate Per 1,000 Gallons Wastewater
1	0 - 2,000	$ 4.74	$ 5.36
2	2,001 - 1,000,000	$ 6.68	$ 7.52
3	Over 1,000,000	$ 5.72	$ 6.46

North Wilkesboro

Usage Rate

In Town $3.98/per 1,000 gallons
Out of Town $5.79/per 1,000 gallons

Norwood

1001 - 5000 gal/mo $4.24/1,000 gallons
5001 - 10,000 gal/mo $3.95/1,000 gallons
10,000 - 20,000 gal/mo $3.75/1,000 gallons
Over 20,000 gallons $3.61/1,000gallons

Pilot Mountain, Town of

Usage Rate

Inside Town Limits $5.95/per 1,000 gallons
Outside Town Limits $11.90/per 1,000 gallons

Commercial

Mount Airy

Inside City Limits

Volumetric Rates:

Usage Block	Monthly Usage	Rate Per 1,000 Gallons Water	Rate Per 1,000 Gallons Wastewater
1	0 - 2,000	$ 2.37	$ 2.68
2	2,001 - 1,000,000	$ 3.34	$ 3.76
3	Over 1,000,000	$ 2.86	$ 3.23

Outside City Limits

Volumetric Rates:

Usage Block	Monthly Usage	Rate Per 1,000 Gallons Water	Rate Per 1,000 Gallons Wastewater
1	0 - 2,000	$ 4.74	$ 5.36
2	2,001 - 1,000,000	$ 6.68	$ 7.52
3	Over 1,000,000	$ 5.72	$ 6.46

North Wilkesboro

Usage Rate

Commercial rate same as residential

In Town $3.98/per 1,000gallons
Out of Town $5.79/per 1,000gallons

Norwood

Commercial rates same as residential

Pilot Mountain, Town of

Usage Rate

Inside Town Limits $5.95/per 1,000 gallons
Outside Town Limits $11.90/per 1,000 gallons

Irrigation

Mount Airy

No separate irrigation fees

North Wilkesboro

No separate irrigation rates

Norwood

No separate irrigation rates

Pilot Mountain, Town of

No separate irrigation rates

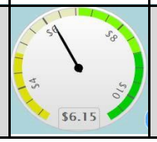
Rates Comparison

Utility	Richmond County	Rockingham	Salisbury	Thomasville
Base Charge	Residential Unit Base Fee $22.65 (per single unit if multi-unit) Commercial Unit Base Fee $31.00 (per single unit if multi-unit)	Base charge of $9.30/mo including first 2,000 gallons of consumption	Monthly Rates: 3/4" $4.11 1" $6.08 1-1/2" $9.35 2" $13.28 3" $25.73 4" $44.07 6" $94.50 8" $160.00 10" $251.70 12" $330.30 16" $657.80	***WATER*** **DESCRIPTION** / **RATE** 3/4" WATER INSIDE $ 9.70 1" WATER INSIDE $ 24.25 2" WATER INSIDE $ 77.60 3" WATER INSIDE $ 155.20 4" WATER INSIDE $ 242.50 6" WATER INSIDE $ 485.00 8" WATER INSIDE $ 776.00 10" WATER INSIDE $ 1,115.50 3/4" WATER OUTSIDE $ 21.83 1" WATER OUTSIDE $ 54.56 2" WATER OUTSIDE $ 174.60 3" WATER OUTSIDE $ 349.20 4" WATER OUTSIDE $ 545.63 6" WATER OUTSIDE $ 1,091.25 8" WATER OUTSIDE $ 1,746.00
Residential	Usage Rate Decreasing block with 8 tiers	Usage Rate 2001-50,000 gallons $2.20/1,000 gallons 50,001-250,000 gallons $1.90/1,000 gallons Over 250,000 gallons $1.50/1,000 gallons	Usage rate $3.80/100 cf	Monthly Consumption Rate Inside City Limits $5.04/per 1,000 gallons Outside City Limits $11.34/per 1,000 gallons
Commercial	Usage Rate Decreasing block with 8 tiers	Usage Rate Commercial rates same as residential	Commercial rates same as residential	Monthly Consumption Rate Inside City Limits $5.04/per 1,000 gallons Outside City Limits $11.34/per 1,000 gallons
Irrigation	No separate irrigation rates	No separate irrigation rates	No separate irrigation rates	No separate irrigation rates

Rates Comparison

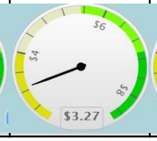
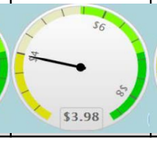
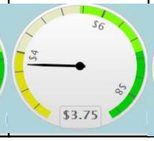
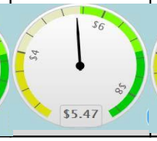
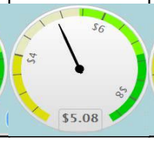
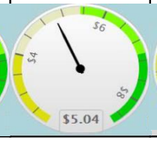
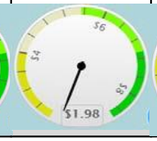
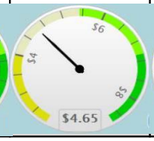
Utility	Wilkesboro	Wingate	Winston-Salem	Yadkinville
Base Charge	Monthly minimum-first 3,000 gallons Inside Outside Residential $6.73 $13.46 Apartment $6.73 $13.46 Commercial $16.79 $33.58 Industrial $16.79 $33.58	Base charges based on meter size - includes first 1,500 gallons monthly Inside Outside Residential Unit Base Fee $11.00 $22.00 (per single unit if multi-unit)	Base charges based on meter size for residential and commercial and have different rate schedules based on geographical area	Minimum Monthly Rate In Town $12.46 includes 3,000 gallons Out of Town $24.94 includes 3,000 gallons
Residential	Usage Rate (per 1,000 gallons) Inside Outside Residential $1.98 $3.96 Apartment $1.98 $3.96	Usage Rate (Inside City) 1,501-9,999 gallons $4.95/1,000 gallons 10,000-19,999 gallons $6.25/1,000 gallons Over 20,000 gallons $7.22/1,000 gallons	Usage Rate (City rates shown) 1-600 cf $2.10/100 ccf 601-1800 cf $3.12/100 ccf 1801-40,000 cf $3.48 / 100 ccf Over 40,000 cf $2.11/100 ccf	Usage Rate (per 1,000 gallons) In Town Out of Town Next 7,000 gallons $3.70 $7.41 Next 10,000 gallons $3.50 $7.02 Next 30,000 gallons $3.33 $6.65 Next 50,000 gallons $3.14 $6.28
Commercial	Usage Rate (per 1,000 gallons) Inside Outside Commercial $1.98 $3.96 Industrial $1.98 $3.96	Usage Rate Commercial rates same as residential	Usage Rate Commercial rates same as residential	Usage Rate (per 1,000 gallons) In Town Out of Town Next 7,000 gallons $3.70 $7.41 Next 10,000 gallons $3.50 $7.02 Next 30,000 gallons $3.33 $6.65 Over 50,000 gallons used $3.14 $6.28
Irrigation	No separate irrigation rates	No separate irrigation rates	Irrigation Base Fee Based on meter size 1-600 cf $2.10/100 ccf between 601-1,800 ccf $3.12/100 ccf between Over 1,800 cf $3.48/100 ccf between	No separate irrigation fees

UNC Environmental Finance Center Dashboard Comparison

Utility	Union Co	Albemarle	Anson Co	Concord	Davidson Water	Davie Co	Denton	Dobson	Elkin	Hamlet Water System	Handy Sanitary District	Jonesville	Kannapolis	King	Lexington
Affordability (Water Bills as % Median Household Income)	0.41%	0.75%	0.90%	0.66%	0.72%	2.07%	1.64%	1.91%	1.03%	0.85%	1.29%	2.71%	0.99%	0.52%	1.08%
Conservation Signal (Water Price/1,000 gallons, after 10,000 gallons)															

Source: https://efc.sog.unc.edu/resource/north-carolina-water-and-wastewater-rates-dashboard Accessed September 2018

UNC Environmental Finance Center Dashboard Comparison

Utility	Mocksville	Montgomery Co	Mount Airy	North Wilkesboro	Norwood	Pilot Mountain, Town of	Richmond County	Rockingham	Salisbury	Thomasville	Wilkesboro	Wingate	Winston-Salem	Yadkinville
Affordability (Water Bills as % Median Household Income)	0.93%	1.00%	0.86%	1.84%	1.11%	1.25%	1.60%	0.60%	0.97%	1.14%	0.36%	0.94%	0.68%	0.65%
Conservation Signal (Water Price/1,000 gallons, after 10,000 gallons)														

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Appendix B

Water Shortage Response Plan Comparison Matrix

Water Shortage Response Plan Comparison Matrix: Triggers

Utility	Union Co	Albemarle	Anson Co	Concord[2]	Davidson Water	Davie Co	Denton	Dobson	Elkin	Hamlet Water System	Handy Sanitary District
Source Water	Catawba River & Blewett Fall Lake (Anson County - Finished)	Tuckertown Reservoir & Badin Lake	Blewett Falls Lake	Lake Howell (WSACC) - 2007 IBT from Catawba Basin (Charlotte Water - Finished) & Yadkin Basin (Albemarle - Finished), Purchase (Kannapolis - Finished)	Yadkin River	South Yadkin River & Yadkin River	Tuckertown Reservoir	Fisher River	Big Elkin Creek	Water Lake	Town of Denton (Tuckertown Reservoir)
Level 1 or Voluntary Reductions	Catawba-Wateree LIP Year-round irrigation restrictions to 3 days per week, regardless of drought status	Lake Levels: High Rock Lake: -4.0 ft Badin Lake: -4.0 ft Demand: >85% of available water supply capacity for 5 consecutive days	YPDLIP	US Drought Monitor: 0 Stage 0 Most stringent of: Yadkin Pee Dee LIP: High Rock Lake or WSACC Drought Operations Plan: Lake Howell or Catawba Wateree LIP Drought Response Plan	Lake Level: Reservoir Levels on-site @ WTP: < 85% Streamflows: < 400 cfs Demand: 7 day average > 21.6 mgd (80%)	US Drought Monitor: 0 or 1 Streamflows: Water demand exceeds 25% of accessible flow to either intake for 7 consecutive days	Lake Storage: Usable Storage <75% Lake Level: 4.5ft < full	None	River flow < 2.34 cfs for 7 consecutive days Pump run times increase >30% to maintain previous rates Event causing loss of system capacity >30%	None	Handy Sanitary District implements Town of Denton plan since they are water supplier Lake Storage: Usable Storage <75% Lake Level: 4.5ft < full
Level 2 or Mandatory Reductions I	Catawba-Wateree LIP Demand: >80% of available capacity for the average of a 7 day period	Lake Levels: High Rock Lake: -8.0 ft Badin Lake: -6.0 ft Tuckertown Reservoir: -2.0 ft Demand: >75% of available water supply capacity for 5 consecutive days	YPDLIP	US Drought Monitor: 1 Stage 1 Most stringent of: Yadkin Pee Dee LIP: High Rock Lake or WSACC Drought Operations Plan: Lake Howell or Catawba Wateree LIP Drought Response Plan	Lake Level: Reservoir Levels on-site @ WTP: < 80% Streamflows: < 350 cfs Demand: 7 day average > 22.95mgd (85%)	US Drought Monitor: 1 or 2 Streamflows: Water demand exceeds 50% of accessible flow to either intake for 7 consecutive days	Lake Storage: Usable Storage <65% Lake Level: 6.5ft < full	None	River flow < 1.67 cfs for 3 consecutive days Pump run times increase >50% to maintain previous rates Event causing loss of system capacity >30%	None	Lake Storage: Usable Storage <65% Lake Level: 6.5ft < full
Level 3 or Mandatory Reductions II	Catawba-Wateree LIP Demand: >90% of available capacity for the average of a 7 day period	Lake Levels: High Rock Lake: -14.0 ft Badin Lake: -8.0 ft Tuckertown Reservoir: -3.0 ft Demand: >65% of available water supply capacity for 5 consecutive days	YPDLIP	US Drought Monitor: 2 Stage 2 Most stringent of: Yadkin Pee Dee LIP: High Rock Lake or WSACC Drought Operations Plan: Lake Howell or Catawba Wateree LIP Drought Response Plan	Lake Level: Reservoir Levels on-site @ WTP: < 75% Streamflows: < 300 cfs Demand: 7 day average > 24.3 mgd (90%)	Only one Mandatory level, presumed to same as level 2.	Lake Storage: Usable Storage <50% Lake Level: 8.5ft < full	None	River flow < 1.22 cfs at any point Pump run times increase >65% to maintain previous rates Event causing loss of system capacity >65%	None	Lake Storage: Usable Storage <50% Lake Level: 8.5ft < full
Level 4 or Emergency Reductions	Catawba-Wateree LIP Demand: >100% of available capacity for the average of a 7 day period	Lake Levels: High Rock Lake: -24.0 ft Badin Lake: -10.0 ft Tuckertown Reservoir: less than 50% useable storage	YPDLIP	US Drought Monitor: 3 Stage 3 Most stringent of: Yadkin Pee Dee LIP: High Rock Lake or WSACC Drought Operations Plan: Lake Howell or Catawba Wateree LIP Drought Response Plan	Lake Level: Reservoir Levels on-site @ WTP: < 60% Streamflows: < 250 cfs Demand: 7 day average > 25.65 mgd (95%)	US Drought Monitor: 2 or 3 Streamflows: Compare to 7 day demand System Specific Indicators: 7 day average demand as % of flow >75%	Lake Storage: Usable Storage <30% Lake Level: 12.5ft < full	None	River flow < 0.67 cfs at any point Pump run times increase >80% to maintain previous rates Event causing loss of system capacity >80%	None	Lake Storage: Usable Storage <30% Lake Level: 12.5ft < full
Level 5 or Water Rationing	Catawba-Wateree LIP Demand: If demand continues to exceed available capacity such that an extreme water shortage is in effect due to such capacity limitations for 30 consecutive days	Lake Levels: Badin Lake: -22.0 ft	YPDLIP	US Drought Monitor: 4 Stage 4 Lake Levels: High Rock Lake: YPDLIP Inflow: Lake Howell: WSACC Stream Inflow: YPDLIP	None	Same as Level 4	Lake Storage: Usable Storage <0% Lake Level: Below top of lower intake	None	No specific rationing level	None	Lake Storage: Usable Storage <0% Lake Level: Below top of lower intake

Water Shortage Response Plan Comparison Matrix: Triggers

Utility	Jonesville	Kannapolis[2]	King
Source Water	Yadkin River	2007 IBT from Catawba Basin (Charlotte Water - Finished) & Yadkin Basin (Salisbury - Finished), Grandfathered IBT from Yadkin Basin (Second Creek - Raw), Purchase (Concord - Finished)	Yadkin River
Level 1 or Voluntary Reductions	Jonesville Board of Commissioners decides when and what stage conservation should be implement based on information from the Town manager. There are no predetermined response triggers.	US Drought Monitor: 0 Stage 0 Most stringent of: Yadkin Pee Dee LIP: High Rock Lake or WSACC Drought Operations Plan: Lake Howell or Catawba Wateree LIP Drought Response Plan	Website contains recommended tips for voluntarily conserving water. No voluntary restriction level in drought management/WSRP plan or water conservation ordinance. Stage 1 considered mandatory.
Level 2 or Mandatory Reductions I		US Drought Monitor: 1 Stage 1 Most stringent of: Yadkin Pee Dee LIP: High Rock Lake or WSACC Drought Operations Plan: Lake Howell or Catawba Wateree LIP Drought Response Plan	Mandatory: USGS flow gage at ENON: <1000 cfs Stream height over lower intake: <10 inches Tank levels: Less than 60% System Demand: peak flow 2.4 mgd for 2 days Drought: Declared by State or local agency
Level 3 or Mandatory Reductions II		US Drought Monitor: 2 Stage 2 Most stringent of: Yadkin Pee Dee LIP: High Rock Lake or WSACC Drought Operations Plan: Lake Howell or Catawba Wateree LIP Drought Response Plan	No Level II Mandatory level
Level 4 or Emergency Reductions		US Drought Monitor: 3 Stage 3 Most stringent of: Yadkin Pee Dee LIP: High Rock Lake or WSACC Drought Operations Plan: Lake Howell or Catawba Wateree LIP Drought Response Plan	Mandatory: USGS flow gage at ENON: <600 cfs Stream height over lower intake: <6 inches Tank levels: Less than 40% System Demand: peak flow 2.4 mgd for 5 consecutive days
Level 5 or Water Rationing		US Drought Monitor: 4 Stage 4 Lake Levels: High Rock Lake: YPDLIP Inflow: Lake Howell: WSACC Stream Inflow: YPDLIP	Mandatory: USGS flow gage at ENON: <350 cfs Stream height over lower intake: <4 inches Tank levels: Less than 25% System Demand: 2.7 mgd for 2 consecutive days

Water Shortage Response Plan Comparison Matrix: Triggers

Utility	Lexington	Mocksville	Montgomery Co	Mount Airy	North Wilkesboro	Norwood[1]	Pilot Mountain, Town of	Richmond County
Source Water	Lake Thom-a-Lex	Hunting Creek	Lake Tillery	Stewarts Creek	Reddies River	Lake Tillery	Toms Creek	Blewett Falls Lake
Level 1 or Voluntary Reductions	Consults with Thomasville and Davidson Water Usable Storage: < 75% Lake Level: 2'-9" below full	Water Demand exceeds 25% of flow accessible to intake for 7 consecutive days	YPDLIP Whenever the board of commissioners finds that a potential shortage of water supply is indicated	Water level at 1029.5 ft mean sea level through weir in Stewarts Creek dam with plant not operating. (Top of dam 1030 assumed)	River flow - 30 cfs for 7 consecutive days Pump Run Times - 30% increase to maintain previous rates Any event that causes a 30% reduction in system capacity	Lake Levels: Lake Tillery: -5 ft Declaration of Voluntary Conservation stage by Council if it "finds that a potential shortage of water supply is indicated"	No voluntary measures provided in water conservation ordinance. Ordinance only has mandatory, emergency, and rationing measures.	Consumption: Average daily use of 80% of production capacity for 3 consecutive days. Lake Level: < 94ft as reported by energy company managing lake operation for more than 24hrs. The Water Treatment Plant Superintendent, the Public Works Director, and the County Manager will determine the severity of water supply shortage and the various stages of water shortages and subsequent restrictions.
Level 2 or Mandatory Reductions I	Usable Storage: < 65% Lake Level: 3'-10" below full	Water Demand exceeds 50% of flow accessible to intake for 3 consecutive days	Whenever the board of commissioners finds that raw water supplies (e.g., stream flow, surface waters, reservoir levels or groundwater levels) are consistently below seasonal averages, or if the county water system experiences a major leak which the loss of water is substantial, and if they continue to decline and may not be adequate to meet normal needs, and it has been made mandatory by a state agency and there is scientific evidence of a future shortage	Water level at 1028.92 ft mean sea level through weir in Stewarts Creek dam with plant not operating. (Top of dam 1030 assumed)	River flow - 19 cfs for 5 consecutive days Pump Run Times - 50% increase to maintain previous rates Any event that causes a 50% reduction in system capacity	Lake Levels: Lake Tillery: -9.2 ft Declaration of Mandatory Conservation whenever Council finds "raw water supplies (i.e. Streamflow, reservoir levels or groundwater levels) to be consistently below seasonal averages, and if they consistently decline and may not be adequate to meet normal needs	Whenever the town experiences a potential water shortage, the town manager, upon the advice and recommendation of the public works director and water treatment plant supervisor, shall be empowered to declare a water shortage warning	Consumption: Average daily use of 85% of production capacity for 3 consecutive days. Lake Level: < 90ft as reported by energy company managing lake operation for more than 24hrs. The Water Treatment Plant Superintendent, the Public Works Director, and the County Manager will determine the severity of water supply shortage and the various stages of water shortages and subsequent restrictions.
Level 3 or Mandatory Reductions II	Usable Storage: < 60% Lake Level: 5'-7" below full	Water Demand exceeds 50% of flow accessible to intake for 7 consecutive days	Only one level of Mandatory between Voluntary and Emergency	Water level at 1028.75 ft mean sea level through weir in Stewarts Creek dam with plant not operating. (Top of dam 1030 assumed)	None	Lake Levels: Lake Tillery: -13.2 ft	None, only one stage of mandatory.	Consumption: Average daily use of 85% of production capacity for 3 consecutive days. Lake Level: < 90ft as reported by energy company managing lake operation for more than 24hrs. The Water Treatment Plant Superintendent, the Public Works Director, and the County Manager will determine the severity of water supply shortage and the various stages of water shortages and subsequent restrictions.
Level 4 or Emergency Reductions	Usable Storage: < 50% Lake Level: 6'-6" below full	Water Demand exceeds 75% of flow accessible to intake for 3 consecutive days	Whenever the board of commissioners finds that raw water supplies are below the level necessary to meet normal needs and that serious shortages exist	Water level at 1028.58 ft mean sea level through weir in Stewarts Creek dam with plant not operating. (Top of dam 1030 assumed)	River flow - 9 cfs for 24 hour period Pump Run Times - 70% increase to maintain previous rates Any event that causes a 70% reduction in system capacity	Lake Levels: Lake Tillery: -17.6 ft Whenever Council finds "raw water supplies are below the level necessary to meet normal needs and that serious shortages exist"	When the town experiences a shortage of treated water, or when the water supply is not adequate to meet normal needs, the town manager, upon the advice and recommendation of the public works director and water treatment plant supervisor, shall be empowered to declare a water shortage emergency	Consumption: > 90% on any one day. Lake Level: < 85ft as reported by energy company managing lake operation for more than 24hrs. The Water Treatment Plant Superintendent, the Public Works Director, and the County Manager will determine the severity of water supply shortage and the various stages of water shortages and subsequent restrictions.
Level 5 or Water Rationing	Usable Storage: < 40% Lake Level: 8'-6" below full	Water Demand exceeds 75% of flow accessible to intake for 7 consecutive days	Whenever the board of commissioners of the county water system has declared a water shortage emergency and finds a need to provide for the equitable distribution of critically limited water supplies in order to balance a limited available supplies, and to ensure that sufficient water is available to preserve public health and safety	Water level at 1028.42 ft mean sea level through weir in Stewarts Creek dam with plant not operating. (Top of dam 1030 assumed)	None	Lake Levels: Lake Tillery: Below Top of Lower Intake Whenever Council has declared an Emergency and finds a "need to provide for the equitable distribution of critically-limited water supplies"	Whenever the town board, upon the advice and recommendation of the town manager, has declared a water shortage crisis and determines a need to provide for the equitable distribution of critically limited treated water or water supplies to ensure that sufficient treated water is available to preserve public health and safety of the citizens, the town board shall create and enforce a water rationing policy	None

Water Shortage Response Plan Comparison Matrix: Triggers

Utility	Rockingham	Salisbury	Thomasville	Wilkesboro[1]	Wingate	Winston-Salem[1]	Yadkinville
Source Water	Roberdel Lake and City Pond	Yadkin River	Lake Thom-a-Lex	Yadkin River	Pee Dee River & Catawba River	Yadkin River and Salem Lake	South Deep Creek
Level 1 or Voluntary Reductions	Roberdel Lake Storage @ 75% and Level @ 10ft City Pond Storage @ 75% and Level @ 6 ft	River flows at USGS Yadkin College gage: >750 cfs but <1000 cfs and US Drought Monitor (USDM): Moderate through Exceptional **OR** River flows at USGS Yadkin College gage: >500cfs but <750cfs and US Drought Monitor: Abnormally through Severe	Usable Storage: < 75% Lake Level: 2'-0" below full	US Drought Monitor: Severe Lake Levels: W. Kerr Scott Reservoir: <= 1027 ft. Streamflow: <=300 cfs System Demand: 3 consecutive days > 85%	Demand: Sustained demand for 80% of the town water system treatment and/ or transmission capacity. Catawba-Wateree LIP	US Drought Monitor: Severe Lake Levels: W. Kerr Scott Reservoir: <= 1027 ft. Streamflow: <=554 cfs System Demand: 3 consecutive days > 85%	Daily river/reservoir levels not conforming to seasonal expectations as determined by ORC or demand approaching 95% of capacity
Level 2 or Mandatory Reductions I	Roberdel Lake Storage @ 65% and Level @ 9ft City Pond Storage @ 65% and Level @ 5 ft	River flows at USGS Yadkin College gage: >350 cfs but <500 cfs and US Drought Monitor (USDM): Extreme and Exceptional **OR** River flows at USGS Yadkin College gage: >250cfs but <350cfs and US Drought Monitor: Abnormally through Severe	Usable Storage: < 65% Lake Level: 3'-3" below full	US Drought Monitor: Extreme Lake Levels: W. Kerr Scott Reservoir: <= 1023 ft. Streamflow: <=130 cfs more than 5 consecutive days System Demand: > 90% capacity	Town Manager to determine. Catawba-Wateree LIP	US Drought Monitor: Extreme Lake Levels: W. Kerr Scott Reservoir: <= 1023 ft. Streamflow: <=200 cfs 5 consecutive days System Demand: > 90% capacity	Staff gauge reading 1 ft 3 inches and no rain forecasted
Level 3 or Mandatory Reductions II	Roberdel Lake Storage @ 50% and Level @ 7ft City Pond Storage @ 50% and Level @ 4 ft	River flows at USGS Yadkin College gage: >250 cfs but <350 cfs and US Drought Monitor (USDM): Extreme and Exceptional **OR** River flows at USGS Yadkin College gage: >200cfs but <250cfs and US Drought Monitor: Abnormally through Exceptional	Usable Storage: < 50% Lake Level: 5'-0" below full	US Drought Monitor: Extreme Lake Levels: W. Kerr Scott Reservoir: <= 1019 ft. Streamflow: <=100 cfs more than 3 consecutive days System Demand: 3 consecutive days > 90%	Town Manager to determine. Catawba-Wateree LIP	US Drought Monitor: Extreme Lake Levels: W. Kerr Scott Reservoir: <= 1019 ft. Streamflow: <=175 cfs 3 consecutive days System Demand: 3 consecutive days > 90% capacity	Staff gauge reading 1 ft 2 inches and no rain forecasted
Level 4 or Emergency Reductions	Roberdel Lake Storage @ 30% and Level @ 4ft City Pond Storage @ 30% and Level @ 2 ft	River flows at USGS Yadkin College gage: >150 cfs but <200 cfs and US Drought Monitor (USDM): Abnormally through Exceptional	Usable Storage: < 40% Lake Level: 6'-0" below full	US Drought Monitor: Extreme Lake Levels: W. Kerr Scott Reservoir: <= 1015 ft. Streamflow: <=80 cfs more than 2 consecutive days System Demand: > 95% capacity	Town Manager to determine. Catawba-Wateree LIP	US Drought Monitor: Extreme Lake Levels: W. Kerr Scott Reservoir: <= 1015 ft. Streamflow: <=125 cfs 2 consecutive days System Demand: > 95% capacity	Staff gauge reading 1 ft 1 inches and no rain forecasted
Level 5 or Water Rationing	Roberdel Lake Storage @ 0% and Level @ 4ft City Pond Storage @ 0% and Level below top of lower intake	River flows at USGS Yadkin College gage: <150 cfs and US Drought Monitor (USDM): Abnormally through Exceptional	Usable Storage: < 30% Lake Level: 8'-0" below full	None	Town Manager to determine. Catawba-Wateree LIP	None	Staff gauge reading 1 ft and no rain forecasted

Water Shortage Response Plan Comparison Matrix: Conservation Measures

Utility	Union Co	Albemarle	Anson Co	Concord	Davidson Water	Davie Co	Denton	Dobson
Level 1 or Voluntary Reductions	Voluntary: – Use water-saving devices and methods. - Faucets should not be left running while shaving, brushing teeth, or washing dishes. - Showers should be limited to no more than five (5) minutes and baths should be avoided. – Toilets should be flushed after multiple usages. - Limit the use of clothes and dish washing machines to running only full loads. – Inspect and repair all leaks and defective components of water delivery systems . – Reuse household water to water plants. Mandatory: – Spray Irrigation System use shall be limited to three (3) days per week. – Drip irrigation or any handheld water methods are still allowed to water any day and time.	Voluntary: – Spray irrigation should be limited to hours between 7:00 PM and 6:00 AM. - Use of water for wash down of outside areas such as driveways, parking lots, and sidewalks should be curtailed. – Faucets should not be left running while conducting personal hygiene, or washing dishes. – The use of clothes and dishwashers should be limited where possible, and these units should be operated with full loads. - The use of flow restriction and other water saving devices is encouraged. – Showers should be used for bathing, and showers should be limited for four minutes or less. – Filling of pools should be deferred or limited to hours between 7:00 PM and 6:00 AM. - Distribute conservation measure information.	None	Voluntary: – Household water should be reutilized to the greatest extent possible for watering. – Faucets should not be left running while shaving, brushing teeth, or washing dishes. – The use of flow restrictions and other water saving devices is encouraged.	Voluntary: - Use showers for bathing and limit to four minutes. - Limit toilet flushing by multiple usage when possible. – Do not leave faucets running while shaving, rinsing dishes, or brushing teeth. - Limit use of clothes washers and dishwashers. If used, they should be fully loaded. - Limit lawn watering to that which is necessary for plant survival. - Water shrubbery the minimum required. - Limit washing of vehicles. - Do not wash down outside areas such as sidewalks, patios, and driveways. - Use disposable and biodegradable dishes. - Install water saving devices in toilets and showers.	Voluntary: - Increase conservation educational campaign. - Increase the price of metered irrigation water by 50 % of the normal price. – 5 % potable water use reduction goal (system-wide as well as individual users). – Limit outdoor water use for landscape irrigation. - Washing of vehicles or mobile equipment is prohibited. – Filling of water into any pond, ornamental fountain, pool, or hot tub is prohibited. – Use of treated water for dust control or compaction is prohibited. – Use of water from hydrants for purposes other than fire suppression, public emergency, or flushing system is prohibited.	Voluntary Reductions; – all water users will be asked to reduce their normal water use by 5% Customer education and outreach programs will encourage water conservation and efficiency measures including: – irrigating landscapes a maximum of one inch per week; -preventing water waste, runoff and watering impervious surfaces; -watering plants deeply to encourage root growth; -washing only full loads in clothes and dishwashers; -using spring-loaded nozzles on garden hoses; and -identifying and repairing all water leaks	None
Level 2 or Mandatory Reductions I	Voluntary: - Implement all voluntary conservation measures above. - Limit Spray Irrigation System use to no more than two (2) days per week. – Use spring-activated nozzles when watering lawns and gardens by hand with a hose. – Limit residential vehicle, or any other type of mobile equipment, washing to the designated spray irrigation System use days. Mandatory: – Comply with all mandatory restrictions above.	Mandatory: - Irrigation should not be done except by handheld containers and limited to the hours between 7:00 PM and 6:00 AM. - Residential wash down of outside areas is prohibited. - Residential washing of cars and other vehicles is prohibited. - Restaurants shall serve water to patrons only at the request of the patron. - Commercial, industrial and construction operations shall eliminate all possible waste of water. Large scale commercial and industrial operations and construction activities that utilize 15,000 cubic feet or more of water per month shall submit a water reduction compliance plan to achieve 25%, 50%, or 75% water reduction. - Above-ground pools, jacuzzis, and hot tubs having a capacity of 500 gallons or more shall be filled by permit only.	None	Mandatory: – Planting of new ornamental plants and seeding of lawns should be deferred. – Household water should be reutilized to the greatest possible extent for watering. – Use of water for wash down of outside areas such as driveways or parking lots should be limited. – Faucets should not be left running while shaving, brushing teeth, or washing dishes. – The use of clothes washing machines and dishwashers should be limited. – Washing of cars or other vehicles should be limited to the two days per week. Hose should not be left running while washing vehicles. – The use of flow restrictions and other water saving devices is encouraged. – Filing pools shall be deferred or limited to hours between 8:00 PM and 8:00 AM. – Showers should be used for bathing and the length of showers should be limited.	Voluntary: - All voluntary measures should be followed. Mandatory: - All of the above mandatory measures should be followed. - Limit one hour of outdoor watering between the hours of 7:00 AM and 9:00 AM or 7:00 PM to 9:00 PM on the following days, Tuesday, Thursday, Saturday.	Voluntary: - All voluntary measures should be followed. Mandatory: - All of the above mandatory measures should be followed. - Increase the price of metered irrigation water by 100 % of the normal price. - Landscape watering between the hours of 8:00 PM and 8:00 AM, using a hand held container, hose, or drip irrigation. – Ban outdoor water use for landscape irrigation except historic heritage vegetation. – Ban washing of vehicles or mobile equipment. – Ban filling of water into any pond, ornamental fountain, pool, or hot tub. – Ban use of treated water for dust control or compaction. – Ban use of water from fire hydrants for purposes other than fire suppression or public emergency. – Restaurants shall serve water only upon customer's request and use single serving utensils, plates, and cups. - Wash down outside areas such as streets, driveways, parking lots sidewalks, patio, or exteriors of any building.	Mandatory Reductions I All customers are expected to reduce their water use by 10% in comparison to their previous month's water bill. In addition to continuing to encourage all voluntary reduction actions, the following restrictions apply: -irrigation is limited to a half inch per week between 8PM and 8AM; -outdoor use of drinking water for washing impervious surfaces is prohibited; and -all testing and training purposes requiring drinking water (e.g. fire protection) will be limited.	None
Level 3 or Mandatory Reductions II	Voluntary: - Implement all voluntary conservation measures above. Mandatory: - Comply with all mandatory restrictions above. - Spray irrigation no more than two (2) days per week and only between the hours of 12:00 AM. until 8:00 AM. and 8:00 PM. until 12:00 PM. - Eliminate personal vehicle washing unless using a commercial carwash. - Eliminate the filling of new swimming pools and fountains. - Eliminate public building, sidewalk, and street washing activities. - Limit construction uses of water. - Limit flushing and hydrant testing programs.	Mandatory: - Any form of water or irrigating lawns, gardens, and/or other plants is prohibited. - The use of water for wash down or outside areas is prohibited. - The washing of cars, vehicles, and/or other equipment is prohibited. - Restaurants shall utilize single serving utensils and plates in addition to serving water to patrons only at the request of the patron. - Recreational use of potable water, including filling of pools, is prohibited. - Commercial, industrial, and construction activities utilizing 15,000 cubic feet or more of water per month shall achieve mandatory reductions in daily water usage of 25%, 50%, or 75% through whatever means are available. - Drinking water taps or hydrant permits shall be issued or revoked at the discretion of the Director of Public Utilities. - Unless bulk water sales is made pursuant to an existing contract, bulk water sales shall be prohibited.	None	Mandatory: - Outdoor irrigation shall be allowed two days per week and shall occur only between 8:00 PM and 8:00 AM on the two days each week. - The use of hand-held water containers is permitted on any day without. - Wash down of outside areas, is prohibited - Residential washing of cars and other vehicles is prohibited. - Wash down of public building, sidewalks and streets washing activities should be limited. - Newly constructed or drained pools shall be filled by permit only.	Voluntary: - All voluntary measures should be followed. Mandatory: - All of the above mandatory measures should be followed. - Limit to one hour of outdoor watering by handheld garden hose only, between the hours of 7:00 AM and 9:00 AM or 7:00 PM to 9:00 PM on the following days, Tuesday, Thursday, Saturday. - Ban filling of new or used swimming pools or ornamental fountains. - Ban washing of any vehicles. - Ban washing down driveways, patios, sidewalks or other outside areas or use for dust control. - Serve drinking water in restaurants, expect by request. - Use of hydrants for firefighting only. - Use of water for unnecessary purposes is prohibited.	Same as Level 2	Mandatory Reductions II Customers must continue actions from all previous stages and further reduce water use by 20% compared to their previous month's water bill. All non-essential uses of drinking water are banned and garden and landscape irrigation must be reduced to the minimum amount necessary for survival. Additionally, in Stage 3, a drought surcharge of 1.5 times the normal water rate applies.	None
Level 4 or Emergency Reductions	Voluntary: – Implement all voluntary conservation measures above. – Encourage industrial/manufacturing process changes that reduce water use. Mandatory: – Comply with all mandatory restrictions above. – Spray irrigation no more than one (1) day per week and only between the hours of 12:00 AM until 8:00 AM and 8:00 PM until 12:00 PM. – Eliminate the serving of drinking water in restaurants except upon patron request. – Eliminate variances for landscape irrigation.	Mandatory: – All use of water for purposes other than the maintenance of public health and safety is prohibited. – Unless bulk water sale is made pursuant to an existing contract, bulk water sales shall be prohibited. – Monthly residential water use shall not exceed 50 cubic feet (384 gallons) of water per day at each metered location.	None	Mandatory: – Outdoor irrigation shall be allowed two days per week and shall occur only between 8:00 PM and 8:00 AM on the two days each week. – Recreational use of potable water including filling of pools in prohibited. – Hydrant flushing and testing programs are prohibited.	Voluntary: - All voluntary measures should be followed. Mandatory: - All of the above mandatory measures should be followed. - No outside use of water, except emergency use involving fire or accident.	Voluntary: - All voluntary measures should be followed. Mandatory: - All of the above mandatory measures should be followed. – Lock out all irrigation meters except those serving livestock or historic heritage vegetation. – Maximum 15 % potable water use reduction goal. – Residential water users shall reduce water consumption to level necessary to sustain life and lives of pets or to maintain minimum standards of hygiene and sanitation. – Ban outdoor water use for landscape irrigation. – Ban washing of vehicles or mobile equipment. – Ban filling of water into any pond, ornamental fountain, pool, or hot tub. – Ban use of treated water for dust control or compaction. – Ban use of water from fire hydrants for purposes other than fire suppression or public emergency. – Restaurants and food servers shall serve water only upon customer's request and use single serving utensils, plates, and cups.	Mandatory Emergency Customers must continue all actions from previous stages and further reduce their water use by 25% compared to their previous month's water bill. A ban on all use of drinking water except to protect public health and safety is implemented and drought surcharges increase to 2 times the normal water rate.	None
Level 5 or Water Rationing	Voluntary: - Implement all voluntary conservation measures above. Mandatory: - Comply with all mandatory restrictions above. - Prohibit all non-essential water use including the prohibition of all residential irrigation, irrigation of commercial stock, and filling of ponds to sustain aquatic life. - Prohibit the use of water outside a structure for any use other than a fire emergency. - Require the use of disposable utensils and plates at all restaurants.	None	None	Mandatory: - All use of water outdoors for any purposes other than maintenance of public safety is prohibited. - Non-residential water customers and construction activities utilizing 5,000 or more gallons water per day, are required to reduce daily water usage through whatever means is available.	None	Same as Level 4	Water Rationing is to provide drinking water to protect public health (e.g. residences, residential health care facilities and correctional facilities). All customers are only permitted to use water at the minimum required for public health protection. Firefighting is the only allowable outdoor water use and pickup locations for distributing potable water will be announced according to Denton's Emergency Response Plan. Drought surcharges increase to 5 times the normal water rate.	None

Water Shortage Response Plan Comparison Matrix: Conservation Measures

Utility	Elkin	Hamlet Water System	Handy Sanitary District	Jonesville	Kannapolis	King	Lexington	Mocksville
Level 1 or Voluntary Reductions	Voluntary: - Inspect and repair all faulty and defective parts of faucets and toilets causing water waste. - Use shower for bathing rather than bathtub and limit shower to no more than five (5) minutes. - Do not leave faucets running while shaving, rinsing dishes or brushing teeth. - Limit use of clothes washers and dishwashers; operate fully loaded. - Limit lawn watering and all other outside water use: even addresses water on Monday, Wednesday, and Friday 7:00 PM to 6:00 AM, odd addresses water on Tuesday, Thursday, and Saturday 7:00 PM to 6:00 AM, and no watering on Sunday. - Limit the washing of vehicles, watering of shrubbery; Do not wash down sidewalks, patios, and driveways. -Water flow restrictions in showerheads and other water-saving devices. - Use disposable and biodegradable dishes where possible. - Install water-saving devices in toilets. - Limit hours of operation of water-cooled air conditioners. - Limit refilling of swimming or wading pools. - Follow conservation during all construction-related activities.	None	Voluntary: - Users asked to reduce usage 5% - Maximum of 1 inch per week irrigation - Prevent water waste and runoff from impervious surfaces - Washing full loads - Identifying and repairing leaks	Voluntary: - Limit lawn and shrubbery watering to that which is necessary for plants to survive. - Limit vehicle washing to the minimum. - Refrain from washing down outside areas such as sidewalks, patios, etc. - Use showers, and limit showers to no more than four minutes. - Refrain from leaving faucets running. - Limit use of clothes washers and dishwashers and operate fully loaded. - Install water-flow restrictive devices in showerheads and water saving devices in toilet tanks. - Use disposable and biodegradable dishes. - Install water saving devices	Voluntary: - Limit irrigation to 8pm until 8am for a max of two days per week - Planting of new ornamental plants and seeding of lawns should be deferred. - Household water should be reutilized to the greatest possible extent for watering. - Use of water for wash down of outside areas should be limited. - Faucets should not be left running. - The use of clothes washing machines and dishwashers should be limited and these units should be operated with full loads. - Washing of cars or other vehicles should be limited to the two designated days per week. - The use of water saving devices is encouraged. - Filing pools shall be limited to hours between 9:00 PM and 6:00 AM. - Showers should be used for bathing and the length should be limited.	Town website has education information on water conservation tips for year-round use. The first declared water shortage or drought management stage is for mandatory conservation. Stage triggers are custom to King based on their water system and streams flows at their intake.	Voluntary: - Inform the public of water conservation measures. - Use showers for bathing and limit to no more than four (4) minutes. - Limit toilet flushing by multiple usage. - Do not leave faucets running. - Limit use of clothes washers and dishwashers. - Limit lawn watering to that which is necessary for plants to survive. - Water shrubbery the minimum required. - Mulch shrubs, trees, and flowers. - Limit car washing at home to the minimum, and use a commercial car wash when possible. - Do not wash down outside areas such as sidewalks, patios and driveways. - Install water flow restrictive devices in showerheads and sink faucets. - Use disposable and biodegradable dishes. - Install water saving devices in toilet tanks. - Limit hours of operation of water-cooled air conditioners. - Delay new landscape work. - Drip irrigation systems are encouraged in lieu of traditional systems. - Utilize untreated or reclaimed water for street washing, landscape irrigation and other appropriate purposes to the extent practical.	Voluntary: - Users asked to reduce usage 5% - Maximum of 1 inch per week irrigation - Prevent water waste and runoff from impervious surfaces - Washing full loads - Identifying and repairing leaks
Level 2 or Mandatory Reductions I	Mandatory: Unlawful for a Customer to: - Water shrubbery, trees, ornamental plants, flowers and vegetable gardens, except by water hose utilizing a hand-held spring-loaded nozzle or hand-held container. - Water lawns and grass by sprinkler, irrigation or drip irrigation except on such days and during such hours as established. All other outside water uses except by the following schedules and restrictions; even addresses water only on Wednesday and Friday 7:00 PM to 6:00 AM, odd addresses water only Thursday and Saturday 7:00 PM to 6:00 AM, and no watering on Sunday. - No filling of swimming pools or wading pools of any kind. - Operate water-cooled air conditioners or other equipment that does not recycle cooling water, except when health and safety are adversely affected. - Wash automobiles, trucks, trailers, boats, airplanes or any other type of mobile equipment. - Wash down outside areas expect for commercial use. - Operate or introduce water, except where such water is totally recycled, into any ornamental fountain, pool or pond or other structure making similar use of water. - Serve drinking water in food establishments, except upon specific request. - Use water from any public or private fire hydrants for any purpose other than maintenance, fire suppression or other public emergency. - Use water for dust control or compaction. - Use water for any unnecessary purpose or to waste water.	None	Mandatory: - Continue all voluntary actions - Reduce water usage by 10% - Irrigation limited to 1/2 inch per week from 8pm to 8am - No washing of outdoor impervious surfaces - Limited water usage for fire protection testing and training	Voluntary: - All voluntary measures should be followed. Mandatory: - No watering of lawns, grass, shrubbery, trees, flowers or vegetable gardens except between the hours of 6:00 PM and 9:00 PM Saturday and Sunday. - No new filling of swimming and/ or wading pools. - No washing of automobiles or mobile equipment at private residences, households, or apartments. - No washing down of outside areas. - No introducing water into any ornamental fountain, pool or pond or other structure. - No using water from public or private fire hydrants for any purpose other than emergency. - No using water for dust control or compaction. - No using waster for any unnecessary purpose or intentionally wasting water.	Mandatory: - All voluntary measures become mandatory plus: -Residential car washing prohibited - Drained or new pools filled by permit only	Mandatory: - Water lawns, grass, shrubbery, trees, flower and vegetable gardens except between the hours of 7:00 PM and 7:00 AM, one day per week expect for commercial purposes. - Washing automobiles, or any other type of mobile equipment except with a container not to exceed three gallons expect for commercial purposes. - Washing down outside areas except for commercial purposes. - Use water from public or private fire hydrants for any purpose other than fire protection services, other public emergency or water department need. - Use water for dust control or compaction. - Intentionally waste treated water.	Mandatory: - All of the above mandatory measures should be followed. It shall be unlawful to: - Water shrubbery, trees, flowers and gardens between the hours of 8:00 PM to 8:00 AM. Watering shall be performed by handheld hose with a spring-loaded nozzle; by container; by drip irrigation system; or by soaker hoses. - Operate water-cooled air conditioners or other equipment that does not recycle cooling water. - Fill newly-constructed swimming or wading pools or refill swimming or wading pools that have been drained. - Wash automobiles, - or any other type of mobile equipment, excluding commercial car washing. -Wash down outside areas with a hose. - Serve drinking water in restaurants, cafeterias or other food establishments, except upon request. - Use water from a public or private fire hydrant or sprinkler system for any purpose other than fire suppression. - Use water for dust control or compaction. - Use recreational water toys. - Use potable water for dust control or compaction. - Use water in fundraising or promotional events other than for direct consumption. - Water and wastewater rates using more than twenty (20) ccf will be doubled. - Water rates for water consumed by sprinkler systems will be five (5) times the normal rate.	Mandatory: - Continue all voluntary actions - Reduce water usage by 10% - Irrigation limited to 1/2 inch per week from 8pm to 8am - No washing of outdoor impervious surfaces - Limited water usage for fire protection testing and training
Level 3 or Mandatory Reductions II	Mandatory: It shall be unlawful for Customers to: - Water lawns or do any other outside watering except by hand-held hoses with a spring loaded handle or a bucket according to the following schedules: even addresses Wednesday only from 7:00 PM to 9:00 PM and 4:00 AM to 6:00 AM, odd addresses Saturday only from 7:00 PM to 9:00 PM and 4:00 AM to 6:00 AM. - Exceed the following water usage mandate for non-residential customers which utilize 5,000 or more gallons of water per day shall achieve mandatory reductions in daily water usage of 25%, 50% or 75%. The Utilities Director shall determine the target reduction percentage by the severity of the water emergency. - Make any water service connections.	None	Mandatory: - Continue all level 2 mandatory actions - Reduce water usage by 20% - Irrigation limited to minimum for plant survival - Water rate surcharge of 1.5X implemented	Voluntary: - All voluntary measures should be followed. Mandatory: - All of the above mandatory measures should be followed. - No water of lawns, grass, shrubbery, trees, flowers or vegetable gardens. - No serving of drinking water in food establishments, except upon request.	Mandatory: – All voluntary measures become mandatory plus: -Residential car washing prohibited -No recreational use including pools -Irrigation only allowed once per week -Hydrant use and testing only for public health or water quality	King policy only has 3 levels. All are mandatory.	Mandatory: - All of the above mandatory measures should be followed. It shall be unlawful to: -Water or sprinkle any lawn, garden, sod, shrubs or flowers except with non-potable water. - Use water outside a structure for any use other than emergency use involving fire or accident. - Introduce water into a swimming or wading pool. - To use a pressure washer. - All irrigation connections are to be valved off. - Restaurants must serve food on disposable plates, saucers, cups, eating utensils, napkins and tablecloths.	Mandatory: - Continue all level 2 mandatory actions - Reduce water usage by 20% - Irrigation limited to minimum for plant survival - Water rate surcharge of 1.5X implemented
Level 4 or Emergency Reductions	Mandatory: The following mandatory water restrictions shall be imposed: - All use of water for purposes other than maintenance of public health and safety is prohibited. - Usage by individuals shall be limited to those amounts necessary to sustain life through drinking, food preparation and personal hygiene. - Excessive use water rates: Any customer who exceeds the allotment will be subject to five (5) times the normal rate.	None	Mandatory: - Continue all level 3 mandatory actions - Reduce water usage by 25% - Ban on all water usages except public health and safety - Water rate surcharge of 2.0X implemented	Voluntary: - All voluntary measures should be followed. Mandatory: - All of the above mandatory measures should be followed. - No using water outside of structure for any use other than emergencies involving fire. - No introducing water into swimming pools. - Reduction or elimination of all water consumption amount.	Mandatory: - Residential water use not to exceed 300 gallons per day. - All use of water out doors for any purposes other than maintenance of public safety is prohibited. - Non-residential water customers and construction activities utilizing 5,000 or more gallons water per day, are required to reduce daily water usage through whatever means is available to the target percentages.	Mandatory: - All of the above mandatory measures should be followed. - Water or sprinkle any grass, shrubbery, trees, flower and vegetable gardens with treated water. - Wash automobiles, trucks, trailers, boats, airplanes, or any other type of mobile equipment. - Wash down outside areas. - Fill ponds and pools. - Serve drinking water in restaurants, cafeterias, or other food establishments, except upon request. - Use treated water outside a structure for any use other than an emergency use involving fire protection services or as needed by the city to maintain the water system. - Introduce water into any ornamental fountain or similar structure. - Make any nonessential use of treated water for commercial or public use.	Mandatory: - All of the above mandatory measures should be followed.. - Commercial and industrial water customers will be required to cut their water use by forty (40) percent. Failure to do so will result in water and wastewater rates being applied to accounts, at two (2) times the adopted rates.	Mandatory: - Continue all level 3 mandatory actions - Reduce water usage by 25% - Ban on all water usages except public health and safety - Water rate surcharge of 2.0X implemented
Level 5 or Water Rationing	No specific rationing measures but stage 4 contains water use statements comparable to rationing.	None	Mandatory: - Continue all level 4 mandatory actions - Ban on all outdoor water usages except fire fighting - Water rate surcharge of 5.0X implemented	Voluntary: - All voluntary measures should be followed. Mandatory: - All of the above mandatory measures should be followed. - Fire protection will be maintained, tank trucks shall use raw water. - Limited to those uses necessary to meet essential health and safety needs. - Variable percentage rationing among all water users		Mandatory: - All of the above mandatory measures should be followed. - Rationing. - Water customers must achieve an immediate further reduction in water use in order to extend existing water supplies. - Fire protection must be maintained where possible and tank trucks shall use nonpotable water, if available. - Additional measures of mandatory conservation. controls such as a percentage reduction in consumption - Termination of service to specific areas in the water system on a rotating basis. - Prohibition of all industrial uses of potable water or whatever is necessary to protect the health and safety of the customers of the water system.	Mandatory: - All of the above mandatory measures should be followed. - Use water at the minimum required for public health protection. - Implement water-rationing measures. - There shall be no industrial use of water. - There shall be no commercial uses of water. - There shall be no institutional uses of water. - The city may discontinue water service to its customers for a maximum of twelve (12) hours. - Fire protection will be maintained when possible. - Whenever possible, tanker fire trucks shall use non-potable water. - Water usage shall be limited to the minimum quantities necessary for sanitary purposes and fire protection and suppression and water shall be used for no other purpose.	Mandatory: - Continue all level 4 mandatory actions - Ban on all outdoor water usages except fire fighting - Water rate surcharge of 5.0X implemented

Water Shortage Response Plan Comparison Matrix: Conservation Measures

Utility	Montgomery Co	Mount Airy	North Wilkesboro	Norwood	Pilot Mountain, Town of	Richmond County	Rockingham	Salisbury
Level 1 or Voluntary Reductions	Voluntary: Ask customers to limit Class 3 water uses. Class 3: Nonessential uses of water. - Ornamental purposes. Fountains, reflecting pools, and artificial waterfalls. - Gardens, lawns, parks, golf courses (except greens), playing fields and other recreational areas. - Filling and operation of recreational swimming pools which serve fewer than 25 dwellings. - Noncommercial washing of motor vehicles. - Serving water in restaurants, clubs, or eating places except by specific request. - Air conditioning. Refilling cooling towers after draining except as specified for Class 1. - Commercial car and truck washes. - Commercial bulk water sales. The board of commissioners shall have the power to adopt shortage water rates by ordinance designed to conserve water supplies. Such rates may provide for, but not be limited to: - Higher charges per unit for increasing usage. - Uniform charges for water usage per unit of use. - Extra charges for use in excess of a specified level. - Discounts for conserving water beyond specific levels.	Voluntary: - Education and outreach programs - irrigation a maximum of 1 inch per week - preventing water waste and runoff of impervious areas - washing full loads -using spring-loaded nozzles on water hoses - identifying and repairing leaks	Voluntary: Limit Class III uses: - Operation of water fountains, ornamental pools, and swimming pools serving less than 25 people - Non-commercial washing of motor vehicles, sidewalks, houses, etc -Non-commercial water of gardens, lawns, park, playing field, and other rec areas	Voluntary: - Ask customers to limit use (especially Class 3 uses) and eliminate the waster of water. Class I: Essential Water Uses - Domestic Use: Water necessary to sustain human life and the lives of domestic pets, and to maintain minimum standards of hygiene and sanitation. - Health Care Facilities: Patient care rehabilitation, including swimming pools used for patient care and rehabilitation. Class 2: - Not defined in the policy although it is noted in the Emergency Reduction stage Class 3: Non-essential uses of water - Ornamental Purposes: Fountains, reflecting pools, and artificial waterfalls. - Outdoor Non-commercial watering (public or private): Gardens, lawns, parks, golf courses (except greens), playing fields and other recreational areas. Filling and operation of recreational swimming pools which served fewer than 25 dwellings. Non-commercial washing of motor vehicles. Serving water in restaurants, clubs, or eating places except by specific request. Air conditioning: refilling cooling towers after draining except as specified in Class I. - Public Use: Fire hydrants: any purpose, including use of sprinklers caps and testing fire apparatus and for fire department drills, except as listing in Class I. Flushing of sewers and hydrants except as listed in Class I.	None	Voluntary: - Check for leaks: faucets, toilets, and outdoor spigots - Take short showers. - Cut water off while brushing teeth and/or shaving. - Install a low-flow showerhead and aerators on bathroom and kitchen faucets. - Run dishwashers and washing machines only when they are full. - Water lawns only in the early mornings or late evenings. - Use a broom instead of a hose to clean driveways, walks and patios. - Wash cars less often. - Keep grass at least two inches high to shade roots and hold moisture. - All newly installed or substantially improved irrigation systems that are equipped with automatic timers and which directly or indirectly use Richmond County Water shall be equipped with automatic rain and soil moisture sensors that are activated to prevent the operation of those irrigation systems while rain is falling or soil moisture is adequate.	Voluntary: - Customers asked to reduce usage 5% - Max of 1 inch per week irrigation - Prevent water runoff on impervious areas - Wash only full loads - Use spring-loaded hose nozzles - Repair all leaks	Voluntary: - Increase conservation educational campaign. - 5% potable water use reduction goal. - Watering of lawns and ornamental plants should be limited to that necessary for plant survival only. Irrigation uses should be limited to between the hours of 9:00 PM and 4:00 PM. - Household water should be reutilized to the greatest extent possible for watering. - Use of water for washdown of outside areas should be curtailed. - Faucets should not be left running. - The use of washing machines and dishwashers should be limited. - Noncommercial washing of cars and other vehicles should be curtailed or limited to Saturdays and Sundays. - The use of flow restrictors and other water saving devices is encouraged. - Showers used for bathing should be limited to four (4) minutes or less. - Filling of pools should be deferred or limited to the hours between 9:00 PM and 4:00 AM. - Commercial and industrial operations shall eliminate all possible wastage of water.
Level 2 or Mandatory Reductions I	Mandatory: - Encourage voluntary water conservation measures. - Ban on all Class 3 water uses.	Customers expected to reduce consumption 10% - Continue voluntary measures - Mandatory: - irrigation limited to half inch between 8pm and 8am - no washing of outdoor impervious areas - fire protection testing and training limited	Mandatory: - All users to adhere to voluntary measures, plus all Class III uses banned - Class II outdoor watering limited to specified days - Industrial and bulk customers to develop plans to reduce use 25% - Potential to implement 15% rate surcharge	Voluntary: - All voluntary measures should be followed. Mandatory: - All of the above mandatory measures should be followed. - Ban on all Class 3 water uses.	Mandatory: It shall be unlawful to use water for the following purposes: - Water lawns, grass, shrubbery, trees, flower and vegetable gardens except between the hours of 7:00 PM and 7:00 AM, on that property's garbage pickup day expect for commercial purposes. - Wash automobiles, trucks, trailers, boats, airplanes, or any other type of mobile equipment except with a container not to exceed three gallons expect for commercial purposes. - Wash down outside areas expect for commercial purposes. - Use water from public or private fire hydrants for any purpose other than fire protection services, other public emergency or water department need. - Use water for dust control or compaction. - Intentionally waste treated water.	Mandatory: Unlawful to use water for the following purposes: - Water lawns, grass, shrubbery, trees, flower and vegetable gardens except on Wednesday and Sunday or for commercial purposes. - Wash automobiles, trucks, trailers, boats, airplanes, or any other type of mobile equipment other than on Saturday (one day out of each week) expect for commercial purposes. - Wash down outside areas except for commercial purposes. - Use water from public or private fire hydrants for any purpose other than fire suppression or other public emergency or water department needs. - Use water for dust control or compaction. - Intentionally waste treated water.	Continue voluntary measures with reduction increase to 10% Mandatory: - Non-commercial irrigation only on Wednesday and Sunday with a max of 1/2 inch - Non-commercial mobile equipment washing only on Saturday - Commercial car washes limited to historical max month with meter removal at the limit - No outdoor washing of impervious surfaces such as driveways, sidewalks, or buildings - Fire suppression only from hydrants - No water for dust control or compaction activities	Voluntary: - All voluntary measures should be followed. Mandatory: - 5 % potable water use reduction goal. - Monitor compliance with water use bans and enforce when necessary. - Irrigation of lawns and ornamental trees or plants. shall not be done except during the hours between 9:00 PM and 4:00 AM.
Level 3 or Mandatory Reductions II	Montgomery County only has one Mandatory level between Voluntary and Emergency	Continue previous efforts plus: - 20% water usage reduction - Non-essential uses banned -irrigation limited to plant survival	None	No level 2 Mandatory		Mandatory: Unlawful to use water for the following purposes: - Irrigation of lawns, gardens, trees, or shrubs expect on Sunday. - There shall be no introduction of water into any ornamental fountain, pool, or pond or other structure making similar use of water. - Washing of automobiles is strictly prohibited expect for commercial purposes.	Continue voluntary measures with reduction increase to 20% Mandatory: - Non-commercial irrigation only on Sunday with a watering can and a max of 1/2 inch - Non-commercial car washing prohibited - Commercial car washes limited to historical max month with meter removal at the limit - No outdoor washing of impervious surfaces such as driveways, sidewalks, or buildings - Fire suppression only from hydrants - No water for dust control or compaction activities	Mandatory: - 7 % potable water use reduction goal. - Monitor compliance with water use bans and enforce when necessary. - Household water shall be reutilized to the greatest extent possible for watering. - Faucets shall not be left running. - The use of washing machines and dishwashers shall be limited. These units should be operated with full loads when used. - Irrigation of lawns and ornamental trees or plants shall not be done except during the hours between 9:00 p.m. and 4:00 a.m. Variances for commercial irrigation may be issued. - Planting of new ornamental plants or trees or seeding of lawns shall be deferred. - Use of water for washdown of outside areas is prohibited. - Noncommercial washing of cars and other vehicles shall be prohibited except on Saturdays and Sundays. - Commercial and industrial operations shall eliminate all possible wasting of water. - Newly constructed or drained pools shall be filled by permit only.
Level 4 or Emergency Reductions	Mandatory: - Identify Class 1 customers for voluntary conservation initiatives. - Ban Class 2 uses. - Ban Class 3 uses.	Continue previous efforts plus: - 25% water usage reduction - All uses banned except to protect public health and safety - rate surcharge of 1.5 implemented	Mandatory: - All users to adhere to voluntary measures, plus all Class III uses banned - Class II outdoor watering banned - Industrial and bulk customers to implement plans to reduce use - Potential for 30% rate surcharge	Voluntary: - All voluntary measures should be followed. Mandatory: - All of the above mandatory measures should be followed. - Class I users shall be identified as targets for voluntary conservation measures. - Class II shall be banned.	Mandatory: It shall be unlawful to use water for the following purposes: - Water or sprinkle any grass, shrubbery, trees, flower and vegetable gardens with treated water. - Wash automobiles, trucks, trailers, boats, airplanes, or any other type of mobile equipment. - Wash down outside areas such as streets, driveways, service station aprons, parking lots, office buildings, exteriors of homes or apartments, sidewalks, patios, or other similar purposes. - Fill ponds, swimming pools, wading pools, hot tubs, spas, etc., or refil ponds, swimming pools, wading pools, hot tubs, spas, etc., that have been drained or partially drained. - Serve drinking water in restaurants, cafeterias, or other food establishments, except upon request. - Use treated water outside a structure for any use other than an emergency use involving fire protection services or as needed by the town to maintain the water system. - Introduce water into any ornamental fountain or similar structure. - Make any nonessential use of treated water for commercial	Mandatory: Unlawful to use water for the following purposes: - Any outdoor purposes other than emergency fire suppression. - Water service may be discontinued or reduced. - Reduction in heating/cooling systems demand.	All measures in stage 1 and 2 are mandatory. - No outdoor use except fire suppression - Reduction of cooling demand for water cooled HVAC	Mandatory: - 12 % potable water use reduction goal. - Monitor compliance with water use bans and enforce when necessary. - Irrigation of lawns and other plants is prohibited. - Washing of cars, vehicles and equipment is prohibited. - Restaurants and food serving establishments shall utilize disposable service utensils and plates in all cases. - Recreational use of potable water is prohibited. - Large-scale commercial and industrial water customers utilizing five thousand (5,000) or more gallons of water per day shall achieve mandatory reductions in daily water usage through whatever means are available.
Level 5 or Water Rationing	Extensive rationing measures for a number of customer classes with the goal of all usage being limited to public health and safety	Continue previous efforts plus: - All uses banned except to protect public health and safety - rate surcharge of 2.0 implemented	None	Mandatory: - Implement rationing (detailed rationing measures described in ordinance).	Mandatory: - Implement rationing. - Water customers must achieve an immediate further reduction in water use in order to extend existing water supplies and, at the same time, ensure that sufficient water is available to preserve the public health and sanitation and to provide fire protection service. - Further reductions in water usage may be required. - Fire protection must be maintained where possible and tank trucks shall use nonpotable water, if available. - Percentage reduction in consumption, termination of service to specific areas in the water system on a rotating basis. - Prohibition of all industrial uses of potable water or whatever is necessary to protect the health and safety of the customers of the water system.	None	Mandatory: - Only use Water for public Health purposes - Fire suppression Only outdoor use	Mandatory: - 15 % potable water use reduction goal. - Monitor compliance with water use bans and enforce when necessary. - All use of water for purposes other than maintenance of public health and safety are prohibited. - Where the city system is still functional, daily residential water use shall be limited to the amount necessary to sustain life through drinking, food preparation and personal hygiene. - Usage by individuals shall be limited to those amounts necessary to sustain life through drinking, food preparation and personal hygiene.

Water Shortage Response Plan Comparison Matrix: Conservation Measures

Utility	Thomasville	Wilkesboro	Wingate	Winston-Salem	Yadkinville
Level 1 or Voluntary Reductions	Voluntary: - Publicity campaign to inform the public. - Use showers for bathing rather and limit showers to no more than four minutes. - Limit toilet flushing by multiple usages between flushes. - Do not leave faucets running. - Limit use of clothes washers and dishwashers. - Limit lawn watering to that is necessary for plants to survive. - Water shrubbery the minimum required. - Mulch shrubs, trees, and flowers with two inches depth of material. - Limit car washing at home to the minimum, and use a commercial car wash when possible. - Do not wash down outside areas such as sidewalks, patios and driveways. - Install water flow restrictive devices in showerheads and sink faucets. - Use disposable and biodegradable dishes. - Install water-saving devices in toilet tanks. - Limit hours of operation of water-cooled air conditioners. - All residents, businesses and institutions are encouraged to delay new landscape work until the water shortage has ended.	Voluntary: - Circulation of water use reduction education material. - Request class III non essential water uses to be re-evaluated and conserved. - Comply with 10 % potable water reduction goal. Class I: - Domestic: Water to sustain human and domestic pet life, maintain minimum standards of hygiene and sanitation. - Patient Care: Patient Care and rehabilitation. - Public Use: Firefighting and approved flushing of hydrants. Class II: - Domestic: Minimal use for kitchen, bathroom, and laundry, minimal watering of vegetable gardens and trees. - Public Use: Operation of public swimming pools, which serve more than 25 residents. Commercial: Commercial vehicle washes and laundromats, restaurants and hotels, irrigation of golf course greens, water by commercial nurseries at a minimum level, minimum amount require to maintain essential cooling operations. - Agricultural: Minimum amount required maintaining crop livelihood, livestock, and related activities. - Industrial: Minimum use necessary to operate production facilities and maintain jobs. - Institutional: Efficient use by schools, churches, government facilities, and other institutional users. Class III: - All: Ornamental uses. Residential lawn irrigation, non-commercial washing of vehicles.	Voluntary: - Limit car washing. - Limit lawn and garden/shrubbery watering. - Use only hoses with spring-activated nozzles when watering lawns and gardens. - Do not wash down outside areas such as sidewalks, patios, parking lots, service bays or aprons. - Do not leave faucets running while shaving or rinsing dishes. - Limit use of clothes washers and dish washers and when used, operate fully loaded. - Shower instead of taking a bath and limit showers to no more than four minutes. - Limit flushing of toilets by multiple usage. - The use of disposable and biodegradable dishes is encouraged. - The use of flow-restrictive and water-saving devices is encouraged. - Limit hours of operation of water-cooled air conditioners. - All residents, businesses and institutions are requested to temporarily delay new landscape work until the water shortage has ended.	Voluntary: - Limiting the watering of lawns, landscaping , and other vegetation to not more than one hour per day and avoiding water between 9:00 AM and 6:00 PM. - Inspecting and repairing all leaks and faulty and defective parts of faucets and toilets. - Installing water flow restrictive showerheads and water saving devices in toilets. - Showing for not more than 5 minutes. - Turning off faucets. - Limiting the use of washing machines and dishwashers, and only operating them when full. - Limiting the washing of vehicles. - Refraining from using water to wash down outside areas. - Refraining from filling swimming or wading pools.	Voluntary: - Customers asked to reduce usage 5% - Max of 1 inch per week irrigation - Prevent water runoff on impervious areas - Wash only full loads - Use spring-loaded hose nozzles - Repair all leaks
Level 2 or Mandatory Reductions I	Voluntary: - All voluntary measures should be followed. Mandatory: - Water shrubbery, trees, flowers and gardens except from 8:00 PM on Monday to 8:00 AM - Filling swimming or wading pools or refill swimming or wading pools that have been drained is prohibited. - Operating water-cooled air conditioners or other equipment that does not recycle cooling water is prohibited. - Washing automobiles or any other type of mobile equipment, excluding commercial car washing is prohibited. - Washing down outside areas is prohibited. However, this may be done with a pressure washer used by a private contractor or representatives of the business itself. - Operating or introduce potable water into any ornamental fountain, pool or pond or other structure is prohibited - Serve drinking water in restaurants, cafeterias or other food establishments, except upon request. - Use of water from a public or private fire hydrant or sprinkler system for any purpose other than fire suppression or other public emergency is prohibited. Water use for normal maintenance of water and sewer lines is permitted. - Use recreational water toys is prohibited. - Use potable water for dust control or compaction is prohibited. - Use water in fund raising or promotional events other than for direct consumption is prohibited. - Water and sewer rates for all residential connections using more than 15,000 gallons per month will be surcharged at double the normal water rate. - Water rates for water consumed by sprinkler systems will be surcharged at five (5) times the normal rate.	Mandatory: -Class III water conservation measures - Watering lawns and other vegetation should occur Saturday and Sunday from 6:00 PM until 9:00 AM. - Request Class II potable water conservation. - Enforce a system wide 20% water use reduction goal. - Notify water use customers by any or all methods as previously mentioned. - Ban all non-commercial pressure washing and wash-down of impervious surfaces. - Ban ornamental uses. - The town manager may choose to carry out additional water use restrictions.	Voluntary: - All voluntary measures should be followed. Mandatory: - The town manager may choose to carry out additional water use restrictions.	Voluntary: - All voluntary measures should be followed. Mandatory: - All of the above mandatory measures should be followed. - Watering of lawns, landscaping, and other vegetation shall be limited to manual or automated sprinkling between the hours of 6:00 PM and 9:00 AM. - The dates upon which sprinkling will be permitted will be determined by street address numbers. Customers whose street address numbers are odd shall be allowed to do such sprinkling on odd numbered days of the month. Customers whose street address numbers are even shall be allowed to do such sprinkling on even numbered days of the month.	Continue voluntary measures with reduction increase to 10% Mandatory: - Irrigation limited to 1/2 inch between 8pm and 8am - Washing outdoor surfaces prohibited - Fire suppression only from hydrants
Level 3 or Mandatory Reductions II	Voluntary: - All voluntary measures should be followed. Mandatory: - All of the above mandatory measures should be followed. The following shall be prohibited: - Watering or sprinkle any lawn, garden, sod, shrubs or flowers except with nonpotable water. - Use of water outside a structure for any use other than emergency use involving fire or accident. - Introduction of water into a swimming or wading pool. - Use of pressure washer. - All irrigation connections are to be valved shut or off, and all automatic irrigation systems turned off. - Restaurants must serve food on disposable plates, saucers, cups, eating utensils, napkins and tablecloths.	Mandatory: - All of the above mandatory measures should be followed. - Water of lawns and other vegetation should occur Saturday form 12:00 AM until 5:00 AM. - Limit Class II potable water non-essential usage. - Enforce a system-wide 25 % water use reduction goal. - Notify water use customers by any or all methods as previously mentioned. - Ban all non-commercial pressure washing and washdown of impervious surfaces. - Ban ornamental uses. - The town manager may choose to carry out additional water use restrictions.	Voluntary: - All voluntary measures should be followed. Mandatory: - All of the above mandatory measures should be followed. The following shall be prohibited: - Watering lawns; provided that shrubbery, trees, flowers and vegetable gardens may be watered by hand or by drip irrigation. - Conducting residential vehicle washing. - Washing public buildings, sidewalks and streets. - Using water for dust control during construction. - Conducting flushing or hydrant testing programs. - Filling new swimming pools. - Serving drinking water in restaurants, cafeterias or other food establishments, except upon request.	Voluntary: - All voluntary measures should be followed. Mandatory: - All of the above mandatory measures should be followed. - The watering of lawns, landscaping, and other vegetation shall be limited to Saturdays and Sundays via manual or automated sprinkling between the hours of 6:00 PM and 9:00 AM. Customers whose street address numbers are odd shall be allowed to use sprinklers on Saturdays, while customers whose street address numbers are even shall be allowed to use sprinklers on Sundays.	Mandatory: - All of the above voluntary/mandatory measures should be followed. - Watering or sprinkle any lawn, grass, shrubbery, trees, or flowers banned beyond survival quantity. - Drought water rate surcharge of 1.5x
Level 4 or Emergency Reductions	Voluntary: - All voluntary measures should be followed. Mandatory: - All of the above mandatory measures should be followed. - Commercial and industrial water customers shall cut their water use by 40 %. - All customers are only permitted to use water at the minimum required for public health protection. - In the event of water rationing, water will be supplied in the minimal quantities required for the health, welfare and safety of the citizens in accordance with the following guidelines. - There shall be no industrial use of water. - There shall be no commercial uses of water. - There shall be no institutional uses of water. - Water usage shall be limited to the minimum quantities necessary for sanitary purposes and fire protection and suppression and water shall be used for no other purpose. - The city manager may authorize relief in writing from specific provisions of these restrictions.	Mandatory: - All apply from previous levels. - Enforce a system-wide 35 % water use reduction goal. - Notify water users by any and all methods as previously outlined. - Ban Class III non essential uses. - Ban of all non-essential Class II usage. - Request conservation from Class I (essential) users. - Ban all landscaping irrigation. - Ban all recreational use. - The town manager may choose to carry out additional water use restrictions.	Voluntary: - All voluntary measures should be followed. Mandatory: - All of the above mandatory measures should be followed. The following shall be prohibited: - Induction water into any pool. - Use of water outside a structure for any use other than an emergency involving a fire. Encourage the following: - Fire protection to be maintained by drafting of ponds, rivers and the like, wherever possible. - The use of throw-away utensils and plates is encouraged and recommended at all eating establishments. - Operate an evaporative air conditioner which recycles water except during operating hours of business. - Use potable water for road construction practices.	Voluntary: - All voluntary measures should be followed. Mandatory: - All of the above mandatory measures should be followed. - Any use of water outdoors for non-emergency related reasons. - Watering of lawns, and their landscaping, shall be permitted only with the use of a water can or other hand held container or device, not exceeding three gallons in size. - The washing of vehicles and other mobile equipment. - The filling of pools. - Customers shall be encourage to reduce their consumption, with goal of reducing, by at least 25% - The Assistant City Manager shall temporarily impose restrictions on automated and manual irrigation systems.	Mandatory: - All of the voluntary measures are mandatory. - All use of drinking water except for public health and safety banned - Water rate surcharge of 2x
Level 5 or Water Rationing	All mandatory requirements plus: - No industrial or commercial use of water -No institutional use of water -Usage limited to sanitary needs and fire suppression	None	None	None	Mandatory: - All of the voluntary measures are mandatory. - All use of drinking water except for public health and safety banned - Water rate surcharge of 5x

C

Appendix C

Conservation Plan Decision Matrix

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REGIONAL WATER SUPPLY

Water Conservation Program Stringency/Effectiveness Comparison:

Continuous Conservation Measures

Conservation Category	Measure	Union Co	Albemarle	Anson Co	Concord	Davidson Water	Davie Co	Denton	Dobson
Rate Structure	Rate Structure Inclining (Residential)								
	Conservation signal rate (>10,000 gal/month) >1.5 times the lowest volumetric rate								
Public Education	Year-round public education via website or other media or external activities promoting conservation								
Water Loss Reduction	Unaccounted for water studies, SCADA monitoring for water loss, smart water meters, or other measures implemented								
Outdoor Water Use	Irrigation mandatorily limited to 3 or less days per week Stage 0 or 1 (Typically Voluntary Stages)								
	Outdoor washing prohibited (except commercial or essential use) at Stage 2 or earlier								
Plumbing Retrofitting	Retrofit incentive program or prevalence of plumbing fixtures installed after 1990								
Alternative Water Management	Water Reuse / Reclaimed Water Program								

Criteria Scoring Legend:

- System meets the measure
- System substantially meets the measure with only slight differences
- System does not meet the measure or have similar programs
- No information posted on website or in WSRP on the measure and no response to 2 phone call inquiries

Note:

1 - CS = Conservation signal rate per UNC CH Environmental Finance Center Study (> 10,000 gallons / month usage)

Water Conservation Program Stringency/Effectiveness Comparison:

Continuous Conservation Measures

Conservation Category	Measure	Elkin	Hamlet Water System	Handy Sanitary District	Jonesville	Kannapolis	King	Lexington	Mocksville
Rate Structure	Rate Structure Inclining (Residential)								
	Conservation signal rate (>10,000 gal/month) >1.5 times the lowest volumetric rate								
Public Education	Year-round public education via website or other media or external activities promoting conservation								
Water Loss Reduction	Unaccounted for water studies, SCADA monitoring for water loss, smart water meters, or other measures implemented								
Outdoor Water Use	Irrigation mandatorily limited to 3 or less days per week Stage 0 or 1 (Typically Voluntary Stages)								
	Outdoor washing prohibited (except commercial or essential use) at Stage 2 or earlier								
Plumbing Retrofitting	Retrofit incentive program or prevalence of plumbing fixtures installed after 1990								
Alternative Water Management	Water Reuse / Reclaimed Water Program								

Criteria Scoring Legend:

- System meets the measure
- System substantially meets the measure with only slight differences
- System does not meet the measure or have similar programs
- No information posted on website or in WSRP on the measure and no response to 2 phone call inquiries

Note:

1 - CS = Conservation signal rate per UNC CH Environmental Finance Center Study (> 10,000 gallons / month usage)

Water Conservation Program Stringency/Effectiveness Comparison:

Continuous Conservation Measures

Conservation Category	Measure	Montgomery Co	Mount Airy	North Wilkesboro	Norwood	Pilot Mountain, Town of	Richmond County	Rockingham	Salisbury
Rate Structure	Rate Structure Inclining (Residential)								
	Conservation signal rate (>10,000 gal/month) >1.5 times the lowest volumetric rate								
Public Education	Year-round public education via website or other media or external activities promoting conservation								
Water Loss Reduction	Unaccounted for water studies, SCADA monitoring for water loss, smart water meters, or other measures implemented								
Outdoor Water Use	Irrigation mandatorily limited to 3 or less days per week Stage 0 or 1 (Typically Voluntary Stages)								
	Outdoor washing prohibited (except commercial or essential use) at Stage 2 or earlier								
Plumbing Retrofitting	Retrofit incentive program or prevalence of plumbing fixtures installed after 1990								
Alternative Water Management	Water Reuse / Reclaimed Water Program								

Criteria Scoring Legend:

- System meets the measure
- System substantially meets the measure with only slight differences
- System does not meet the measure or have similar programs
- No information posted on website or in WSRP on the measure and no response to 2 phone call inquiries

Note:

1 - CS = Conservation signal rate per UNC CH Environmental Finance Center Study (> 10,000 gallons / month usage)

Water Conservation Program Stringency/Effectiveness Comparison:

Continuous Conservation Measures

Conservation Category	Measure	Thomasville	Wilkesboro	Wingate	Winston-Salem	Yadkinville
Rate Structure	Rate Structure Inclining (Residential)					
	Conservation signal rate (>10,000 gal/month) >1.5 times the lowest volumetric rate					
Public Education	Year-round public education via website or other media or external activities promoting conservation					
Water Loss Reduction	Unaccounted for water studies, SCADA monitoring for water loss, smart water meters, or other measures implemented					
Outdoor Water Use	Irrigation mandatorily limited to 3 or less days per week Stage 0 or 1 (Typically Voluntary Stages)					
	Outdoor washing prohibited (except commercial or essential use) at Stage 2 or earlier					
Plumbing Retrofitting	Retrofit incentive program or prevalence of plumbing fixtures installed after 1990					
Alternative Water Management	Water Reuse / Reclaimed Water Program					

Criteria Scoring Legend:

- System meets the measure
- System substantially meets the measure with only slight differences
- System does not meet the measure or have similar programs
- No information posted on website or in WSRP on the measure and no response to 2 phone call inquiries

Note:

1 - CS = Conservation signal rate per UNC CH Environmental Finance Center Study (> 10,000 gallons / month usage)

Water Conservation Program Stringency/Effectiveness Comparison:

Response Triggers

Conservation Stage Trigger Utilized	Union Co	Concord	Kannapolis	Mount Airy
Yadkin Pee Dee LIP or Catawba Wateree LIP				

Criteria Scoring Legend:

	System meets criteria
	System substantially meets criteria
	System does not meet criteria
	No information posted on website, in WSP, and no response to phone calls on this criteria

Results:

All identified water systems were screened using the process described in the Conservation Plan Comparison Decision Matrix. This process was a two step process to identify the most stringent (and most effective) conservation plan to compare to the Union County plan.

For each of the conservation categories one or two measures were selected based on those most likely to effective measurable water use reductions. This created 8 measures for the six categories (two measures within rates and two within Outdoor Use). Each of system plans were evaluated against these eight measures. Three systems met at least four of eight measures in addition to Union County - Concord, Kannapolis, and Mount Airy.

The final criteria, which was applied to all three of the shortlisted systems was what drought stage trigger is used to implement most of the measures. To make a true comparison of stringency (effectiveness) the triggers would need to be the same, otherwise the actually timing of the stage implementations could be significantly different. For this comparison, the Yadkin Pee Dee Low Inflow Protocol and Catawba Wateree Low Inflow Protocol were used since they are accepted practice in each river basin. Only Kannapolis and Concord, along with Union County, use this criteria to implement drought response stages.

Based on the slight differences in each WSRP there isn't a single conservation plan or WSRP that can be considered most stringent. The Concord and Kannapolis plans could be considered equally stringent/effective. The Union County conservation and drought management plan meets, and in some cases, exceeds the requirements of all these plans. Therefore the Union County Conservation Plan meets the requirements of GS 143-215.22L(n)(1) of being equal or exceeding the most stringent water conservation plan implemented by a public water system that withdraws water from the source river basin.

D

Appendix D

Union County Water Shortage Response Plan

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REGIONAL WATER SUPPLY

Section 1.0 - Purpose

The purpose of this Water Shortage Response Plan ("Plan") is to maintain and protect the public health, safety and welfare of Union County ("County") residents by establishing short and long-term demand management strategies to effectively manage the limited resource of the water supply in the County. This Plan aids in effectively managing the water supply in the County by requiring efficient and responsible use of water within the County and by establishing measures and procedures for reducing potable water use during times of water shortage resulting from drought, capacity limitations, and system emergencies.

The water demand management strategies set forth in this Plan reduce the rate of increase in overall water use through year-round water conservation practices that maximize the County's existing and planned water supply sources and reduce seasonal peak day demands that result in the need for costly expansion of water treatment, storage, and transmission facilities. The implementation of voluntary and mandatory water reduction measures within the Union County water utility service area extends the available water supply with regard for domestic water use, sanitation and fire protection, and minimizes the adverse impacts in the event a water shortage is declared.

This Plan is also designed to be in accordance with the Catawba-Wateree Low Inflow Protocol ("CW-LIP") for the Catawba-Wateree River Basin. The CW-LIP was developed pursuant to the Comprehensive Relicensing Agreement for the Catawba-Wateree Hydro Project (FERC Project No. 2232) dated December 22, 2006 (the "Relicensing Agreement"), to which Union County is a party. The Relicensing Agreement establishes the CW-LIP as the agreed-upon methodology to deal with water shortages during periods of drought. Thus, Union County, as a signatory to the Relicensing Agreement, is required to comply with the CW-LIP. The CW-LIP establishes a policy for how Duke Energy Carolinas, LLC, regional water users, and other stakeholders will operate water systems during periods of drought by progressing through a series of staged water use restrictions during worsening drought conditions. The goal of the CW-LIP is to delay the point at which the Catawba River's usable water storage is fully depleted and to provide additional time to allow precipitation to restore stream flow, reservoir levels and groundwater levels to normal ranges.

As a publicly owned water system, the operation of the County's water utility system is subject to N.C.G.S. § 143-355(l) and N.C.G.S. § 143-355.2, requiring an approved Water Shortage Response Plan as part of the Local Water Supply Plan. A Water Shortage Response Plan must include specific requirements as set forth in rules governing water use during droughts and

water emergencies (15A NCAC § 02E.0607) and Article 38 of Chapter 143 of the North Carolina General Statutes. The Union County Water Use Ordinance (the "Ordinance") authorizes the implementation of this Plan and incorporates this Plan into the Ordinance.

Section 2.0 - Applicability

The provisions of this Plan apply to all persons, customers, and property utilizing water supplied through the County's water system; however, it does not apply to reuse or reclaimed water. This Plan also does not apply to private drinking water wells, as that term is defined in N.C.G.S. § 87-85, or ponds.

Section 3.0 - Definitions

Bona Fide Farm Use means water uses for the production and activities relating or incidental to the production of crops, grains, fruits, vegetables, ornamental and flowering plants, dairy, livestock, poultry, and all other forms of agriculture, as defined in N.C.G.S. § 106-581.1.

County means Union County, North Carolina

County Manager means, for the purposes of this Plan, the person currently occupying the position of Union County Manager (which includes a County Manager with an acting or interim designation), or in the absence of such a person, the Executive Director of Public Works.

Customer means a person, company, organization, or any other entity (individuals, corporations, partnerships, associations, and all other legal entities) using water supplied by the County's water utility, or in whose name an account for water utility service is maintained by the County.

CW-LIP means the Catawba-Wateree Low Inflow Protocol for the Catawba River Basin, as developed pursuant to the Relicensing Agreement.

Duke Energy means Duke Energy Carolinas, LLC and any successor in interest entity.

Essential Water Use means the use of water necessary for firefighting, health, and safety, and sustaining human and animal life. Specifically, for certain types of water uses set forth below, the following is considered Essential Water Use:

a. Domestic Use- Water use necessary to sustain human life and the lives of domestic pets, as well as to maintain minimum standards of hygiene and sanitation.

b. Commercial Use- Water use integral to the production of goods and/or services by any establishment having profit as its primary aim, except as otherwise specifically prohibited by this Plan.
c. Industrial Use- Water use in processes designed to convert materials of lower value into forms having greater usability and value, except as otherwise specifically prohibited by this Plan.
d. Institutional Use- Water use by government; public and private educational institutions; churches and places of worship; water utilities; and other public organizations, except as otherwise specifically prohibited by this Plan.
e. Health Care Facility Use- Water use in patient care and rehabilitation, including swimming pools used for patient care and rehabilitation, in nursing homes, and other care facilities.
f. Public Use- Water use for firefighting, including testing and drills by a fire department if performed in the interest of public safety; water system operations; and water necessary to satisfy federal, state, and local public health, safety, or environmental protection requirements.
g. Correctional Facility Use- Water use necessary to sustain human life and to maintain minimum standards of hygiene and sanitation.

MGD means million gallons per day.

Non-Essential Water Use means any use of water that does not meet the definition of Essential Water Use.

Ordinance means the current Union County Water Use Ordinance.

Plan means this Water Shortage Response Plan.

Rate Ordinance means the Ordinance Setting Charges, Fees, Rates and Deposits for Customers Served by the Union County Water and Sewer System.

Relicensing Agreement means the Comprehensive Relicensing Agreement for the Catawba-Wateree Hydro Project (FERC Project No. 2232) dated December 22, 2006.

Spray Irrigation System means a system of application of water to landscaping by means of a device, other than a hand-held hose or watering container, which projects water through the air in the form of particles or droplets.

UCPW means the Union County Public Works Department.

US Drought Monitor means a website hosted and maintained by the National Drought Mitigation Center that indicates what parts of the country are in a drought and the severity of such droughts.

Section 4.0. - Declaration and Implementation

The County Manager, upon notification from the Executive Director of Public Works of a water shortage as described in this Plan and the Ordinance, is authorized by the Ordinance to declare a water shortage, designate a water shortage stage, and implement the water use reduction measures or restrictions corresponding with such a stage, as such measures and restrictions are outlined in this Plan and the Ordinance. The County Manager, the Executive Director of Public Works, and UCPW are responsible for the implementation of this Plan.

Current Contact Information:

County Manager
Ms. Cynthia Coto, ICMA-CM
500 North Main Street, Suite 918
Monroe, NC 28112
Phone: 704-292-2625
Email: cindy.coto@co.union.nc.us

Executive Director of Public Works
Mr. Edward Goscicki, PE
500 North Main Street, Suite 600
Monroe, NC 28112
Phone: 704-296-4212
Email: Edward.goscicki@unioncountync.gov

Section 5.0. - Notification

When a water shortage has been declared, and whenever the water shortage stage changes, the County Manager will notify the Board of County Commissioners at its next regular meeting. At a minimum, the following notification options will be used to notify Customers of required response measures when a water shortage stage is declared or changed (based upon the new stage):

Stages 0 and 1

- County website (www.co.union.nc.us)
- County employee email announcements
- Social media
- Utility bill inserts

Stage 2

- County website (www.co.union.nc.us)
- County employee email announcements

- Social media
- Utility bill inserts
- Press releases to local television, radio, and/or print media

Stages 3 and 4

- County website (www.co.union.nc.us)
- County employee email announcements
- Social media
- Utility bill inserts
- Press releases to local television, radio, and/or print media
- Reverse 911 Notification System, if such system is currently available to UCPW

Additional means of notification may be used including, but not limited to,:

- Independent mailings to Customers outside of utility bills
- Take-home fliers at Union County Public Schools
- County vehicle magnets

Section 6.0 - Determination of a Water Shortage

A water shortage is a condition that exists when the demands and requirements of water Customers served by the Union County water system cannot be satisfied without depleting the available supply of treated water or the available water supply to or below a critical level; i.e., the level at which water is available for Essential Water Use.

Providing a reliable supply of water requires being prepared for water shortages of varying severity and duration, which may be caused by conditions such as drought, exceeding plant capacity, water quality problems, or disruptions in facility operations. For this Plan, water shortage conditions specific to the County have been categorized into three types: Resource Limitations, Capacity Limitations, and System Emergencies.

Prescribed indicators determine the severity or stage of a water shortage. These indicators are based on the ability of the County to meet water demands and are influenced by several components of the County's water supply system: the water source, raw water intake and pipeline, treatment plant, storage tanks, and distribution system. When a specific indicator's criterion is met, the corresponding water shortage stage is recommended and declared.

In determining a water shortage stage and the corresponding restrictions, consideration will be given, as applicable, to water shortage levels and available sources of supply, available usable

storage on hand, draw-down rates, the projected supply capability, outlook for precipitation, daily water use patterns, and availability of water from other sources.

A summary of indicators for five water shortage stages, from a Stage 0 Water Shortage (year-round water conservation) to a Stage 4 Water Shortage (water shortage emergency), are summarized for each type of water shortage in the following sections. These water shortage stages are intended to achieve system-wide water use reductions. If multiple indicators are met for more than one type of water shortage stage, the more severe of the indicators provided will determine the stage to be declared. For example, if Duke Energy, through the CW-LIP, declares a Stage 1 Water Shortage and other conditions cause the County to be in a Stage 2 Water shortage, then a Stage 2 Water Shortage will be declared until the County recovers from the Stage 2 Water Shortage or a more severe stage is declared.

It is possible that water shortage stages may not necessarily be implemented sequentially if water supply and/or demand conditions worsen rapidly. Likewise, recovery of water shortage stages may not always occur sequentially, depending on how quickly supply and/or demand conditions improve.

Section 6.1 - Resource Limitations

The County receives approximately 80% of its water from the Catawba River, which is dependent primarily on rainfall for replenishment. This leaves the County vulnerable to extended deficiencies in precipitation, known as drought, which can deplete the reservoirs along the Catawba River and impact the amount of water available for the County to withdraw. Drought can also have a significant impact on the lifestyle, ecology, and agriculture of a region. It is important in times of drought, when Customers often use more water than average, for the County to more closely monitor and control water usage to ensure the adequate short-term availability of water as well as to protect the environment.

CW-LIP

As a joint-owner of a large water intake located on the main stem of the Catawba River, Union County participated in Duke Energy's Federal Energy Regulatory Commission (FERC) relicensing process for the Catawba River and became a signatory stakeholder for the Relicensing Agreement. The Relicensing Agreement established rules and guidelines for how the Catawba-Wateree River system will be operated for the next fifty years, ending in year 2058. One major element of the Relicensing Agreement is the implementation of the CW-LIP, which establishes a policy for how Duke Energy and other Catawba River stakeholders will operate during periods of drought. This CW-LIP requires regional water users to move through a series of staged water use restrictions during worsening drought conditions. The goal of the CW-LIP is to delay the

point at which the Catawba-Wateree River system's usable water storage is fully depleted and provide additional time to allow precipitation to restore stream flow, reservoir levels, and groundwater levels to normal ranges. As a signatory stakeholder, Union County has agreed to comply with the prescribed requirements defined in the CW-LIP.

The CW-LIP describes indicators defined by worsening hydrologic conditions. These indicators use specific measurements to determine the various water shortage stages of low inflow conditions or water shortages. A summary of indicators for the various water shortage stages is provided in the table below. When Duke Energy declares a water shortage stage based on the CW-LIP indicators, the County shall also declare the same stage, or a more severe stage if other conditions apply in the County.

CW-LIP Indicators

Stage	Storage Index [1]		US Drought Monitor 3-Month Numeric Average		Stream Gage 6-Month Rolling Average as a percent of the Historical Average[2]
0[3]	90% < SI < 100% TSI		DM ≥ 0		≤ 85%
1	75% < SI ≤ 90% TSI	**and**	DM ≥ 1	**or**	≤ 78%
2	57% < SI ≤ 75% TSI	**and**	DM ≥ 2	**or**	≤ 65%
3	42% < SI ≤ 57% TSI	**and**	DM ≥ 3	**or**	≤ 55%
4	SI ≤ 42% TSI	**and**	DM ≥ 4	**or**	≤ 40%

[1] The ratio of Remaining Usable Storage to Total Usable Storage at a given point in time.
[2] The sum of the rolling 6-month average for the Monitored United States Geological Survey ("USGS") Streamflow Gages as a percentage of the period of record rolling average for the same historical 6-month period for the Monitored USGS Streamflow Gages.
[3] Stage 0 is triggered when any two of the three indicator points are reached.

During recovery from a water shortage stage, the progression of stages will be reversed. All three indicator points identified on the above table for the lower water shortage stage must be met or exceeded before returning to that lower stage (except as indicated in the table above regarding a Stage 0 Water Shortage).

North Carolina Drought Management Advisory Council

The North Carolina Drought Management Advisory Council ("NCDMAC") has statutory authority and is responsible for issuing drought advisories tailored to local conditions. The NCDMAC can issue drought classification and response actions by county. If the US Drought Monitor of North

Carolina shows more than one drought designation in a county, the drought classification for the county is the highest drought designation that applies to at least twenty five percent (25%) of the land area of the county.

The NCDMAC may recommend a drought designation for a county that is different from the designation based on the U.S. Drought Monitor of North Carolina if the depiction of drought does not accurately reflect localized conditions. In recommending a drought designation that differs from the U.S. Drought Monitor designation, NCDMAC will consider stream flows, ground water levels, the amount of water stored in reservoirs, weather forecasts, the time of year and other factors that are relevant to determining the location and severity of drought conditions. The NCDMAC makes recommendations that the County will take into consideration. When the NCDMAC declares a water shortage stage, the County shall also declare the same stage, or a more severe stage, if other conditions apply in the County.

Section 6.2 - Capacity Limitations

A water treatment plant's capacity is designed to meet the distribution system's anticipated maximum daily demand at a relatively constant flow rate with storage tanks in the distribution system intended to handle fluctuations in demand throughout the day. Customer demand for potable water will also fluctuate seasonally, often using more water in the spring and summer to promote lawn and other plant growth. Sometimes a combination of dry weather and high temperatures occurring during the summer can lead to unexpectedly high Customer demand. For example, during the drought of record in 2007, the County's demand exceeded the treatment capacity at the Catawba River Water Treatment Plant for several days during a two-week period.

The County continues to grow and connect new Customers to the water distribution system; however, adding additional capacity to a water treatment plant is a slow and expensive process. To ensure the County's ability to meet Customer demand for both Essential Water Use and Non-Essential Water Use, the County must declare water shortage stage if the water demand is nearing available treatment capacity on a regular basis.

The water shortage stage, and duration of such a stage, will depend on the extent to which Customer water demands approach or exceed Union County's capacity to meet those demands and how much the water use restrictions successfully reduce short-term demands. If the daily demands of the water system exceed a specified percentage of total available capacity for a specified period of time as described in the table below, the corresponding water shortage stage shall be declared.

Capacity Limitation Indicators

Stage	Union County Designation	Daily Demand
0	Year-Round Water Conservation	
1	Moderate Water Shortage	Demand > 80% of available capacity for the average of a 7 day period
2	Severe Water Shortage	Demand > 90% of available capacity for the average of a 7 day period
3	Extreme Water Shortage	Demand > 100% of available capacity for the average of a 7 day period
4	Exceptional Water Shortage	If demand continues to exceed available capacity such that an Extreme Water Shortage (Stage 3) is in effect due to such capacity limitations for thirty (30) consecutive days

When the recovery criteria shown in the table below for that water shortage stage have been met, the Public Works Executive Director will advise that the County Manager declare a reduced stage with the corresponding water use restrictions. It may be possible to reduce by more than one water shortage stage if the necessary recovery criteria have been met for intermediate stages.

Recovery from Capacity Limitations

Stage	Union County Designation	Recovery
0	Year-Round Water Conservation	
1	Moderate Water Shortage	Below 80% of available capacity for 90 consecutive days
2	Severe Water Shortage	Below 85% of available capacity for 60 consecutive days
3	Extreme Water Shortage	Below 90% of available capacity for 30 consecutive days
4	Exceptional Water Shortage	Below 95% of available capacity for 30 consecutive days

Section 6.3 - System Emergencies

The integrity of the water supply, treatment facilities, and distribution system are critical to meeting the potable water demands of the County. If there are major disruptions to any of

these components, it may be necessary to initiate water restrictions to ensure that basic needs are met. Such events include, but are not limited to:

- Water source contamination
- Water treatment plant disruptions
- Water distribution system disruptions

System emergencies typically require an immediate response and may require a major reduction of water use in a short period of time. Because each emergency event is different and varies in degree of severity and duration, no pre-determined water shortage stage can be identified for every event.

If the Executive Director of Public Works determines a system emergency condition exists that warrants the need to implement a water shortage stage, he/she will recommend to the County Manager a stage and associated water use restrictions that are deemed necessary and appropriate given the nature, extent, and expected duration of the emergency condition. The County Manager may declare a water shortage stage and associated water use restrictions that are deemed necessary and appropriate for the emergency condition.

As additional information becomes available regarding the system emergency, the water shortage stage initially declared may be quickly modified or resolved. When the factors determining the water shortage conditions have improved, the Executive Director of Public Works will recommend that the County Manager declare a reduced water shortage stage. The County Manager may then declare a reduced water shortage stage and associated water use restrictions that are deemed necessary and appropriate for the changed conditions.

As joint-owners of the Catawba River Water Treatment Plant, Union County and Lancaster County Water & Sewer District are developing the “Raw Water Intake Contingency Plan for the Union-Lancaster Catawba River Water Treatment Plant”. The purpose of the raw water intake contingency plan is to mitigate disruptions in the quality or quantity of available source water or integrity of the raw water intake structure with minimal impacts to both distribution systems. These measures will reduce the County’s vulnerability to raw water concerns and also reduce raw water-related incidents requiring a declaration of a system emergency water shortage.

Section 7.0 - Water Shortage Stage Measures and Restrictions

To ensure that water demand is reduced to a sustainable level after the declaration of a water shortage stage, water use measures and restrictions need to be enforced. Regardless of the

type of water shortage, each stage requires the same estimated reduction in demand so each stage has one set of corresponding actions that will be taken to conserve water. The water use measures and restrictions corresponding to each water shortage stage are set forth in the sections below.

Section 7.1 - Year-Round Water Conservation (Stage 0 Water Shortage)

This water shortage stage is intended to manage the County's long-term water resources by promoting water use efficiency. In the past, the County water system has experienced a high water demand peaking factor, measured as a ratio between the highest demand day of the year and the average demand over the entire year. This is reflective of the County's above average proportion of residential users and high irrigation use when compared with other utilities.

In 2008, the County's peaking factor exceeded 2.0. While Customers were under no water restrictions and had unlimited water use available, the County experienced several days in May 2007 with the daily demand exceeding the maximum capacity of 18 million MGD from the Catawba River Water Treatment Plant. The highest daily usage measured was 21.3 MGD. A water treatment plant is designed to meet an anticipated maximum day demand; however, this volume should only be needed or approached a few days per year. By reducing the maximum day demand, the County can push back the time frame when additional source water is needed and the water treatment plant needs to be expanded. Developing a new water source and the construction of new treatment process units or a new water treatment plant are very expensive, so rate increases corresponding with financing new infrastructure can be reduced by delaying their development.

As a part of the 2011 Comprehensive Water & Wastewater Master Plan, the County determined that steps would need to be taken to limit this water demand peaking factor to 1.7 to ensure adequate water supply in the future and to bring the County in line with peer water system utilities in North Carolina. Without water use restrictions, the County's water system will continue to have days where the maximum day demand exceeds the water treatment plant capacity, especially during periods of hot and dry weather. Additionally, these high demands place stress on the distribution system.

Therefore, this Plan and the Ordinance establish the implementation of mandatory and voluntary year-round water use restrictions and water conservation measures. These water use restrictions and water conservation measures are in effect under normal conditions and will serve as Stage 0 Water Shortage restrictions (Stage 0 Water Shortage is the minimum water shortage stage that will always be in effect in the County if there is no declaration of a

heightened stage). When a Stage 0 Water Shortage is in place, all Customers shall be required to adhere to the following mandatory water use restrictions:

Mandatory Water Use Restrictions

- Customer Spray Irrigation System use shall be limited to three (3) days per week.
- Customers shall at all times comply with the Spray Irrigation System schedule for use set forth in Section 7.7 of this Plan.

Limiting Spray Irrigation System use to 3 days per week is sufficient to meet the irrigation needs of lawns and other plants and reduces the likelihood of accidental over-watering. Those Customers using drip irrigation or any handheld watering methods are still allowed to water any day and time. Customers regularly engaged in the sale of plants, shrubbery, trees and flowers are permitted to use water by any method at any time for irrigation of their commercial stock.

In addition to the mandatory maximum of three (3) days per week for Spray Irrigation System use schedule, voluntary water conservation practices are also encouraged year-round at this water shortage stage. These voluntary measures, which are encouraged, but not required, are described below:

Voluntary Water Conservation Measures

a. Use flow-restrictive, water-saving devices and methods. Faucets should not be left running while shaving, brushing teeth, or washing dishes. Showers should be limited to no more than five (5) minutes and baths should be avoided if not medically necessary. Toilets should be flushed after multiple usages.
b. Limit the use of clothes and dish washing machines to running only full loads.
c. Inspect and repair all leaks and defective components of water delivery systems in any structures (faucets, toilets, equipment, etc.) in a timely manner.
d. Reuse household water to water plants.

Section 7.2 - Moderate Water Shortage (Stage 1 Water Shortage)

At this water shortage stage, the County has concern about the available water supply and Customers are encouraged to adopt water saving measures intended to reduce overall water use. The primary purpose of this water shortage stage is to increase education and awareness of the limited water resources and to encourage additional voluntary water conservation measures to reduce the need for further mandatory restrictions. In the event a Stage 1 Water Shortage is declared, all Customers shall comply with the following mandatory water use restrictions:

Mandatory Water Use Restrictions

- Comply with all Stage 0 Water Shortage Mandatory Water Use Restrictions.
- The transport of water from within the County to outside of the County where such water has been drawn by tanker truck from a hydrant of the County water utility system is prohibited; provided, however, that transport outside of the County shall be allowed for emergency fire protection and Bona Fide Farm Uses.

Customers using drip irrigation or any handheld watering methods are still allowed to water any day and time. Customers regularly engaged in the sale of plants, shrubbery, trees and flowers are permitted to use water by any method at any time for irrigation of their commercial stock.

In addition to the mandatory water use restrictions, additional voluntary water conservation measures are also encouraged at this water shortage stage. These voluntary measures, which are encouraged, but not required, are described below:

Voluntary Water Conservation Measures

a. Implement all Voluntary Water Conservation Measures set forth for a Stage 0 Water Shortage.
b. Limit Spray Irrigation System use to no more than two (2) days per week, using the designated schedule as set forth in Section 7.7 of this Plan.
c. Use spring-activated nozzles when watering lawns and gardens by hand with a hose.
d. Limit residential vehicle, or any other type of mobile equipment, washing to the designated Spray Irrigation System use days set forth in Section 7.7 of this Plan.

Section 7.3 – Severe Water Shortage (Stage 2 Water Shortage)

This water shortage stage reflects an increase in concern over water supply leading to additional mandatory restrictions. Moving to this water shortage stage is intended to bring Customers' and UCPW employees' attention to the increasing severity of the water shortage. Additional mandatory restrictions are necessary when voluntary measures are not effective in the previous water shortage stages in reducing water system demand. In the event a Stage 2 Water Shortage is declared, all Customers shall comply with the following mandatory water use restrictions:

Mandatory Water Use Restrictions

- Comply with all Stage 1 Water Shortage Mandatory Water Use Restrictions.

- Limit Spray Irrigation System use to no more than two (2) days per week and only between the hours of 12:00 a.m. until 8:00 a.m. and 8:00 p.m. until 12:00 a.m., on the days identified in Section 7.7 of this Plan.
- Eliminate personal vehicle washing unless using a commercial carwash.
- Eliminate the filling of new swimming pools and fountains (unless considered Essential Water Use as defined herein).
- Eliminate public building, sidewalk, and street washing activities (unless considered Essential Water Use as defined herein).
- Limit construction uses of water (e.g. dust control).
- Limit flushing and hydrant testing programs, except as necessary to maintain water quality or in other special circumstances.

Customers using drip irrigation or any handheld watering methods are still allowed to water any day and time. Customers regularly engaged in the sale of plants, shrubbery, trees, and flowers are permitted to use water by any method at any time for irrigation of their commercial stock.

Unless otherwise declared as mandatory at this state, Customers are encouraged, but not required, to implement voluntary water conservation measures set forth in this Plan for a Stage 1 Water Shortage.

Section 7.4 - Extreme Water Shortage (Stage 3 Water Shortage)

This water shortage stage is a point at which the County is greatly concerned about the current and future supply of water. Immediate additional water conservation measures and water use restrictions are essential to avoid major restrictions or water rationing. This can be of particular concern during a severe drought with no significant predicted rainfall. It is important for UCPW employees and Customers to understand the rare nature of the situation and to react accordingly. At this water shortage stage, mandatory requirements become more restrictive in an effort to lessen the impacts of worsening conditions and delay or prevent a water shortage emergency. In the event a Stage 3 Water Shortage is declared, all Customers shall comply with the following mandatory water use restrictions:

Mandatory Water Use Restrictions

- Comply with all Stage 2 Water Shortage Mandatory Water Use Restrictions, unless a more stringent requirement is imposed below.

- Limit Spray Irrigation System use to no more than one (1) day per week and only between the hours of 12:00 a.m. until 8:00 a.m. and 8:00 p.m. until 12:00 a.m., on the day identified in Section 7.7 of this Plan.
- Eliminate the filling of all swimming pools, hot tubs, fountains, and decorative ponds (except when necessary to support aquatic life or considered Essential Water use as defined herein).
- Eliminate construction uses of water (e.g. dust control).
- Eliminate flushing and hydrant testing programs, except as necessary to maintain water quality or in other special circumstances.
- Eliminate the serving of drinking water from the County water system in restaurants, cafeterias, and other food establishments (except upon patron request).
- Eliminate variances for landscape irrigation.

Customers using drip irrigation or any handheld watering methods are still allowed to water any day and time. Customers regularly engaged in the sale of plants, shrubbery, trees, and flowers are permitted to use water by any method at any time for irrigation, but only in amounts necessary to prevent the loss of their commercial stock.

In addition to the mandatory water use restrictions, additional voluntary water conservation practices are also encouraged at this water shortage stage. These voluntary measures, which are encouraged, but not required, are described below:

Voluntary Water Conservation Measures

a. Implement all Voluntary Water Conservation Measures set forth for a Stage 2 Water Shortage.
b. Encourage industrial/manufacturing process changes that reduce water use.

Section 7.5 - Exceptional Water Shortage (Stage 4 Water Shortage)

This water shortage stage involves severe water use restrictions and is reserved for situations where the public water supply is threatened and the County must act to ensure there is an adequate supply for Essential Water Use. This water shortage stage brings attention to the exceptionally serious nature of the water shortage and includes rapid notifications listed in Section 5.0 of this Plan. UCPW and other County staff will prepare to implement emergency plans to respond to water outages according to the County's Emergency Response Plan. In the event a Stage 4 Water Shortage is declared, all Customers shall comply with the following mandatory water use restrictions:

Mandatory Water Use Restrictions

- Comply with all Stage 3 Water Shortage Mandatory Water Use Restrictions, unless a more stringent requirement is imposed below.
- Prohibit all Non-Essential Water Use (including the prohibition of all residential irrigation, irrigation of commercial stock, and filling of ponds to sustain aquatic life).
- Prohibit the use of water outside a structure for any use other than a fire emergency.
- Require the use of disposable utensils and plates at all restaurants, cafeterias, and other food establishments.

In addition to the mandatory water use restrictions, additional voluntary water conservation practices are also encouraged at this water shortage stage. These voluntary measures, which are encouraged, but not required, are described below:

Voluntary Water Conservation Measures

a. Implement all Voluntary Water Conservation Measures set forth for a Stage 3 Water Shortage.
b. Continue to encourage industrial/manufacturing process changes that reduce water use. The County will prioritize and meet with large commercial and industrial/manufacturing large water customers to discuss strategies for water use reduction measures.

Section 7.6- Additional Water Use Regulation Authority

Pursuant to the Ordinance, the County Manager, acting in the best interests of the health, safety, and welfare of the citizens of Union County, may further regulate water usage on the following bases: (i) time of day; (ii) day of week; (iii) Customer type, including, without limitation, residential, commercial, industrial, and institutional uses; and (iv) physical attribute, such as address.

Section 7.7 - Irrigation Schedules

A Customer is only permitted to use a Spray Irrigation System on the designated irrigation day(s) assigned to them as set forth in the table below. The Customer's billing cycle number (corresponding with the table below) can be found on the Customer bill.

Billing Cycle	Stages 0 and 1 3-day per week	Stage 2 2-day per week	Stage 3 1-day
1	Mon-Wed-Sat	Mon-Wed	Wed
2	Sun-Tue-Thu	Sun-Thu	Sun
3	Mon-Thu-Sat	Mon-Thu	Thu
4	Tue-Thu-Sat	Tue-Thu	Tue
5	Sun-Wed-Fri	Sun-Wed	Sun
6	Mon-Wed-Sat	Mon-Wed	Mon
7	Sun-Wed-Fri	Sun-Wed	Wed
8	Sun-Tue-Fri	Tue-Fri	Tue
9	Sun-Tue-Fri	Tue-Fri	Fri
10	Mon-Thu-Sat	Mon-Thu	Mon

Section 7.8- Water Conservation Rates

During a declared water shortage due to resource or capacity limitations, water rates increase to ensure adequate operating revenue and to encourage conservation. Rate increases are not utilized in response to a system emergency water shortage condition.

The County utilizes an increasing block rate structure for residential and irrigation water usage. The rates for all user types are defined in the Rate Ordinance. The Rate Ordinance increases all water usage rates during certain water shortage stages. The current rates are shown in the table below; however, the rates are only shown to be illustrative. Customers will be charged the rates established in the then current Rate Ordinance corresponding to the water shortage stage in effect at the time bills are rendered. If a system emergency occurs while in a water shortage situation, the rates applied shall be those corresponding to the current water shortage response due to resource or capacity limitations.

		Standard Rates / Water Shortage Stage I			Water Shortage Stage II			Water Shortage Stage III			Water Shortage Stage IV		
		2015	2016	2017	2015	2016	2017	2015	2016	2017	2015	2016	2017
Residential													
Tier 1	0 - 3,000 gallons	$ 1.95	$ 2.10	$ 2.20	$ 1.95	$ 2.10	$ 2.20	$ 1.95	$ 2.10	$ 2.20	$ 2.62	$ 2.80	$ 2.99
Tier 2	3,001 - 7,000 gallons	2.65	2.80	3.00	2.65	2.80	3.00	2.65	2.80	3.00	3.95	4.25	4.53
Tier 3	7,001 - 10,000 gallons	3.75	4.00	4.25	3.75	4.00	4.25	7.76	8.16	8.50	8.39	9.15	9.52
Tier 4	10,001 - 15,000 gallons	5.85	6.05	6.20	9.44	9.73	9.91	16.11	16.62	16.90	17.40	17.99	18.28
Tier 5	> 15,000 gallons	10.10	10.10	10.10	16.35	16.16	16.15	27.94	27.62	27.60	30.20	29.90	29.85
Irrigation													
Tier 1	0 - 3,000 gallons	$ 3.75	$ 4.00	$ 4.25	$ 3.75	$ 4.00	$ 4.25	$ 7.76	$ 8.16	$ 8.50	$ 8.39	$ 9.04	$ 9.52
Tier 2	3,001 - 7,000 gallons	3.75	4.00	4.25	3.75	4.00	4.25	7.76	8.16	8.50	8.39	9.04	9.52
Tier 3	7,001 - 10,000 gallons	3.75	4.00	4.25	3.75	4.00	4.25	7.76	8.16	8.50	8.39	9.04	9.52
Tier 4	10,001 - 15,000 gallons	5.85	6.05	6.20	9.44	9.73	9.91	16.11	16.62	16.90	17.40	17.99	18.28
Tier 5	> 15,000 gallons	10.10	10.10	10.10	16.35	16.16	16.15	27.94	27.62	27.60	30.20	29.90	29.85
Non-Residential													
Flat Rate		$ 2.70	$ 2.90	$ 3.05	$ 2.86	$ 3.06	$ 3.22	$ 3.12	$ 3.33	$ 3.50	$ 3.74	$ 3.97	$ 4.18
Wholesale													
Flat Rate		$ 2.25	$ 2.40	$ 2.55	$ 2.38	$ 2.53	$ 2.69	$ 2.60	$ 2.76	$ 2.93	$ 3.12	$ 3.29	$ 3.49

Section 8.0 - Enforcement and Penalties

Compliance with the provisions of this Plan is required and authorized by the Ordinance and enforced by personnel of UCPW, independent contractors engaged by UCPW for such purpose, and such other personnel as designated by the County Manager. Enforcement measures and procedures, issuance of violations, and penalties for violation of the water restrictions put in place are further prescribed in the Ordinance. Customers are responsible for any use of water that passes through their service connection. Knowledge of the prevailing restrictions and proper functioning of an automatic Spray irrigation System is the responsibility of the property owner and resident. Any Customer who violates, or permits the violation of, any mandatory water restriction set forth in this Plan or the Ordinance is subject to civil penalties and/or termination of service. Civil penalties for such violations are set forth in the table below. Customers who violate conditions of a variance are also subject to the enforcement penalties.

Stage	Union County Designation	1st Violation	2nd Violation	3rd Violation	4th Violation	5th and Additional Violations
0	Year-Round Water Conservation	Warning	Warning	$250	$500*	$1000*
1	Moderate Water Shortage	Warning	$100	$500	$500*	$1000*
2	Severe Water Shortage	Warning	$200	$500	$500*	$1,000*
3	Extreme Water Shortage	$100	$500	$750	$1000*	$1,500*
4	Exceptional Water Shortage	$200	$500	$1,000	$1,000*	$2,000*

*Includes termination of service

Each day that a violation of a mandatory water restriction occurs or continues to occur after delivery of notice will be considered a separate and distinct violation. Violations will be accumulated by Customers on a calendar year basis for purposes of accrual of civil penalties. The Customer shall remain liable for payment of all civil penalties regardless of when accrued. Violations of any mandatory water use restrictions of any water shortage stage shall accumulate with violations of other stages. Should a Customer move, or cease and renew service, during a calendar year, the Customer's violations shall continue to accumulate as if such move or cessation had not occurred.

Further information and detail regarding enforcement of civil penalties, termination of service, and procedures related thereto are contained in the Ordinance.

Section 9.0 - Appeals

A Customer who receives a notice of violation indicating that the Customer is subject to a civil penalty or the Customer's water service is subject to termination may appeal the violation or pending termination by filing a written notice of appeal in accordance with the procedures and requirements set forth in the Ordinance. The consideration and resolution of all appeals will also be in accordance with the Ordinance.

Section 10.0 - Variances

UCPW is authorized to issue variances in accordance with this Plan and the Ordinance, permitting any Customer satisfying the requirements of this Plan and the Ordinance to use water for a purpose that would otherwise be prohibited by water use restrictions then in effect.

UCPW may issue variances during Stage 0, Stage 1 and Stage 2 provided that each of the following conditions is satisfied: (i) the Customer applies for a variance using forms provided by UCPW; (ii) the Customer pays a variance registration fee in such amount as determined by the Executive Director of Public Works, not to exceed fifty dollars ($50.00); (iii) the application pertains to a new lawn and/or landscape installed incident to new construction, or to newly installed replacement sod, complete reseeding, or natural ground cover within the parameters of an established lawn; (iv) if pertaining to new lawn and/or landscape installed incident to new construction, the Customer applies for a variance either before issuance of a certificate of occupancy or within ninety (90) days after issuance of a certificate of occupancy relative to this new construction; and (v) the Customer submits with the application such supporting documentation as required by UCPW to substantiate that these conditions have been satisfied.

Upon receipt of a variance from UCPW, the Customer may be permitted to water such newly installed lawn and/or landscape, or such newly installed replacement sod, complete reseeding, or natural ground cover, for a period not to exceed forty-five (45) days from the date of issuance of the variance. During the period that the variance is in effect, the Customer shall post signage provided by UCPW to signify the Customer's temporary exempt status from water use restrictions otherwise in effect. The Customer shall post such sign within two (2) feet of the driveway entrance. In any variance issued, UCPW may impose such conditions and restrictions as are appropriate to require that water used from the County water system be minimized to the extent practical.

Variances issued shall terminate upon the earlier occurrence of the following: (i) forty-five (45) days from the date of issuance; or (ii) declaration by the County Manager of a Stage 3 or State 4 Water Shortage. In addition, the County Manager may, upon the recommendation of the Executive Director of Public Works, direct that UCPW cease issuance of new variances in the event it is determined that further issuance will likely result in increased demand that will equal or exceed the treatment and/or transmission capacity of the system or portions thereof.

Any Customer receiving a variance who violates the terms thereof shall be subject to a civil penalty set forth in this Plan and the Ordinance and to revocation of the variance. Any person who has violated the terms of any variance or any mandatory water use restrictions imposed

pursuant to this Plan or the Ordinance may be denied a variance, notwithstanding any provision of this Plan or the Ordinance to the contrary.

Section 11.0- Maintenance of Spray Irrigation Systems

The County recognizes that irrigation systems utilizing water from the County water system should be properly maintained in order to maximize efficiency and prevent waste. Additionally, the County recognizes that such maintenance may occur on days and at such times as would otherwise be prohibited under the Ordinance and this Plan. However, during the period that a Stage 2 or Stage 3 Water Shortage is in effect, an existing Spray Irrigation System may be operated on such days and at such times as would otherwise be prohibited, provided that the requirements for such irrigation system maintenance set forth in the Ordinance are met. The allowance for such operations, issuance of violations and penalties, and appeals are provided for in the Ordinance.

Section 12.0- Plan Evaluation and Effectiveness

The effectiveness of this Plan will be determined by measuring system-wide water use reductions during declared water shortage stages. In addition to water supply and usage, the frequency of implementing water shortage stages within the parameters set forth in the Plan will also be evaluated. If the frequency of implementation of water shortage stages is found to be too great, or if the duration is found to be excessive, then modifications to the Plan, or adjustments to the water supply infrastructure will be considered and proposed. The number of citations issued during a water shortage may also be used to determine if the level and severity of citations is sufficient to achieve the water usage reductions necessary.

All mandatory drought response activities undertaken by the participating members of the Catawba Wateree Drought Management Group, as written in the CW-LIP, will also serve as an expansive and detailed examination of the effectiveness of measures enacted. The table below indicates the potential expected reduction from normal use, or the amount that would otherwise be expected, for each water shortage stage as defined in the CW-LIP in effect as of the adoption date of this Plan.

Water Use Reduction Goals from the CW-LIP

Stage	Percent Reduction Goals
0	
1	3-5%
2	5-10%
3	10-20%
4	30% or more

For the purposes of determining "normal water use", consideration may be given to one or more of the following:

- Historical maximum daily, weekly, and monthly flows during drought conditions.
- Increased customer base (e.g. population growth, service area expansion) since the historical flow comparison.
- Changes in major water users (e.g. industrial shifts) since the historical flow comparison.
- Climatic conditions for the comparison period.
- Changes in water use since the historical flow comparison.
- Other system specific considerations.

The County has implemented a more aggressive approach than the CW-LIP by implementing a year-round, three (3) days per week Spray Irrigation System use schedule (Stage 0 Water Shortage restriction). The reduction goals listed above are compared to unrestricted water use and are not in addition to the reductions expected from year-round water conservation measures.

Section 13.0 - Public Review and Revisions of Plan

This Plan, as well as the Ordinance, will be reviewed and revised as needed to adapt to new circumstances affecting water supply and demand, following implementation of emergency restrictions. Review will be conducted at a minimum of every five years in conjunction with updating the County's Local Water Supply Plan.

Adoption of this Plan, or revisions thereto, will follow the normal processes for approval at a meeting of the Union County Board of Commissioners. The proposed Plan, or revisions thereto, will be publicized in advance on the County's website, as well as be publicized online as part of the meeting agenda at which adoption of this Plan, or revisions thereto, will be considered for

adoption. The public will then have the opportunity to comment on revisions to the Plan through written comment submitted to UCPW or during the public comment period at the Board of Commissioners' meeting.

The public will also have the option to review and comment on the provisions of the Plan at any time. The Plan will be available online through the County's website for the public to view, as well as on file in the Clerk to the Board of Commissioners' office. The public may send comments to the contact person as set forth on the County's website along with this Plan.

Section 14.0 - Effective Date

This Water Shortage Response Plan is effective upon adoption by the Union County Board of Commissioners on this the 4th day of May, 2015.

E

Appendix E

Town of Wingate Water Shortage Response Plan

yadkin
REGIONAL WATER SUPPLY

Water Shortage Response Plan
Town of Wingate, North Carolina
September 20, 2010

The procedures herein are written to reduce potable water demand and supplement existing drinking water supplies whenever existing water supply sources are inadequate to meet current demands for potable water.

I. Authorization

The Wingate Town Administrator shall enact the following water shortage response provisions whenever the trigger conditions outlined in Section IV are met. In his or her absence, the Public Works Director will assume this role.

Mr. Dryw Blanchard
Wingate Town Administrator
Phone: (704) 233-4411
E-mail: admin@wingatenc.com

Mr. James Jones
Town of Wingate Public Works Director
Phone: (704) 233-4042
E-mail: Brower@wingatenc.com

II. Notification

The following notification methods will be used to inform water system employees and customers of a water shortage declaration: employee e-mail announcements, notices at municipal buildings, notices in water bills and on the Town of Wingate website http://wingate.govoffice.com/. Required water shortage response measures will be communicated through PSA announcements on local radio and cable stations, and on the Town of Wingate website. Declaration of emergency water restrictions or water rationing will be communicated to all customers by telephone through use of reverse 911.

III. Levels of Response

Five levels of water shortage response are outlined in the table below. The five levels of water shortage response are: voluntary reductions, mandatory reductions I and II, emergency reductions and water rationing. A detailed description of each response level and corresponding water reduction measures follow below.

Stage	Response	Description
1	Voluntary Reductions	Water users are encouraged to reduce their water use and improve water use efficiency; however, no penalties apply for noncompliance. Water supply conditions indicate a potential for shortage.
2	Mandatory Reductions I	Water users must abide required water use reduction and efficiency measures; penalties apply for noncompliance. Water supply conditions are significantly lower than the seasonal norm and water shortage conditions are expected to persist.
3	Mandatory Reductions II	Same as in Stage 2
4	Emergency Reductions	Water supply conditions are substantially diminished and pose an imminent threat to human health or environmental integrity.
5	Water Rationing	Water supply conditions are substantially diminished and remaining supplies must be allocated to preserve human health and environmental integrity.

In Stage 1, Voluntary Reductions, all water users will be asked to reduce their normal water use by 5%. Customer education and outreach programs will encourage water conservation and efficiency measures including: irrigating landscapes at a minimum of two days per week, a maximum of one inch per week; preventing water waste, runoff and watering impervious surfaces; washing only full loads in clothes and dishwashers; using spring-loaded nozzles on garden hoses; and identifying and repairing all water leaks.

In Stage 2, Mandatory Reductions I, all customers are expected to reduce their water use by 10% in comparison to their previous month's water bill. In addition to continuing to encourage all voluntary reduction actions, the following restrictions apply: irrigation is limited to a half inch per week between 8PM and 8AM one day a week; outdoor use of drinking water for washing impervious surfaces is prohibited; and all testing and training purposes requiring drinking water (e.g. fire protection) will be limited.

In Stage 3, Mandatory Reductions II, customers must continue actions from all previous stages and further reduce water use by 20% compared to their previous month's water bill. All outdoor water use is banned. Prioritize and meet with commercial and industrial large water customers and meet to discuss strategies for water reduction measures including development of an activity schedule and contingency plans. Additionally, in Stage 3, a drought surcharge of 1.5 times the normal water rate applies.

In Stage 4, Emergency Reductions, customers must continue all actions from previous stages and further reduce their water use by 25% compared to their previous month's

water bill. A ban on all use of drinking water except to protect public health and safety is implemented and drought surcharges increase to 2 times the normal water rate.

The goal of Stage 5, Water Rationing, is to provide drinking water to protect public health (e.g. residences, residential health care facilities and correctional facilities). In Stage 5, all customers are only permitted to use water at the minimum required for public health protection. Firefighting is the only allowable outdoor water use and pickup locations for distributing potable water will be announced according to Wingate's Emergency Response Plan. Drought surcharges increase to 5 times the normal water rate.

IV. Triggers

Wingate is provided water solely by purchase from the Union County. When Union County declares a water shortage Wingate is required to do so as well. During this time Wingate Public Works Director will stay in close contact with Union County and follow their triggers.

Return to Normal

When water shortage conditions have abated and the situation is returning to normal, water conservation measures employed during each phase should be decreased in reverse order of implementation. Permanent measures directed toward long-term monitoring and conservation should be implemented or continued so that the community will be in a better position to prevent shortages and respond to recurring water shortage conditions.

V. Enforcement

The provisions of the water shortage response plan will be enforced by Town of Wingate Public Works department and police personnel. Violators may be reported to the Town's phone line or the e-mail contact listed on the town's website. Citations are assessed according to the following schedule depending on the number of prior violations and current level of water shortage.

Water Shortage Level	First Violation	Second Violation	Third Violation
Voluntary Reductions	N/A	N/A	N/A
Mandatory Reductions (Stages 2 and 3)	Warning	$250	Discontinuation of Service
Emergency Reductions	$250	Discontinuation of Service	Discontinuation of Service
Water Rationing	$500	Discontinuation of Service	Discontinuation of Service

Drought surcharge rates are effective in Stages 3, 4 and 5.

VI. Public Comment

Customers will have multiple opportunities to comment on the provisions of the water shortage response plan. First, a draft plan will be will be available at Town Hall for customers to view. A notice will be included in customer water bill notifying them of such. Also a draft plan will be published on the Town of Wingate website. Notice will be printed in all customer water bills to collect comments on the draft. All subsequent revisions to the draft plan will be published at least 30 days prior to an adoption vote by Wingate's Town Commissioners.

VII. Variance Protocols

Applications for water use variance requests are available from the Town of Wingate website and Town Public Works Office. All applications must be submitted to the Public Works Office for review by the Public Works Director or his or her designee. A decision to approve or deny individual variance requests will be determined within two weeks of submittal after careful consideration of the following criteria: impact on water demand, expected duration, alternative source options, social and economic importance, purpose (i.e. necessary use of drinking water) and the prevention of structural damage.

VIII. Effectiveness

The effectiveness of the Wingate water shortage response plan will be determined by comparing the stated water conservation goals with observed water use reduction data. Other factors to be considered include frequency of plan activation, any problem periods without activation, total number of violation citations, desired reductions attained and evaluation of demand reductions compared to the previous year's seasonal data.

IX. Revision

The water shortage response plan will be reviewed and revised as needed to adapt to new circumstances affecting water supply and demand, following implementation of emergency restrictions, and at a minimum of every five years in conjunction with the updating of our Local Water Supply Plan. Further, a water shortage response planning work group will review procedures following each emergency or rationing stage to recommend any necessary improvements to the plan to Wingate's Town Commissioners. The Town of Wingate Public Works Director is responsible for initiating all subsequent revisions.

F

Appendix F

Mandatory Reduction Calculations

yadkin
REGIONAL WATER SUPPLY

3-Year Total

Year	Total Volume in Gallons (May - November)				
	Residential Tier 3	Residential Tier 4	Residential Tier 5	All Irrigation Meters	Total Basin Usage
2016	52,617,200	38,975,500	34,788,300	46,565,500	1,131,664,200
2017	47,080,100	30,079,900	25,414,000	101,271,600	1,342,360,500
2018	46,293,767	30,746,267	27,873,500	56,515,200	1,098,068,200
3-Year Total	**145,991,067**	**99,801,667**	**88,075,800**	**204,352,300**	**3,572,092,900**

	% Reduction	Mandatory Max During Drought (MGD)
Stage 0	0%	23.00
Stage 1	2.5%	22.43
Stage 2	5.0%	21.85
Stage 3	10.0%	20.70
Stage 4	15.0%	19.55

Total Outdoor Usage = **538,220,833**

Total Basin Usage = **3,572,092,900**

Outdoor usage as percent of total summer usage over 3 years = 15%

Assumptions

Stage 4 Reduction = 100% of outdoor usage
Stage 3 Reduction = 2/3 of Stage 4
Stage 2 Reduction - 1/3 of Stage 4
Stage 1 Reduction - 1/2 of Stage 2